UNIVERSITY OF THE PHILIPPINES MANILA
COLLEGE OF ARTS AND SCIENCES
DEPARTMENT OF PHYSICAL SCIENCES AND MATHEMATICS

An Online Enzyme Subfamily Class Prediction Application with Tutorial Module

A Special Problem
in Partial Fulfillment of
the Requirements for the Degree of
Bachelor of Sciences in Computer Science

Submitted by:

Anna Lisa R. Solis
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Introduction

A. Background of the Study

A protein is a complex, high molecular weight organic compound. They are consists of amino acids and joined by peptide bonds. Proteins are important to the structure and function of all living cells and viruses. Many proteins are enzymes or subunits of enzymes [1].

An enzyme is a biopolymer that catalyzes or speeds up a chemical reaction. Most enzymes are proteins; nonetheless RNA and DNA are also known to carry out catalysis. To sustain life enyzmes are essential. This is because with the absence of enzymes, most chemical reactions in biological cells would occur too slowly or would lead to different products. A malfunction (mutation, overproduction, underproduction or deletion) of a single enzyme that is critical can lead to severe diseases [2].

Enzymes are mainly classified into six families based on their EC (Enzyme Commission) numbers,: (1) oxidoreductases, catalyzing oxidoreduction reactions; (2) transferases, transferring a group from one compound to another; (3) hydrolases, catalyzing the hydrolysis of various bonds; (4) lyases, cleaving *C–C*, *C–O*, *C–N* and other bonds by means other than hydrolysis or oxidation; (5) isomerases, catalyzing geometrical or structural changes within one molecule; and (6) ligases, catalyzing the joining together of two molecules coupled with the hydrolysis of a pyrophosphate bond in ATP or a similar triphosphate. Each of these families has its own subfamilies, and sub-subfamilies [3].

Biochemical analysis of eukaryotic and prokaryotic genomes or microarray chips are ussually used to determine the classes of newly found enzyme sequences. These experimental methods are both time-consuming and expensive [4].

B. Statement of the Problem

The protein sequences are entering into databanks at an explosive pace. Because of this, the early determination of the family or subfamily class for a newly found enzyme molecule becomes important. This is because enzyme family or subfamily is directly related to the detailed information about which specific target it acts on, as well as to its catalytic process and biological function. Unfortunately, it is both slow and expensive to do this by experiments only[3].

The covariant-discriminant algorithm was used by other studies to identify the subfamily classes of oxidoreductases. The entire prediction process was based only on the amino acid composition. The amino acid composition of a protein is composed of 20 components. These components represent the occurrence frequencies of the 20 native amino acids in the enzyme. Obviously, if a protein sample is represented by its amino acid composition alone, all the details about its sequence order and sequence length are totally lost. Including all the details of its sequence order and length can be improved this. Therefore, the sample of a protein must be represented by its entire sequence [3].

Because of the rapid sequence generation now prevailing, it has become vitally important to develop an automated and fast method to deal with classification of new proteins as an enzyme and its family class

Objectives of the Study

To produce an online "Enzyme Subfamily Class Prediction Application" that is able to:

1) provide a module that
    a) allows the user to input the sequence of an enzyme through text file

b) classify to which enzyme subfamily class does it belong using amphiphilic pseudo amino acid composition through the following:

- verify the conventional amino acid composition
- identify the sequence correlation factors with different ranks of coupling through the hydrophobicity and hydrophilicity of the constituent amino acids along the sequence of the protein.
- perform augmented covariant-discriminant algorithm

2) provide the user with online tutorials on enzyme subfamily class prediction that:

a) allows the user to view lectures on enzyme families and enzyme subfamily classes prediction

b) contains online exams based on the lectures that the users can take to test their knowledge of the material

3) allows the instructor/sysad/expert to:

a) update lectures and exam questions on the tutorial website

b) modify his password

Significance of the Study

The arrangement of hydrophobicity and hydrophilicity of the amino acid residues along a protein chain plays a very important role in its folding. It is also connected to the enzyme's interaction with other molecules and catalytic mechanism. The different types of proteins will have different amphiphilic features, corresponding to different hydrophobic and hydrophilic sequence-order patterns [3].

Determining to which family and subfamily class an enzyme belongs is important because "they may help deduce the mechanism and specificity of the query protein, providing clues to the relevant biological function" [4].

Since this application has a tutorial portion, it can be used as a teaching supplement in molecular biology, to facilitate understanding of enzyme subfamily class prediction.

E. Scope and Limitation

1. Exam questions are limited to multiple-choice type only. The exam scores are not stored in the database because the exams are to be regarded as self-tests.

2. The type of file is limited to a text file. Keyboard entry is not permitted due to long string length of the enzyme.

3. The classification of enzymes is based on the Enzyme Commission Number.

4. The system does not include the verification of the enzyme subfamily class prediction in the wet laboratory.

5. The application includes only the 16 subfamilies in family oxidoreductases.

F. Assumptions

1. The instructor in charge of updating lectures and exams is an expert in molecular biology.

2. The input text file containing the sequence of an enzyme is assumed to be correct.

II. Review of Related Literature

According to Yu-Dong Cai and Kuo-Chen Chou "the amino acid composition consists of only 20 components, representing the occurrence frequency of each of the 20 native amino acids in a given protein and corresponding to a 20-dimensional (20D) vector. Obviously, if it is used to represent a protein, all the sequence-order and sequence-length effects would be totally missed out and the prediction method underlain with such a basis must bear a considerable intrinsic limitation. To improve such a situation, a novel concept, the so-called pseudo-amino acid composition (Chou, 2001) was proposed and a remarkable improvement in prediction quality was observed."[5]

From the paper, "Weighted-Support Vector Machines for Predicting Membrane Protein Types Based on Pseudo Amino Acid Composition ", stimulated by the concept of using the pseudo-amino-acid composition to incorporate the sequence-order effects, the spectral analysis technique is introduced to represent the statistical sample of a protein.[6]

On predicting enzyme family class in a hybridization space,_**Kuo-Chen Chou and Yu-Dong Cai** mentioned that by hybridizing the gene ontology and pseudo-amino-acid composition, they have introduced a new method that is called GO-PseAA predictor and operate it in a hybridization space. [7]

From the study of Chou and Maggiora, the results showed that "using both resubstitution and jackknife tests indicated that the overall rates of correct prediction by an algorithm incorporating the coupling effect among different amino acid components were significantly higher than those by the algorithms that did not include such an effect."[8]

Kuo-Chen Chou and Yu-Dong Cai said that "situated in a heteropolar environment, the six types of membrane proteins must have quite different amphiphilic sequence-order patterns in order to stabilize their respective frameworks [9]. To incorporate such a feature into the predictor, the amphiphilic pseudo amino acid composition has been formulated that contains a series of hydrophobic and hydrophilic correlation factors."

Klein P. stated in his study that "Protein structural class--alpha, beta, mixed (alpha/beta or alpha + beta), irregular--can be predicted from the amino acid sequence by discriminant analysis. Discrimination is based on distributions, in the classes, of vectors of attributes characterizing the sequences."[10]

According to **Chou KC** and **Elrod DW** "although predicting enzyme family classes is an extremely complicated problem and involve the knowledge of 3-dimensional structure as well as many other physical chemistry factors, some quite promising results have been obtained indicating that the family or subfamily of an enzyme is predictable to a considerable degree by means of sequence-based approach."[4]

"Based on a classification scheme that has covered almost all the organelles and subcellular compartments in an animal or plant cell, a covariant discriminant algorithm was proposed" by Chou KC and Elrod DW "to predict the subcellular location of a query protein according to its amino acid composition."[11]

According to Chou KC and Zhang CT the novel algorithm used to predict the structural class of a protein "is characterized by a covariance matrix that takes into account the coupling effect among different amino acid components of a protein."[12]

According to Kuo-Chen Chou's and Chun-Ting Zhang's study "a new method has been developed in which the similarity between two protein molecules is based on the scale of Mahalanobis distance rather than on the ordinary intuitive geometric distances, such as Minkowski's distance and Euclidian distance." They also stated that "by introducing the Mahalanobis distance, the correlative effect among different amino acids can be automatically incorporated."[13]

III. Theoretical Framework

A. Bioinformatics

The National Center for Biotechnology Information (NCBI 2001) defines bioinformatics as "the field of science in which biology, computer science, and information technology merge into a single discipline" [14]. It is the use of mathematical and informational techniques, including statistics, to solve biological problems [15].

Bioinformatics is "conceptualizing biology in terms of molecules (in the sense of Physical chemistry) and applying 'informatics techniques' (derived from disciplines such as applied mathematics, computer science and statistics) to understand and organize the information associated with these molecules, on a large scale" [14].

Bioinformatics is the science of developing computer databases and algorithms to speed up and enhance biological research [16]. The three important sub-disciplines within bioinformatics are as follows: the development of new algorithms and statistics with which to assess relationships among members of large data sets; the analysis and interpretation of various types of data including nucleotide and amino acid sequences, protein domains, and protein structures; and the development and implementation of tools that enable efficient access and management of different types of information [14].

B. Enzyme Family

Enzymes are proteins produced by all living organisms, and, like all proteins, they consist of amino acids [17]. By definition, enzymes are "catalysts that make many essential biochemical reactions 'happen' and are not used up or chemically altered in the process". Like all catalysts, enzymes accelerate the rates of reactions while experiencing no

permanent chemical modification as a result of their participation. Enzymes can accelerate, often by several orders of magnitude, reactions that under the mild conditions of cellular concentrations, temperature, *p*H, and pressure would proceed imperceptibly (or not at all) in the absence of the enzyme [15].

The enzymes work by lowering the activation energy of whatever reaction the specific enzyme is to catalyze. Each enzyme is entirely specific to the reactants; it will only work for one specific reaction. This is due to the unique active site of the enzyme. The enzymes active site is in a unique 3D shape, here the specific substrates, the substances upon which the enzyme works, are temporarily combined with the enzyme, forming an enzyme substrate complex, or ESC, the reaction then occurs, and the product of the reaction separates from the enzyme, at which point it may be used. The enzyme is then capable of repeating the reaction many thousands of times, although they do have to be replaced energy so often [18].

There are approximately 3000 enzymes which have been characterized. These are grouped into six main classes according to the type of reaction catalyzed [19]. The names of enzymes, both common and systematic, are controlled by the *Enzyme Commission*. The common name is often derived by simply adding the suffix '*-ase'* to the name of the substrate upon which it works [20]. The six main classes of enzymes are as follows: [19]

1. Oxidoreductases- These are enzymes that catalyze oxidations or reductions. Enzymes such as dehydrogenases, oxidases and peroxidases. Oxidoreductases are classified as **EC 1** in the EC number classification of enzymes. Oxidoreductases can be further classified into 16 subclasses:

- EC 1.1 includes oxidoreductases that act on the CH-OH group of donors

- EC 1.2 includes oxidoreductases that act on the aldehyde or oxo group of donors
- EC 1.3 includes oxidoreductases that act on the CH-CH group of donors
- EC 1.4 includes oxidoreductases that act on the CH-NH_2 group of donors
- EC 1.5 includes oxidoreductases that act on CH-NH group of donors
- EC 1.6 includes oxidoreductases that act on NADH or NADPH
- EC 1.7 includes oxidoreductases that act on other nitrogenous compounds as donors
- EC 1.8 includes oxidoreductases that act on a sulfur group of donors
- EC 1.9 includes oxidoreductases that act on a heme group of donors
- EC 1.10 includes oxidoreductases that act on diphenols and related substances as donors
- EC 1.11 includes oxidoreductases that act on peroxide as an acceptor (peroxidases)
- EC 1.12 includes oxidoreductases that act on single donors with incorporation of molecular oxygen (oxygenases)
- EC 1.13 includes oxidoreductases that act on paired donors with incorporation of molecular oxygen
- EC 1.14 includes oxidoreductases that act on superoxide radicals as acceptors
- EC 1.15 includes oxidoreductases that act on CH or CH_2 groups
- EC 1.16 includes oxidoreductases that act on iron-sulfur proteins as donors

2. Transferases- These enzymes catalyze the transfer of a group from one molecule to another. Examples such as Phosphatases, transaminases, and transmethylases. Transferases are classified as **EC 2** in the EC number classification. Transferases can be further classified into nine subclasses:

- EC 2.1 includes enzymes that transfer one-carbon groups
- EC 2.2 includes enzymes that transfer aldehyde or ketone groups
- EC 2.3 includes acyltransferases

- EC 2.4 includes glycosyltransferases
- EC 2.5 includes enzymes that transfer alkyl or aryl groups, other than methyl groups
- EC 2.6 includes enzymes that transfer nitrogenous groups
- EC 2.7 includes enzymes that transfer phosphorus-containing groups
- EC 2.8 includes enzymes that transfer sulfur-containing groups
- EC 2.9 includes enzymes that transfer selenium-containing groups

3. Hydrolases-These enzymes catalyze hydrolysis reactions. Examples are the digestive enzymes such as sucrase, amylase, maltase, and lactase. Hydrolases are classified as **EC 3** in the EC number classification of enzymes. Hydrolases can be further classified into four subclasses:

- EC 3.1 includes hydrolases that act on ester bonds
- EC 3.2 includes hydrolases that act on sugars (glycosylases)
- EC 3.3 includes hydrolases that act on ether bonds
- EC 3.4 includes hydrolases that act on peptide bonds (peptidases)

4. Lyases- These enzymes catalyze the removal of groups in non-aqueous media. An example would be the decarboxylases. Lysases are classified as **EC 4** in the EC number classification of enzymes. Lyases can be further classified into seven subclasses:

- EC 4.1 includes lyases that cleave carbon-carbon bonds, such as decarboxylases
- EC 4.2 includes lyases that cleave carbon-oxygen bonds, such as dehydratases
- EC 4.3 includes lyases that cleave carbon-nitrogen bonds
- EC 4.4 includes lyases that cleave carbon-sulfur bonds
- EC 4.5 includes lyases that cleave carbon-halide bonds
- EC 4.6 includes lyases that cleave phosphorus-oxygen bonds, such as adenylate cyclase

- EC 4.99 includes other lyases

5. Isomerases- Enzymes that catalyze the isomerization of molecules. Examples are racemases, and cis-trans isomerases. Isomerases are classified as **EC 5** in the EC number classification of enzymes. Isomerases can be further classified into six subclasses:

- EC 5.1 includes enzymes that catalyze racemization (racemases) and epimerization (epimerases)
- EC 5.2 includes enzymes that catalyze the isomerization of geometric isomers (cis-trans isomerases)
- EC 5.3 includes intramolecular oxidoreductases
- EC 5.4 includes intramolecular transferases (mutases)
- EC 5.5 includes intramolecular lyases [
- EC 5.99 includes other isomerases

6. Ligases- These are also called synthetases which are enzymes that catalyze condensation reactions where smaller molecules are connected with the resulting removal of a water molecule. This is accompanied with the formation of a high energy Phosphate link that stores energy. An example would be the amino acid RNA ligases. Ligases are classified as **EC 6** in the EC number classification of enzymes. Ligases can be further classified into six subclasses:

- EC 6.1 includes ligases used to form carbon-oxygen bonds
- EC 6.2 includes ligases used to form carbon-sulfur bonds
- EC 6.3 includes ligases used to form carbon-nitrogen bonds
- EC 6.4 includes ligases used to form carbon-carbon bonds
- EC 6.5 includes ligases used to form phosphoric ester bonds
- EC 6.6 includes ligases used to form nitrogen-metal bonds

C. Amphiphilic Pseudo Amino Acid Composition [3]

There are two ways to represent the sample of a protein: the discrete form and the sequential form. A protein in discrete form corresponds to a set of discrete numbers or a multiple dimension vector. This form is easy to deal with in statistical prediction but it is hard to directly incorporate the sequence-order information. The sequential form, on the other hand, is characterized by a series of amino acids according to the order of their positions in the protein chain. This form can reflect all the information about the sequence order length of a protein. However, it is difficult to use in statistics since it involves an almost infinitive number of possible patterns.

A protein sequence is usually represented by a series of amino acid codes. Suppose a protein P with sequence of *L* amino acid residues: $R_1R_2R_3R_4R_5R_6R_7…R$, where R_1 represents the residue of chain position 1, R2 the residue at position 2, and so forth. To solve this dilemma, the amphiphilic pseudo amino acid composition was introduced. Here, the hydrophilicity and hydrophobicity values (shown in Table 1) are assigned to these codes in order to best translate the sequence-order information into a series of numbers for the discrete form representation.

Amino Acid	3-Letter Code	1-Letter Code	Molecular Weight†	Hydrophobicity	Hydrophilicity
Alanine	Ala	A	89.09	0.616	-0.5
Cysteine	Cys	C	121.16	0.680	-1.0
Aspartate	Asp	D	133.10	0.028	+3.0
Glutamate	Glu	E	147.13	0.043	+3.0
Phenylalanine	Phe	F	165.19	1.00	-2.5
Glycine	Gly	G	75.07	0.501	0
Histidine	His	H	155.16	0.165	-0.5
Isoleucine	Ile	I	131.18	0.943	-1.8
Lysine	Lys	K	146.19	0.283	+3.0
Leucine	Leu	L	131.18	0.943	-1.8
Methionine	Met	M	149.21	0.738	-1.3
Asparagine	Asn	N	132.12	0.236	+0.2
Proline	Pro	P	115.13	0.711	-0.5
Glutamine	Gln	Q	146.15	0.251	+0.2
Arginine	Arg	R	174.20	0.000	+3.0
Serine	Ser	S	105.09	0.359	+0.3
Threonine	The	T	119.12	0.450	-0.4
Valine	Val	V	117.15	0.825	-1.5
Tryptophan	Trp	W	204.23	0.878	-3.4
Tyrosine	Tyr	Y	181.19	0.880	-2.3

Table 1. AMINO ACID HYDROPHOBICITY AND HYDROPHILICITY VALUES

Before substituting the values of hydrophobicity and hydrophilicity, they are first converted using the following equation:

Equation 1

$$h^1(\mathrm{R}_i) = \frac{h_0^1(\mathrm{R}_i) - \sum_{k=1}^{20} h_0^1(\mathbb{R}_k)/20}{\sqrt{\sum_{u=1}^{20}\left[h_0^1(\mathbb{R}_u) - \sum_{k=1}^{20} h_0^1(\mathbb{R}_k)/20\right]^2/20}},$$
$$h^2(\mathrm{R}_i) = \frac{h_0^2(\mathrm{R}_i) - \sum_{k=1}^{20} h_0^2(\mathbb{R}_k)/20}{\sqrt{\sum_{u=1}^{20}\left[h_0^2(\mathbb{R}_u) - \sum_{k=1}^{20} h_0^2(\mathbb{R}_k)/20\right]^2/20}},$$

where we use the $\mathbb{R}_i$ (i = 1,2,...,20) to represent the 20 native amino acids according to the alphabetical order of their single-letter codes: A, C, D, E, F, G, H, I, K, L, M, N, P, Q, R, S, T, V, W and Y. The symbols h_0^1 and h_0^2 represent the original hydrophobicity and hydrophilicity values of the amino acid in the brackets right after the symbols.

These values are used to compute the hydrophobicity and hydrophilicity correlation functions given by:

Equation 2

$$H_{i,j}^1 = h^1(\mathrm{R}_i) \cdot h^1(\mathrm{R}_j),$$
$$H_{i,j}^2 = h^2(\mathrm{R}_i) \cdot h^2(\mathrm{R}_j),$$

The sequence-order information can be indirectly and partially reflected through the following equations:

Equation 3

$$\begin{cases} \tau_1 = \frac{1}{L-1}\sum_{i=1}^{L-1} H_{i,i+1}^1 \\ \tau_2 = \frac{1}{L-1}\sum_{i=1}^{L-1} H_{i,i+1}^2 \\ \tau_3 = \frac{1}{L-2}\sum_{i=1}^{L-2} H_{i,i+2}^1 \\ \tau_4 = \frac{1}{L-2}\sum_{i=1}^{L-2} H_{i,i+2}^2, \lambda < L, \\ \cdots\cdots\cdots\cdots \\ \tau_{2\lambda-1} = \frac{1}{L-\lambda}\sum_{i=1}^{L-\lambda} H_{i,i+\lambda}^1 \\ \tau_{2\lambda} = \frac{1}{L-\lambda}\sum_{i=1}^{L-\lambda} H_{i,i+\lambda}^2 \end{cases}$$

where $H^1_{i,j}$ and $H^2_{i,j}$ are the hydrophobicity and hydrophilicity correlation functions obtained from equation 2. τ_1 and τ_2 are called the first-tier correlation factors that reflect the sequence-order correlations between all the most contiguous residues along a protein chain through hydrophobicity and hydrophilicity, respectively (Figure 1, a1 and a2); τ_3 and τ_4 are the corresponding second-tier correlation factors that reflect the sequence-order correlation between all the second-most contiguous residues (Figure 1, b1 and b2); and so forth.

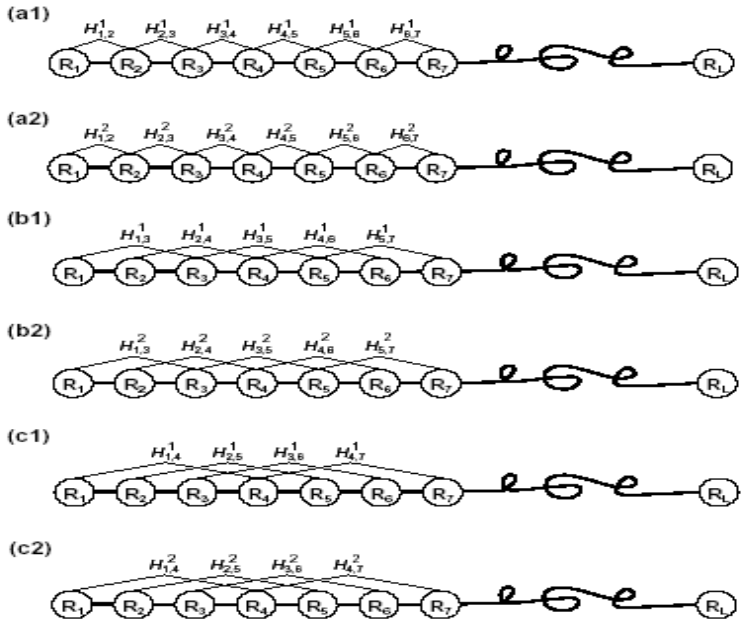

Figure 1. Sequence Order Coupling Mode

By merging the 2λ amphiphilic correlation factors into the classical amino acid composition, we obtain an augmented discrete form to represent a protein sample as follows:

Equation 4

$$\mathbf{P} = \begin{bmatrix} p_1 \\ \vdots \\ p_{20} \\ p_{20+1} \\ \vdots \\ p_{20+\lambda} \\ p_{20+\lambda+1} \\ \vdots \\ p_{20+2\lambda} \end{bmatrix},$$

Where

Equation 5

$$p_u = \begin{cases} \frac{f_u}{\sum_{i=1}^{20} f_i + w\sum_{j=1}^{2\lambda}\tau_j}, & 1 \le u \le 20, \\ \frac{w\tau_u}{\sum_{i=1}^{20} f_i + w\sum_{j=1}^{2\lambda}\tau_j}, & 20 + 1 \le u \le 20 + 2\lambda, \end{cases}$$

where f_i (i = 1,2,...,20) are the normalized occurrence frequencies of the 20 native amino acids in the protein P, τ_j the j-tier sequence-correlation factor computed according to (3), and $w=0.5$ the weight factor.

D. Augmented Covariant-Discriminant Predictor [3]

Given the amphiphilic pseudo amino acid composition of the k[th] enzyme in class m represented by

Equation 6

$$\mathrm{P}_k^m = \begin{bmatrix} p_{k,1}^m \\ \vdots \\ p_{k,20}^m \\ p_{k,20+1}^m \\ \vdots \\ p_{k,20+\lambda}^m \\ p_{k,20+\lambda+1}^m \\ \vdots \\ p_{k,20+2\lambda}^m \end{bmatrix}, k = 1, 2, \ldots, n_m; m = 1, 2, \ldots, \mathcal{M},$$

where $p_{k,1}^m, p_{k,2}^m, \ldots, p_{k,20}^m$ are the amino acid compositions for the k-th enzyme of class m, $p_{k,20+\lambda}^m, p_{k,20+\lambda+1}^m, \ldots, p_{k,20+2\lambda}^m$ the sequence correlation factors of the same enzyme and n_m the total number of enzymes in class m, the standard vector for class m is defined as follows:

Equation 7

$$\overline{\mathrm{P}}^m = \begin{bmatrix} \overline{p}_1^m \\ \vdots \\ \overline{p}_{20}^m \\ \overline{p}_{20+1}^m \\ \vdots \\ \overline{p}_{20+\lambda}^m \\ \overline{p}_{20+\lambda+1}^m \\ \vdots \\ \overline{p}_{20+2\lambda}^m \end{bmatrix}, m = 1, 2, \ldots, \mathcal{M},$$

where

$$\overline{p}_i^m = \frac{1}{n_m}\sum_{k=1}^{n_m} p_{k,i}^m, i = 1, 2, \ldots, 20 + 2\lambda.$$

Equation 8

Suppose **P** is a query enzyme whose subfamily is to be identified. The difference between the query enzyme **P** and the norm of class *m* is measured by the following covariant discriminant function:

$$\Delta(\mathrm{P}, \overline{\mathrm{P}}^{m}) = D^2_{\mathrm{M}}(\mathrm{P}, \overline{\mathrm{P}}^{m}) + ln|\mathrm{S}^{m}|, m = 1, 2, \ldots, \mathcal{M},$$

Equation 9

where

Equation 10

$$D^2_{\mathrm{M}}(\mathrm{P}, \overline{\mathrm{P}}^{m}) = (\mathrm{P} - \overline{\mathrm{P}}^{m})^{\mathrm{T}} \mathrm{S}_{m}^{-1}(\mathrm{P} - \overline{\mathrm{P}}^{m}$$

is the squared Mahalanobis distance, **T** is the transposition operator, while $|\mathbf{S}^{m}|$ and S_{m}^{-1} are the determinant and inverse matrix respectively, of $\mathbf{S}_{m}$. The latter is the covariance matrix for class *m* and defined by

Equation 11

$$\mathrm{S}_{m} = \begin{bmatrix} s^m_{1,1} & s^m_{1,2} & \cdots & s^m_{1,20+2\lambda} \\ s^m_{2,1} & s^m_{2,2} & \cdots & s^m_{2,20+2\lambda} \\ \vdots & \vdots & \ddots & \vdots \\ s^m_{20+2\lambda,1} & s^m_{20+2\lambda,2} & \cdots & s^m_{20+2\lambda,20+2\lambda} \end{bmatrix},$$

where the matrix elements are given by

$$s^m_{i,j} = \frac{1}{n_m - 1} \sum_{k=1}^{n_m} [p^m_{k,i} - \overline{p}^m_i][p^m_{k,j} - \overline{p}^m_j],$$

Equation 12

$$i, j = 1, 2, \ldots, 20 + 2\lambda.$$

According to the principle of similarity, the smaller the difference between the query enzyme **P** and the norm of class *m*, the higher the probability that enzyme **P** belongs to class *m*. Accordingly, the identification rule can be formulated as follows:

Equation 13

$$\Delta(\mathrm{E}, \overline{\mathrm{E}}^{\mu}) = Min\left\{\Delta(\mathrm{E}, \overline{\mathrm{E}}^{1}), \Delta(\mathrm{E}, \overline{\mathrm{E}}^{2}), \ldots, \Delta(\mathrm{E}, \overline{\mathrm{E}}^{\mathcal{M}})\right\},$$

where μ can be 1, 2, 3, ..., or $\mathcal{M}$, and the operator **Min** means taking the minimal one among those in the brackets. The value of the superscript μ derived from Equation (13) indicates to which class the query enzyme **P** belongs.

E. Databases

A database management system, or DBMS, gives the user access to their data and helps them transform the data into information. Such database management systems include dBase, Paradox, IMS, and Oracle. These systems allow users to create, update, and extract information from their databases [21]. Compared to a manual filing system, the biggest advantages to a computerized database system are speed, accuracy, and accessibility.

A relational database is one in which the data consists of a collection of tables related to each other through common values [22]. It stores all its data inside tables, and nothing more. All operations on data are done on the tables themselves or produces other tables as the result. The tables are sets, which are themselves sets of rows and columns. You can

view the database itself as a set of tables [23]. All data which is stored in and retrieved from a relational database is cast in the form of relations [24].

F. Definition of Terms

Hydrophobicity- the property of being water-repellent; tending to repel and not absorb water [25].

Hydrophilicity- having a strong affinity for water; tending to dissolve in, mix with, or be wetted by water [25].

EC numbers (**Enzyme Commission numbers**) - a numerical classification scheme for enzymes, based on the chemical reactions they catalyze. As a system of enzyme nomenclature, every EC number is associated with a recommended name for the respective enzyme [26].

Amphiphilic - denotes a molecule combining hydrophilic and lipophilic (hydrophobic) properties [27].

IV. Design and Implementation

A. Entity Relation Diagram

Figure 2 represents the overall relationships between sysad, lectures, and questions entities.

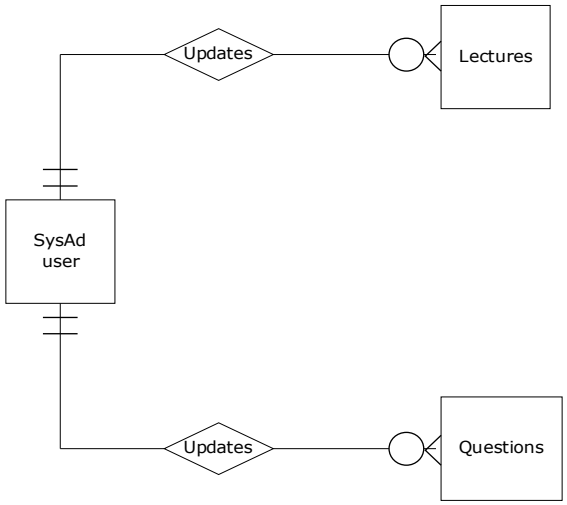

Figure 2. Entity-Relationship Diagram, *Enzyme Subfamily Class Prediction Application.*

The sysad entity in figure 3 represents users who have been given privilege to add lectures and test questions to the application. The lectures entity in figure 4 denotes lectures that are added to the application by sysad. Questions are test questions stored in the application database (Figure 5).

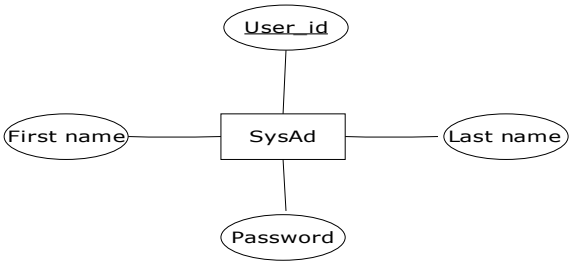

Figure 3. Sysad Entity with Attributes, *Enzyme Subfamily Class Prediction Application.*

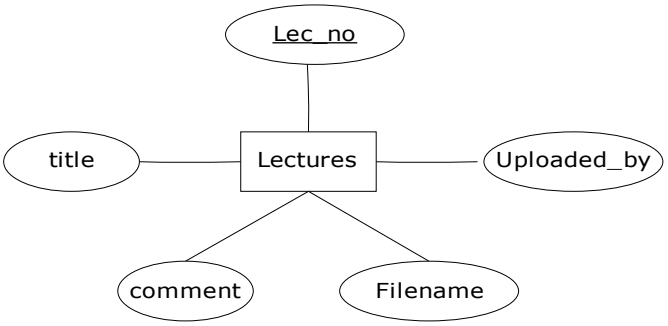

Figure 4. Lectures Entity with Attributes, *Enzyme Subfamily Class Prediction Application.*

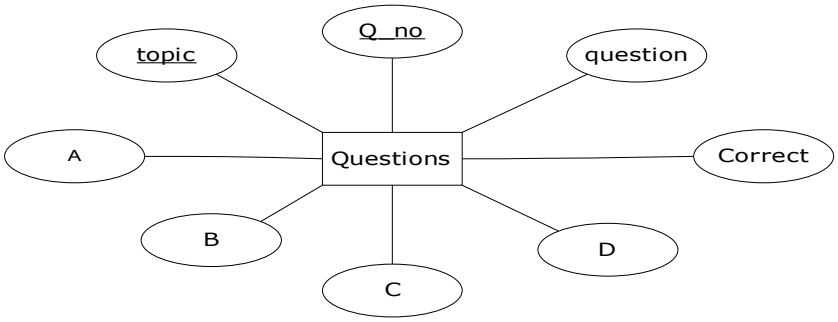

Figure 5. Question Entity with Attributes, *Enzyme Subfamily Class Prediction Application.*

The sequence entity in figure 6 represents the files containing the enzyme sequence to be predicted.

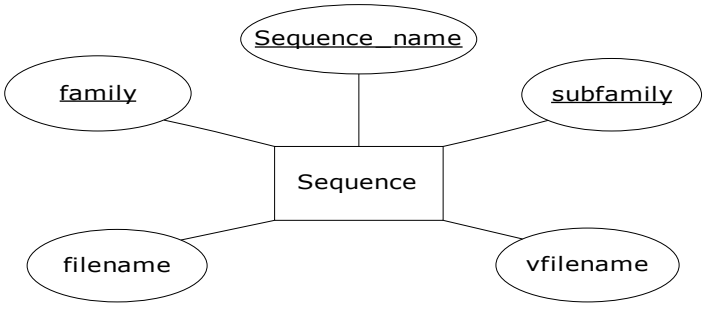

Figure 6. Sequence Entity with Attributes, *Enzyme Subfamily Class Prediction Application.*

B. Data Dictionary

The following tables show how the different entities are represented as tables in the application's database.

Sysad- table that stores "sysad/instructor" user accounts

Field name	Data type	Description
user_id	varchar(50)	Unique account id
Password	varchar(100)	Password associated with a user_id
Firstname	varchar(50)	Sysad/instructor's first name
Lastname	varchar(50)	Sysad/instructor's lastname

Lecture –table that stores uploaded lectures about enzyme subfamily prediction

Field name	Data type	Description
Lec_no	Int	Unique identifier for a lecture
Title	varchar(100)	Unique name for the lecture
uploaded_by	varchar(50)	User_id of sysad who uploaded the lecture
Filename	varchar(100)	Name associated with this document
Comment	varchar(100)	Additional notes or comments on the lecture

Questions –table that stores exam questions and choices

Field name	Data type	Description
q_no	Int	Unique identifier for a question
Topic	varchar(100)	The topic of the exam
Question	Varchar(255)	Question
A	varchar(50)	Choice letter a for this question
B	varchar(50)	Choice letter b for this question
C	varchar(50)	Choice letter c for this question
D	varchar(50)	Choice letter d for this question
Correct	char(1)	The letter of the correct answer

Sequence – table that stores the text files containing the sequence of the enzyme.

Field name	Data type	Description
sequence_name	varchar(100)	Unique name for the sequence
Family	Varchar(100)	Family where the enzyme belong
Subfamily	Varchar(100)	Subfamily where this enzyme belong
Filename	varchar(100)	Name associated with this document
Vfilename	Varchar(100)	Name associated with the discrete form of the sequence

C. Context Diagram

The Context Diagram in Figure 7 represents the overall interactions between the users and the application.

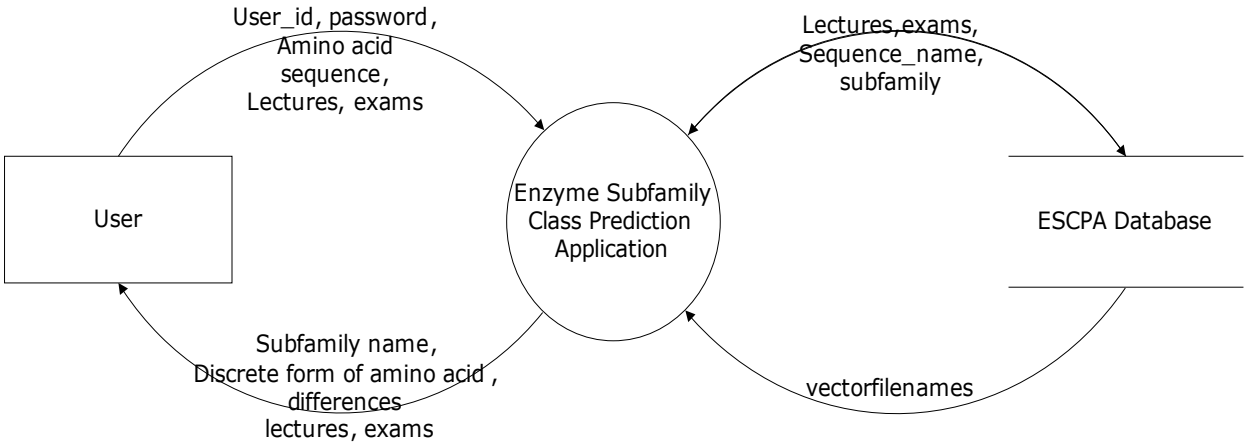

Figure 7. Context Diagram for the Application, *Enzyme Subfamily Class Prediction Application.*

D. Data Flow Diagram

The user interacts with the application by entering the file of the enzyme sequence to be predicted, accessing the study material in the tutorial, or (for users with sysad account) updating the study material (See figure 8).

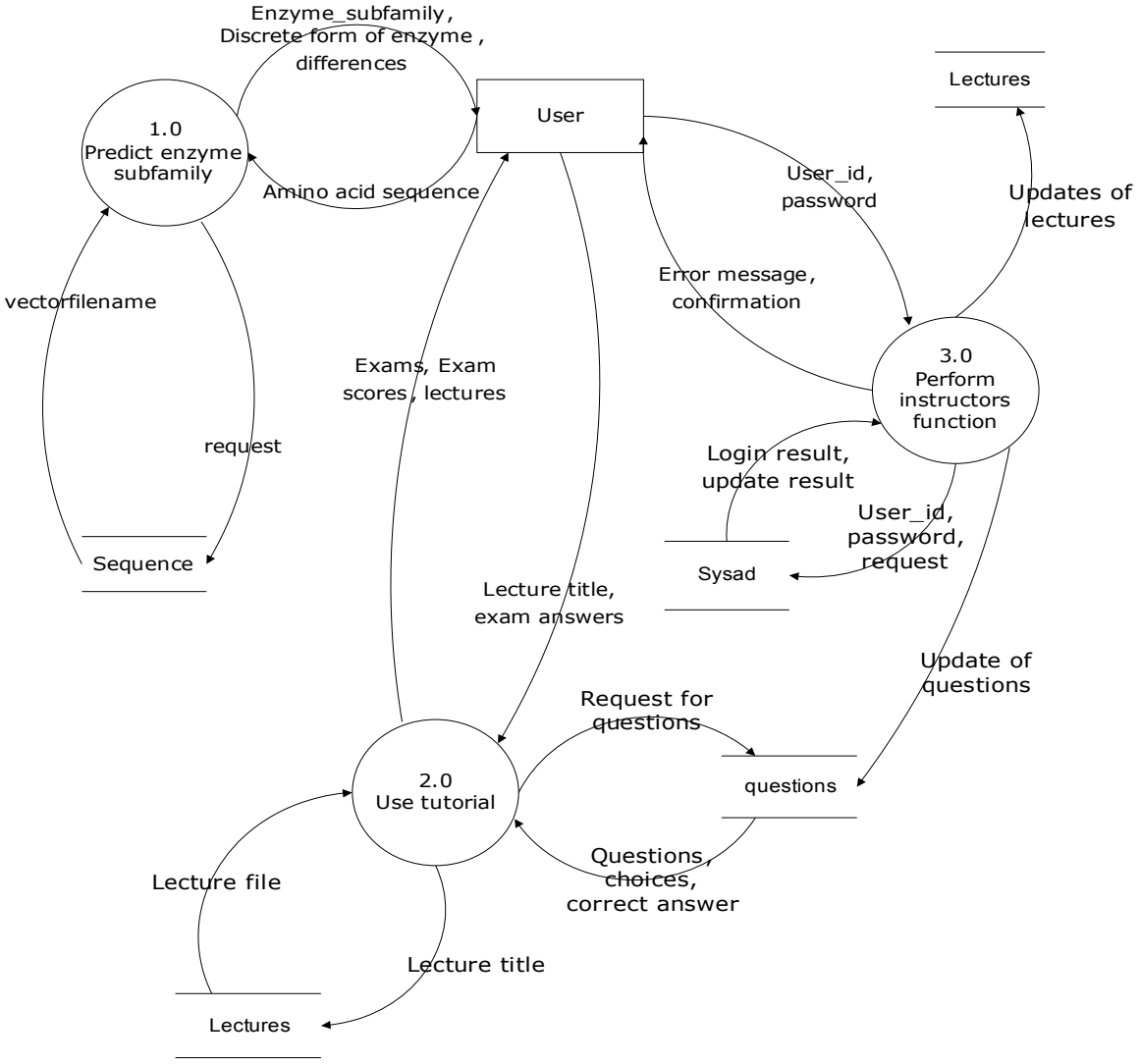

Figure 8. Top–level Data Flow Diagram for Application, *Enzyme Subfamily Class Prediction Application.*

In Figure 9, the prediction of enzyme subfamily classes is further broken down. Figures 10 and 11 show the sub-explosions of processes 1.1 and 1.2 respectively.

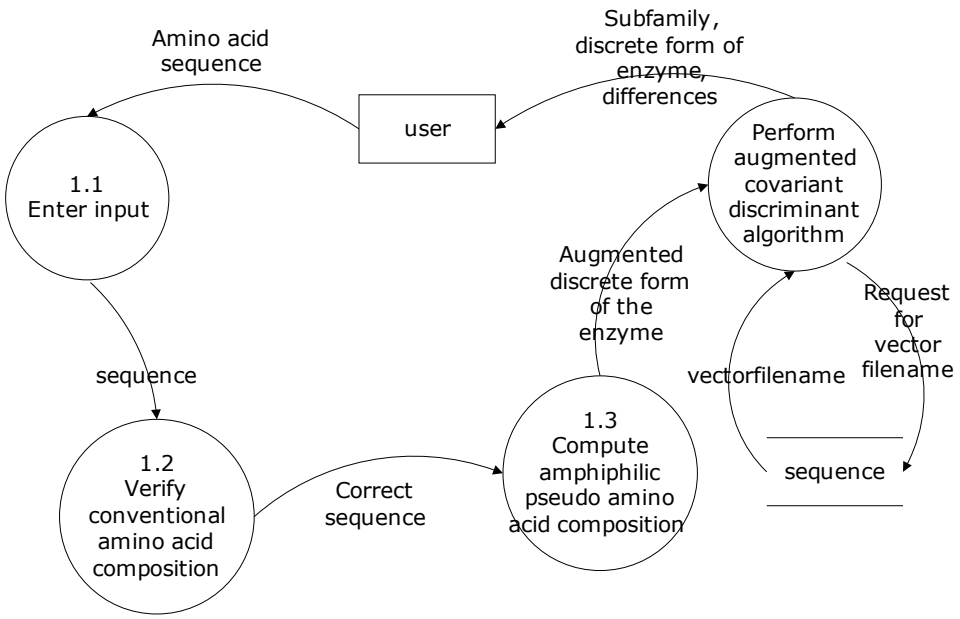

Figure 9. Sub-explosion of Process 1.0, *Enzyme Subfamily Class Prediction Application.*

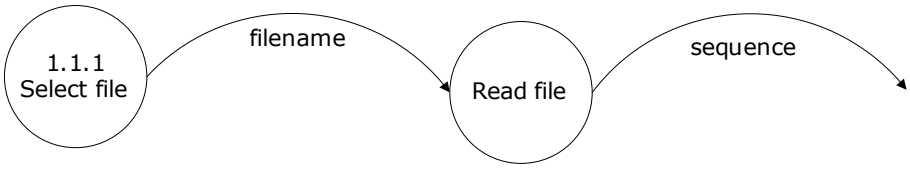

Figure 10. Sub-explosion of Process 1.1, *Enzyme Subfamily Class Prediction Application.*

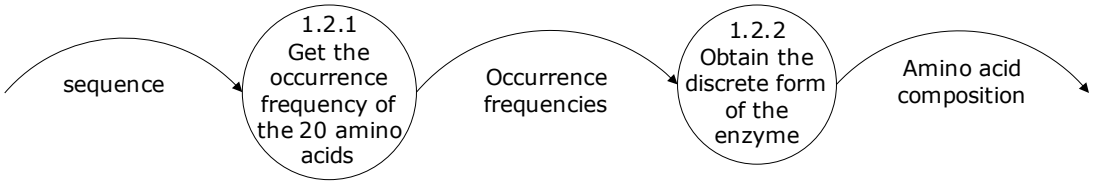

Figure 11. Sub-explosion of Process 1.2, *Enzyme Subfamily Class Prediction Application.*

Figure 12 shows the processes to obtain the discrete form of an enzyme. The processes to determine the subfamily of the query enzyme is shown in figure 13.

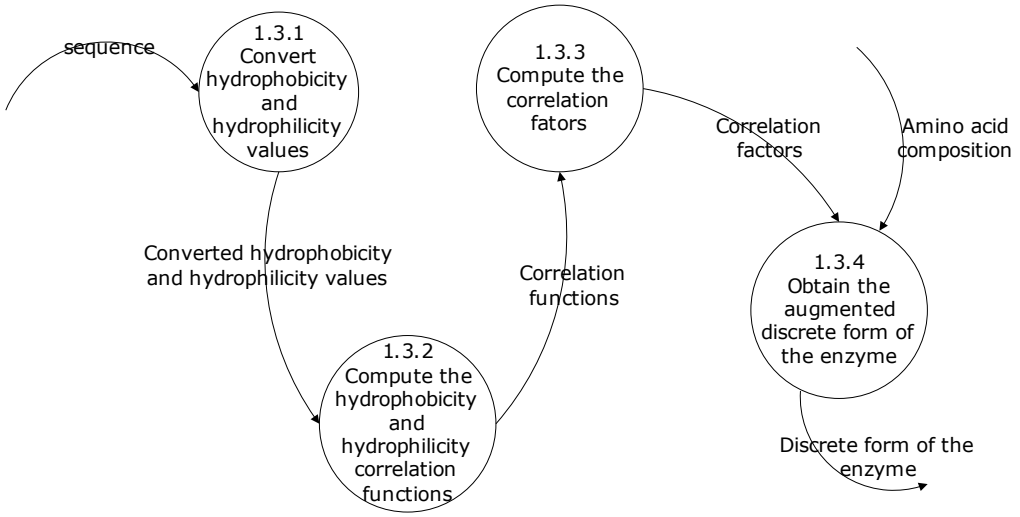

Figure 12. Sub-explosion of Process1.3, *Enzyme Subfamily Class Prediction Application.*

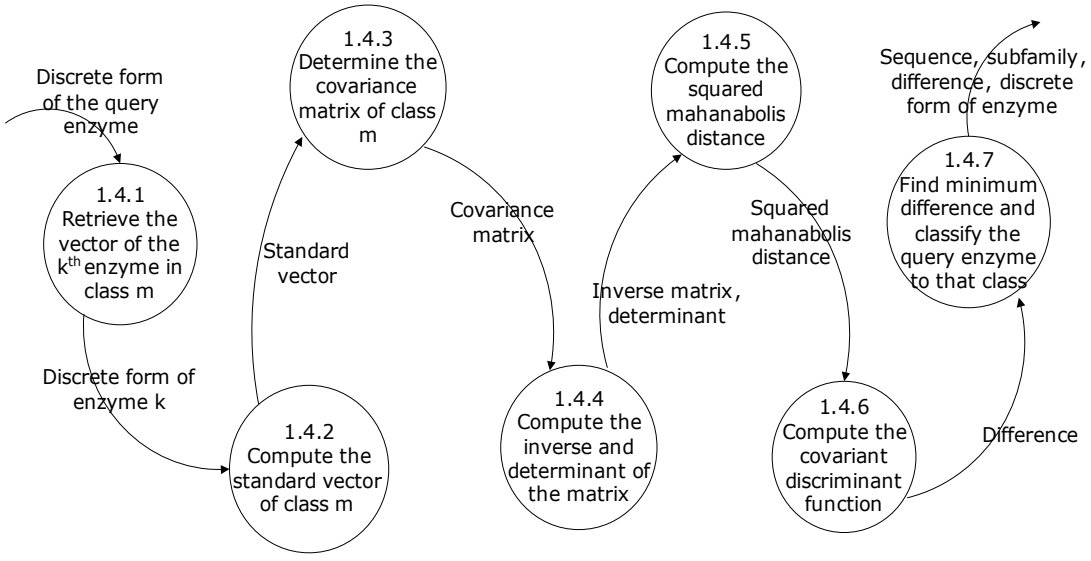

Figure 13. Sub-explosion of Process 1.4, *Enzyme Subfamily Class Prediction Application.*

In Figure 14, the lectures and test questions are retrieved from the application's database when the user accesses the tutorial.

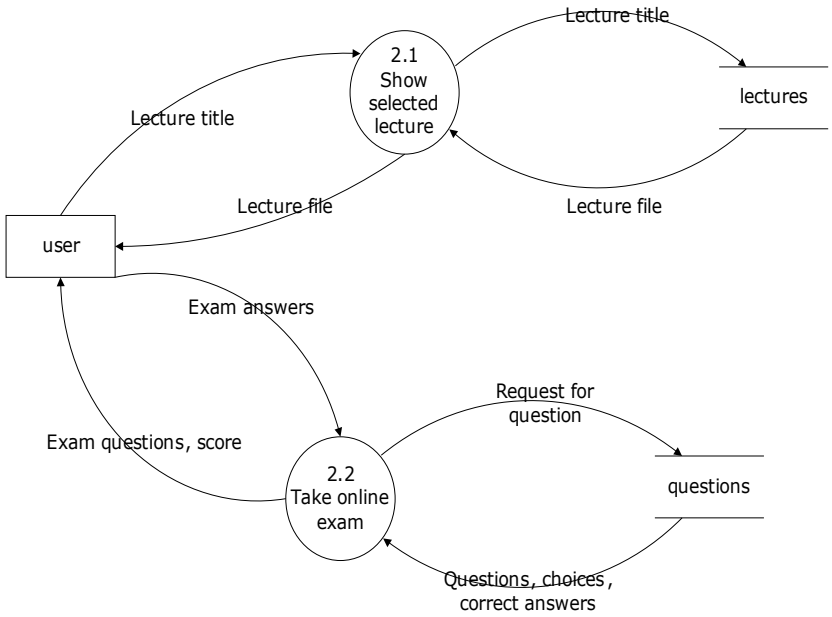

Figure 14. Sub-explosion of Process 2.0, *Enzyme Subfamily Class Prediction Application.*

The interactions with the application that only users with sysad account can experience are in Figure 15. Figures 16 and 17 illustrate the sub-explosions of process 3.2 and 3.3 respectively.

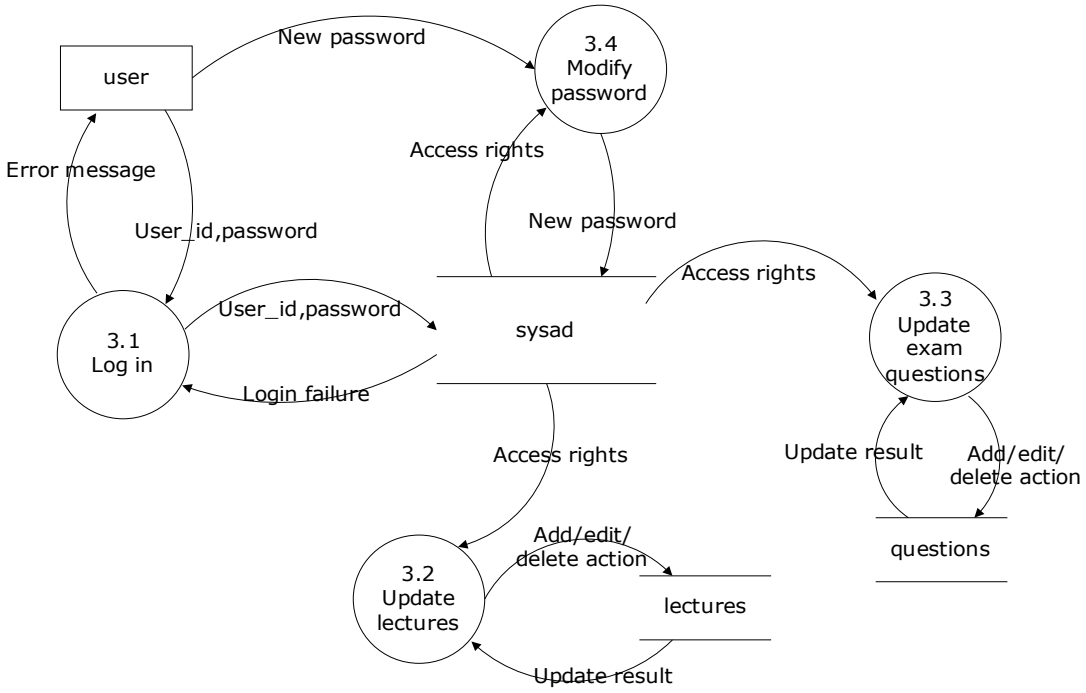

Figure 15. Sub-explosion of Process 3.0, *Enzyme Subfamily Class Prediction Application.*

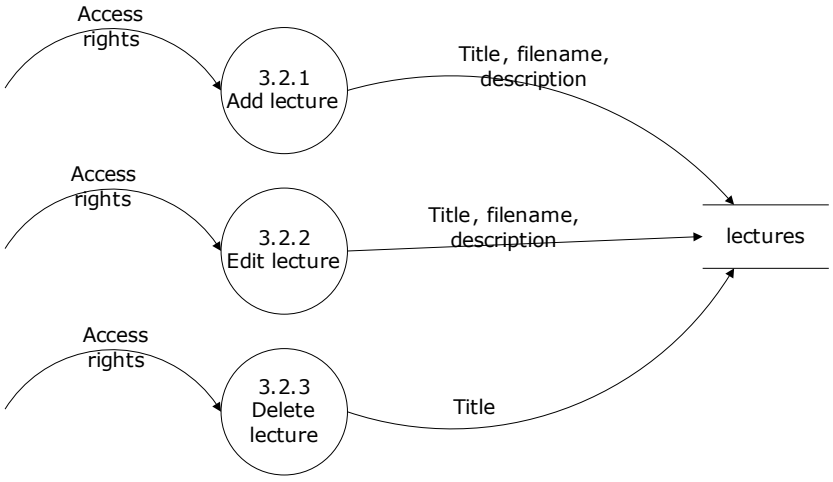

Figure 16. Sub-explosion of Process 3.2, *Enzyme Subfamily Class Prediction Application.*

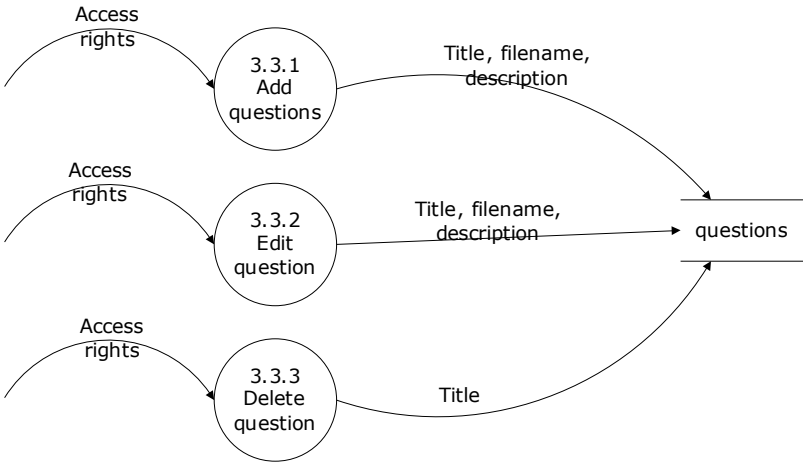

Figure17. Sub-explosion of Process 3.3, *Enzyme Subfamily Class Prediction Application.*

E. Technical Architecture

PHP belongs to the middleware languages which help the web server interpret requests from the World Wide Web. Enzyme Subfamily Prediction Application uses the client-server model, where the computer that requests the services are the clients and the computers that provide the services are the servers. [28]

The client-server intercommunication involves dynamic response generated by the use of server side technologies. With these server technologies it has become easier to maintain Web pages, especially helpful for a large site. The developer needs to embed the server-side language code inside the HTML page. This code is passed to the appropriate interpreter which processes these instructions and generates the final HTML displayed by the browser. The embedded server-script code is not visible to the client as the server sends only the HTML code. [29]

This system uses Personal Home Pages (PHP) as a server side technology. PHP is an open source technology. A request sent for a PHP page from a client is passed to the PHP interpreter by the server along with various program variables. The interpreter then processes the PHP code and generates a dynamic HTML output. This is sent to the server which in turn redirects it to the client. The browser is not aware of the functioning of the server. It just receives the HTML code, which it appropriately formats and displays on the computer [30]. A software program maple is used for the computations.

Technical Requirements:

1. The Server machine

    Hardware requirements:

        Processor: at least 2.66GHz

        RAM: at least 256 MB

        Memory: at least 500 MB

    Software requirements:

        Operating System: at least Windows XP

        Scripting Language: PHP

        Database Platform: MySQL

        Web Server: Apache HTTP Server

        Maple

2. The Client machine

    Software requirements: Operating System is at least Windows XP and Internet access.

V. Results

The home page of *Enzyme Subfamily Prediction Application* is shown in figure 18. The menu is located on the right. The links at the upper right of the page allows the user to log-in or view a static lecture about enzymes. The predict link below leads to the page where the user can predict the enzyme subfamily of a query enzyme. The view lecture and take exam links directs the user to the tutorial module of the system.

Figure 18. Index page, *Enzyme Subfamily Class Prediction Application.*

To upload a text file containing the sequence of an enzyme, the user clicks on Predict on the menu on the right. This directs to a page with a form that allows the user to browse for the text file that contains the sequence of an enzyme (See figure 19).

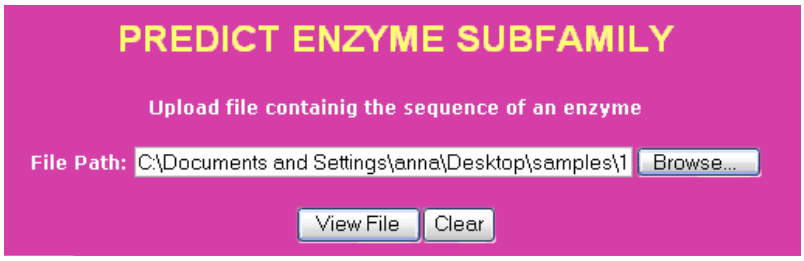

Figure 19. Input form for file uploading, *Enzyme Subfamily Class Prediction Application.*

Upon submitting the form with correct data, the sequence contained in the file will be displayed and clicking the Predict Subfamily button will display the Amphiphilic Pseudo Amino Acid Composition of the query enzyme as shown in figures 20 and 21 respectively.

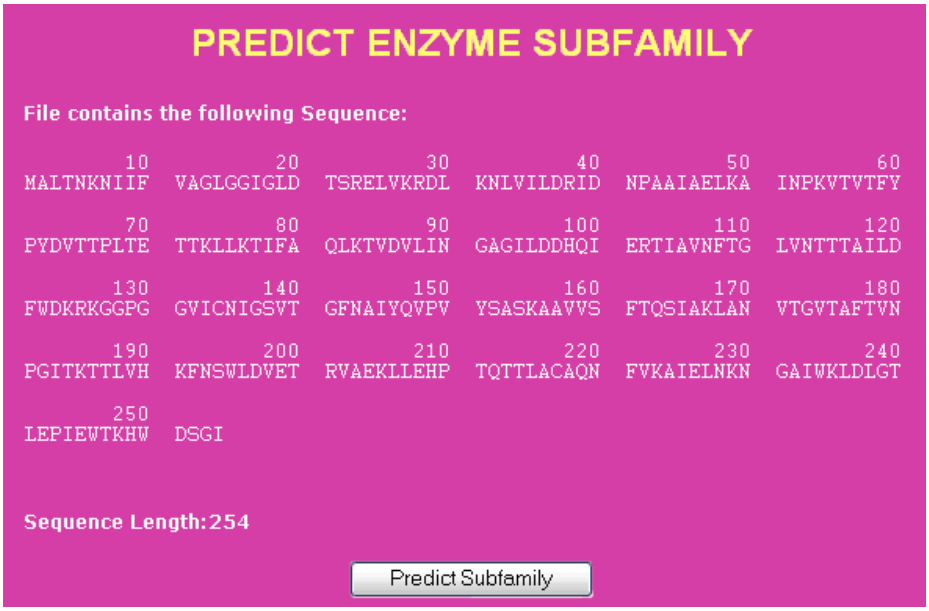

Figure 20. Enzyme Sequence, *Enzyme Subfamily Prediction Application.*

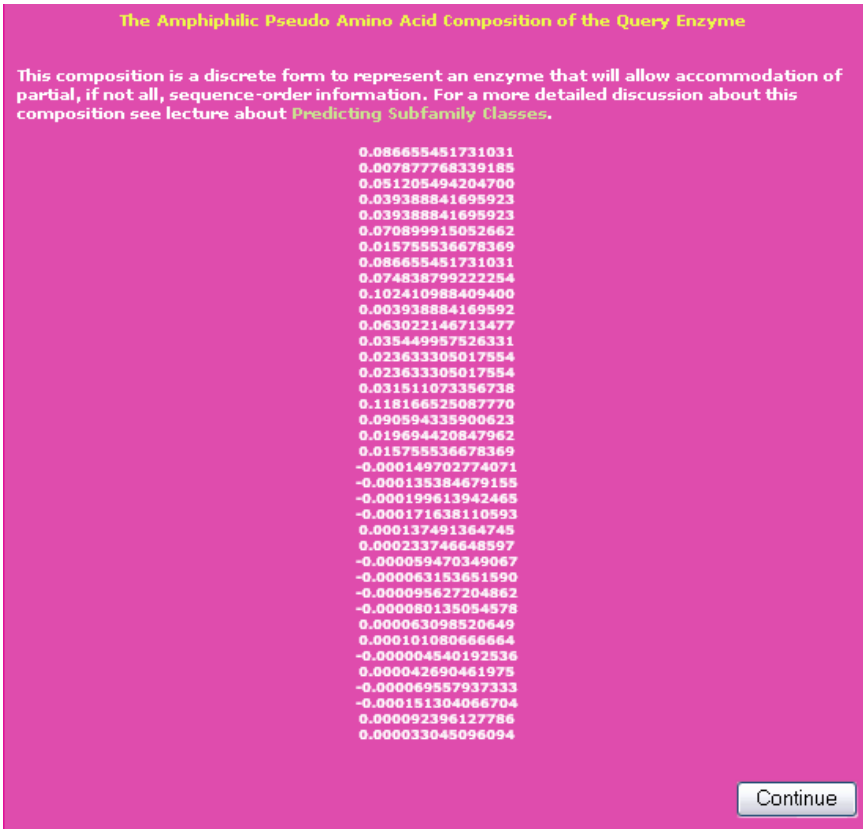

Figure 21. Amphiphilic Pseudo Amino Acid Composition of the Query Enzyme, *Enzyme Subfamily Class Prediction Application.*

Clicking the continue button leads to a page that shows a table that summarizes the difference between the query enzyme and the norm of each class or subfamily. This page also displays the subfamily where the query enzyme probably belong and a short description of that subfamily (See figure 22).

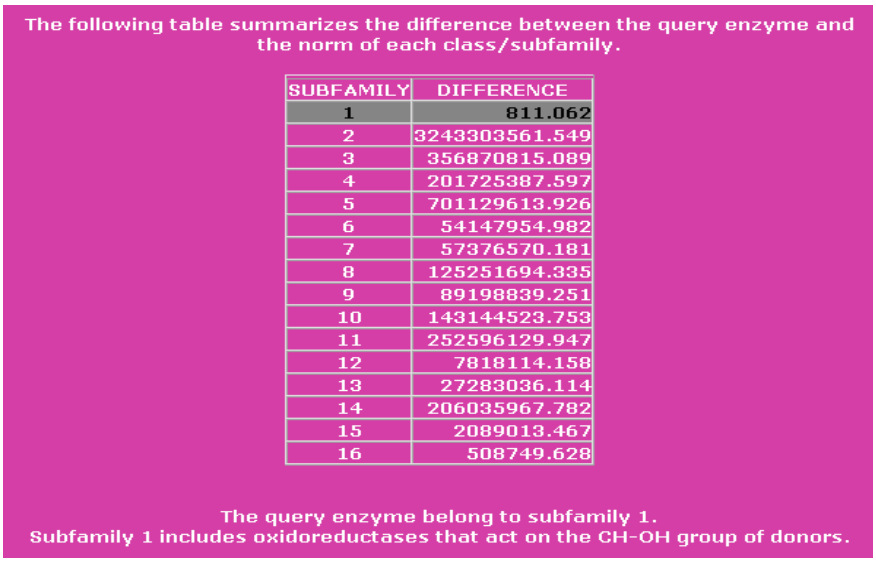

Figure 22. Summary table, *Enzyme Subfamily Class Prediction Application.*

The list of existing lectures in the tutorial part of the application can be viewed by clicking the View Lectures (Refer to figure 23). The lecture titles are hyperlinks. The lecture file will be opened in a new window by clicking the title.

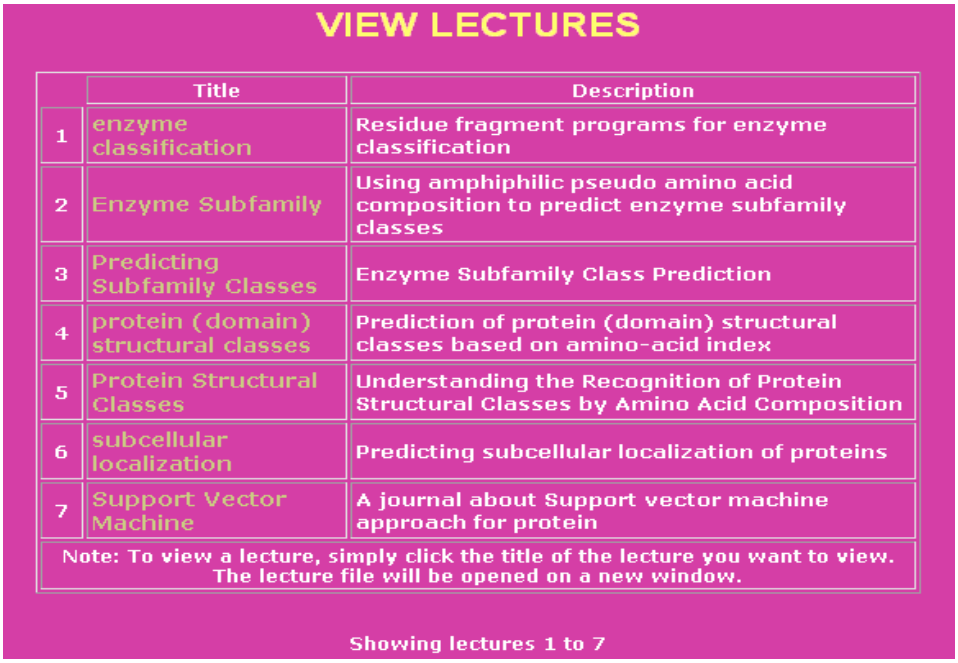

Figure 23. List of available lectures, *Enzyme Subfamily Class Prediction Application.*

Users can take a quiz to test their knowledge of the lecture materials by clicking Take Exam. The user can choose a topic of the exam from the list of available exam topics (Figure 24). Upon clicking the topic of the exam chosen, the questions under this topic will be displayed as shown in Figure 25. The score is computed right after submitting the test, and the exam questions, correct answers and the user's score are displayed (See figure 26).

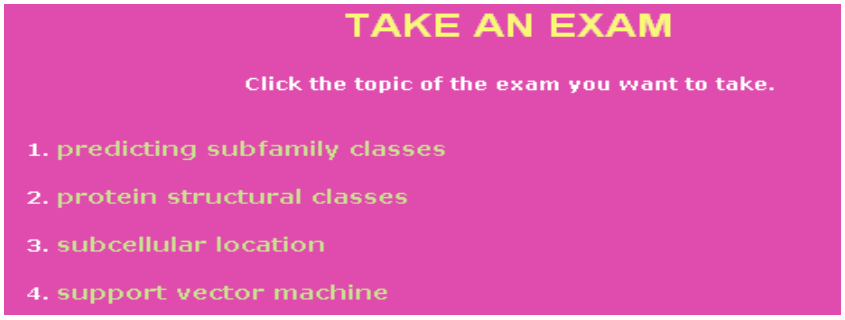

Figure 24. List of available exam topics, *Enzyme Subfamily Class Prediction Application.*

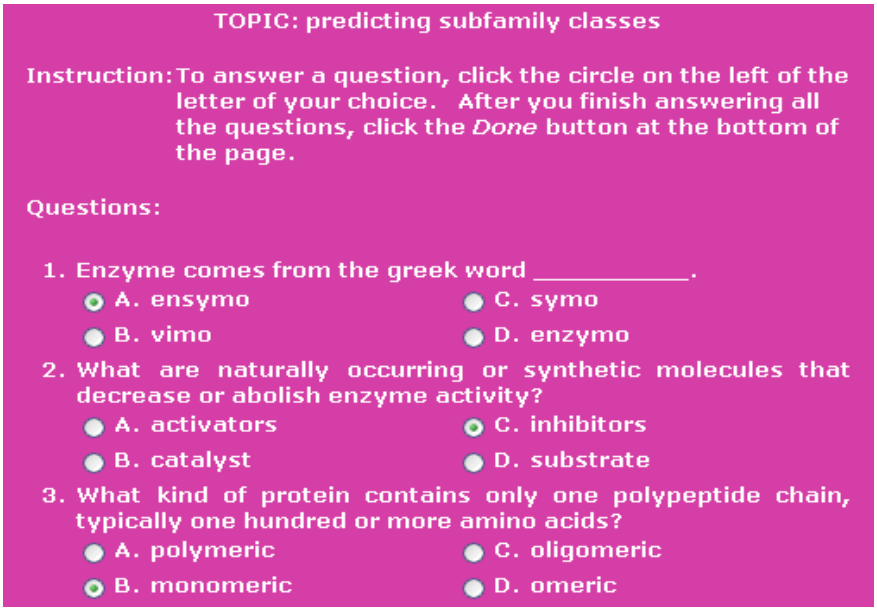

Figure 25. Self Quiz, *Enzyme Subfamily Class Prediction Application.*

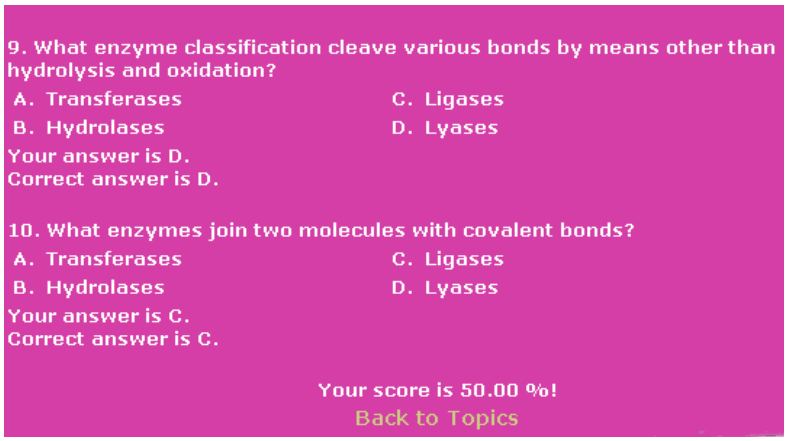

Figure 26. Exam Result, *Enzyme Subfamily Class Prediction Application.*

The About Enzyme menu provides the user with a static lecture about enzyme family and subfamilies. It contains a short description of enzyme, its families and subfamilies (See Figure 27).

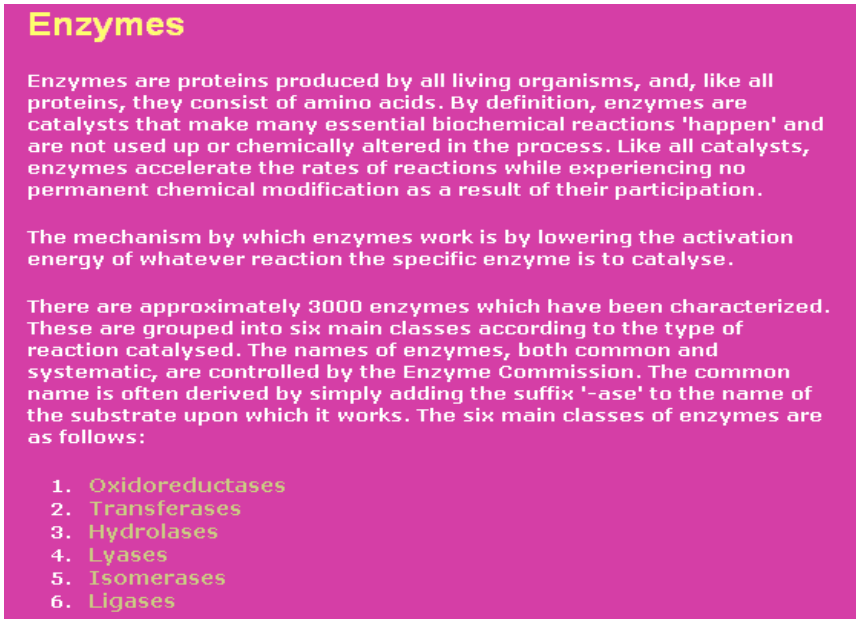

Figure 27. Enzyme families and subfamilies, *Enzyme Subfamily Class Prediction Application.*

The login menu will take the user to the login page for system administrator/ Instructors (Refer to Figure 28). A successful login will take the user to the sysad's area. The options for managing the lectures and test questions are found in this area.

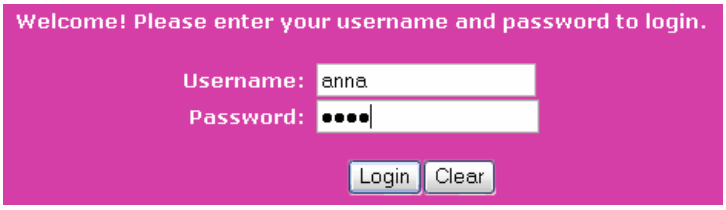

Figure 28. Login page, *Enzyme Subfamily Class Prediction Application.*

To upload a lecture file, the user clicks on Add Lecture. A form for uploading a file will be displayed (Refer to figure 29). A title and description is required for the lecture to be uploaded. A verification message means a successful upload (See figure 30).

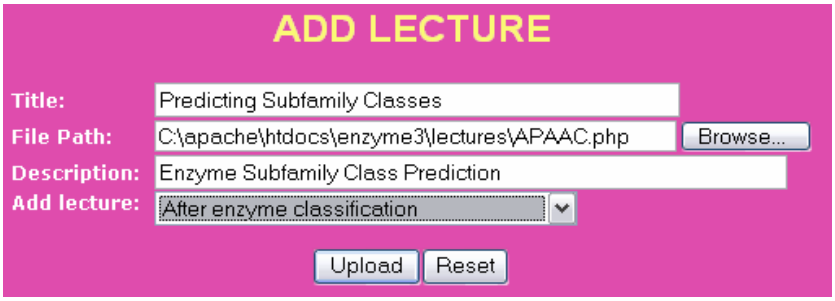

Figure 29. Form for uploading lectures, *Enzyme Subfamily Class Prediction Application.*

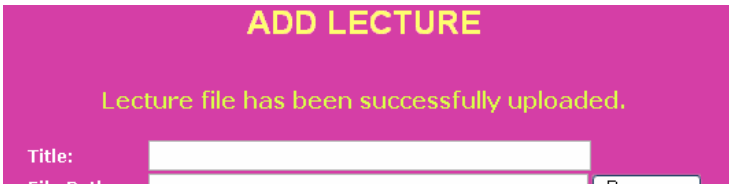

Figure 30. Verification of uploading, *Enzyme Subfamily Class Prediction Application.*

The sysad can also edit (that is, edit the properties of) existing lecture files by clicking on Edit Lectures. A list of available lectures will be displayed. When a lecture is selected for editing, a form will be displayed. This allows the user to replace the selected file with another, or edit its title or description (Figure 31).

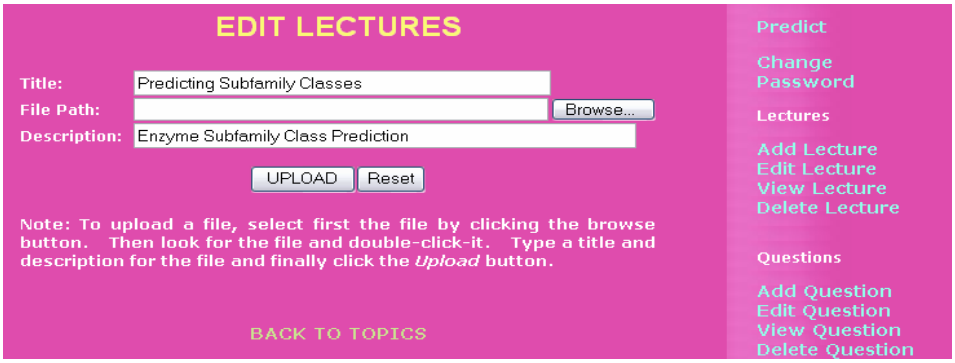

Figure 31. Edit File Details, *Enzyme Subfamily Class Prediction Application.*

Lecture files can de deleted by selecting it from the list. When the user clicks OK on the confirming dialog box as shown in figure 32, the delete will proceed, or else it will be cancelled.

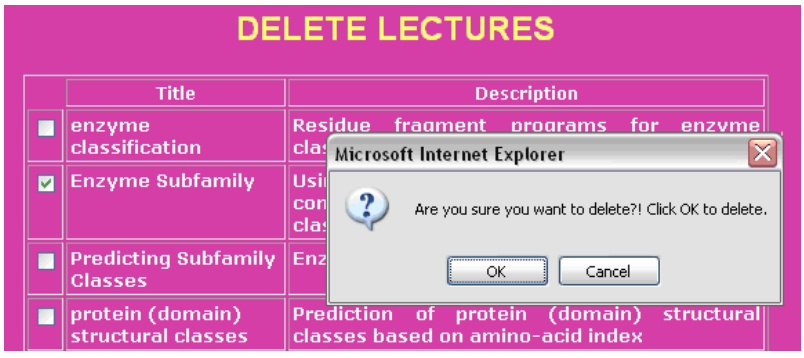

Figure 32. Delete Files, *Enzyme Subfamily Class Prediction Application.*

Questions can also be added to the database (See figure 33). They must be of multiple type, with four available choices, of which only one choice is correct.

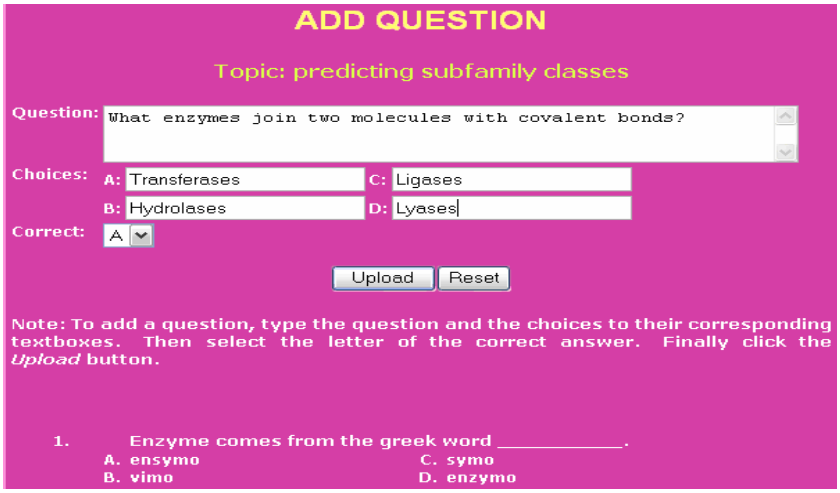

Figure 33. Add Test Questions, *Enzyme Subfamily Class Prediction Application.*

If the sysad clicks on Edit Questions, a list of exam topics will be displayed and the sysad can select the topic that contains the question to be edited. Upon selecting the question to be edited, a form will be displayed that will allow the sysad to edit the question, choices and correct answer (See figures 34, 35 and 36).

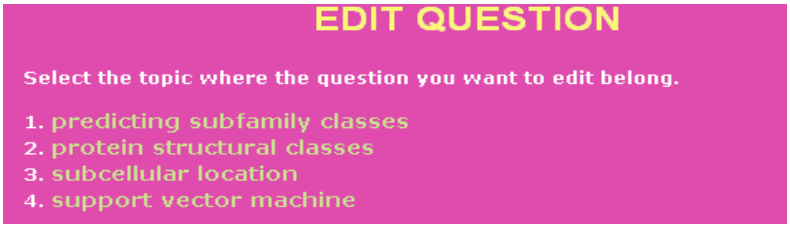

Figure 34. List of Exam Topics, *Enzyme Subfamily Class Prediction Application.*

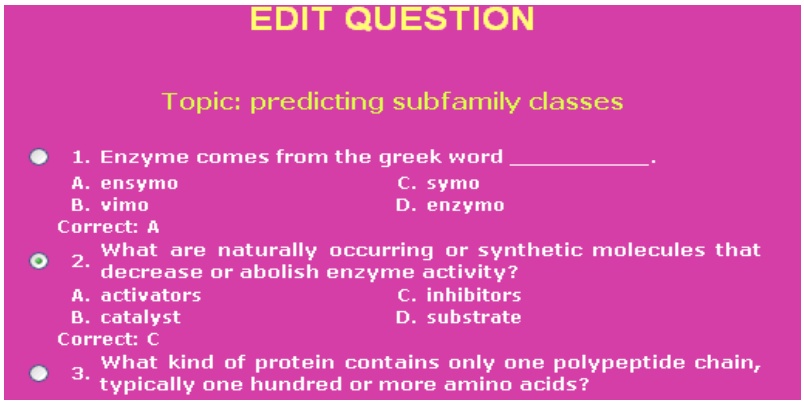

Figure 35. List of Questions, *Enzyme Subfamily Class Prediction Application.*

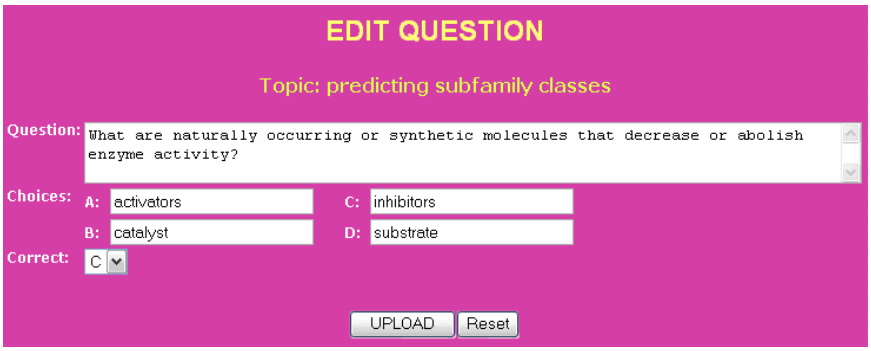

Figure 36. Edit Question, *Enzyme Subfamily Class Prediction Application.*

To delete questions from the database, the sysad clicks on Delete Question. A list of exam topics will be displayed. Questions under a particular topic can be deleted. By clicking OK on the confirming dialogue box, the delete action will proceed. (Refer to figure 37)

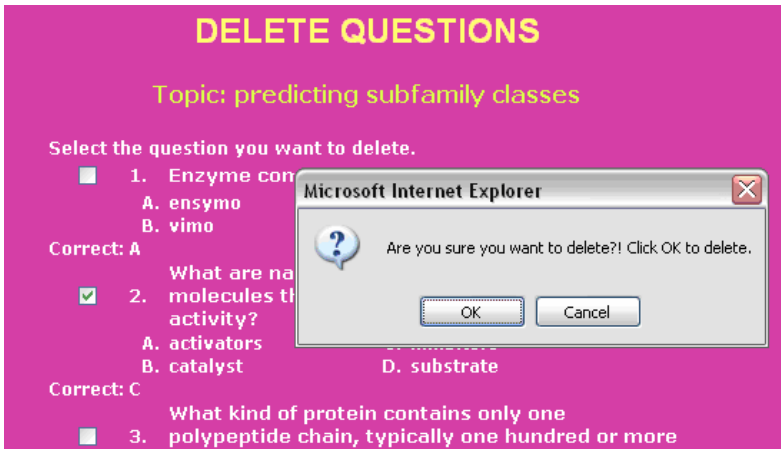

Figure 37. Delete Question, *Enzyme Subfamily Class Prediction Application.*

The sysad is capable of modifying his password as shown in Figure 38.

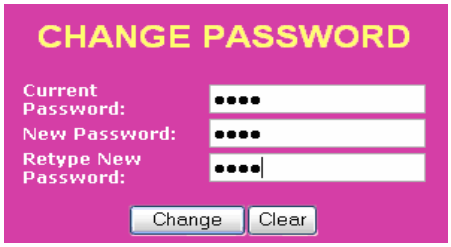

Figure 38. Modify Password, *Enzyme Subfamily Class Prediction Application.*

VI. Discussion

The *Enzyme Subfamily Class Prediction Application* is an online application that classifies to which subfamily the query enzyme belongs and outputs the amphiphilic pseudo amino acid composition of the query enzyme and a summary table of the differences between the query enzyme and the norm of each subfamily. The sequence of an enzyme is uploaded by the user through text file. The subfamily where the query enzyme belongs is obtained by measuring the difference between the query enzyme and the norm of each subfamily using the covariant discriminant function. The amphiphilic pseudo amino acid composition of the query enzyme, the standard vector for each subfamily and the covariance matrix are used to compute the differences. The amphiphilic pseudo amino acid compositions of the enzymes in each subfamily are used to get the covariance matrix for each subfamily. According to the principle of similarity, as stated by K.C. Chou, the smaller the difference between the query enzyme and the norm of a particular subfamily, the higher the probability that the enzyme belongs to that subfamily.

From the study, using the amphiphilic pseudo amino acid composition and the augmented covariant-discriminant algorithm yielded an overall success rates that are remarkably higher than those by other approaches. Also, the success rates by jackknife test are decreased compared with those by the self-consistency test. For small subsets, such a reduction is more notable because the cluster-tolerant capacity for small subsets is usually low. And hence there will be a greater bearing on the small subsets than on the large ones because of the information loss resulting from jackknifing.

The application also provides study materials and self-tests for users who want to learn about the concepts behind predicting subfamily classes. An explanation of how the amphiphilic pseudo amino acid composition of an enzyme was obtained and how the augmented covariant-discriminant algorithm was implemented is included as a static lecture. The exam results are computed right after the exam form is submitted.

A special type of user called the "sysad" can add, edit and delete lecture materials or test questions that are stored in the *Enzyme Subfamily Class Prediction Application*. This user also can modify his password.

This application was designed for use in a client-server scenario. It was developed using PHPTriad (Apache as HTTP server, MySQL as DBMS and PHP as the server-side scripting language). It also uses client-side JavaScript for some form processing.

The *Subfamily Class Prediction Application* can handle sequences of lengths more than 500 since the sequence input is through text file. However, it does not check if the sequence is correct since the application assumes that the input text file is correct.

The *Subfamily Class Prediction Application* uses the augmented covariant-discriminant algorithm which makes use of the Amphiphilic Pseudo amino acid composition to represent an enzyme. This composition includes sequence-order information, unlike other studies which uses the conventional amino acid composition only. This study includes only the subfamilies under the family oxidoreductases. And the sequences used are limited to 500 enzyme sequences only unlike other systems which involve thousands of sequences. However, it is useful as introductory material for students of biochemistry and other related subjects.

Determination of the subfamily of newly found enzyme molecule becomes important because this is directly related to the detailed information of the function of the enzyme. Each type of enzyme has a special function and works in a particular way. Enzyme subfamily is intimately related to the enzyme's catalytic process. It helps determine which specific target that enzyme acts on. It also provides clues to the relevant biological function of the enzyme which is necessary since enzymes facilitate reactions in our body.

VII. Conclusion

The *Enzyme Subfamily Class Prediction Application* is an online system composed of a compute section (the "Predict Subfamily" menu) and a documentation section (the tutorial part).

The application allows unidentified users to predict enzyme subfamily class by uploading a text file containing the sequence of the query enzyme. Using this sequence, the application executes server-side scripts to generate the amphiphilic pseudo amino acid composition of the query enzyme. Afterwards, the application uses this composition to find the difference between the query enzyme and the norm of each subfamily using augmented covariant-discriminant algorithm. These differences calculated are used to classify the query enzyme. The amphiphilic pseudo amino acid composition of the query enzyme and a table containing the differences are displayed in the user's browser.

So as to help the students understand the idea behind *Enzyme Subfamily Class Prediction Application*, lecture materials are provided in the tutorial part of the application. These include a static HTML file that explains how the amphiphilic pseudo amino acid composition can be obtained and the augmented covariant-discriminant predictor. The tutorial module also provides exams under different topics. This can test their understanding of the concepts. Verified "sysad" user has the privilege to update lecture materials and exam questions. The sysad can also modify his password.

VIII. Recommendations

Enzymes are grouped into six main families according to the type of reaction catalyzed. At present, the application includes only enzymes of subfamilies under the family oxidoreductases. A potential enhancement to the *Enzyme Subfamily Class Prediction Application* could be to extend this application to other enzyme families. It is also probable to check if the input sequence is an enzyme and determine the family of the enzyme before determining the subfamily where the enzyme belongs.

Since the *Enzyme Subfamily Class Prediction Application* accepts data from anonymous users, exam scores are not stored in the database. It would be better, probably, to maintain another type of user that has the capability of performing the functionalities for an ordinary user. In addition, he can also store his exam results for future reference.

Exams are limited to multiple-choice type only. A possible improvement would be to allow the sysad to create exams of other types.

IX. Bibliography

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X. Appendix

connect.php

```
<?
        $connect= mysql_connect("localhost") or die("cannot
connect");
        mysql_select_db("escpa", $connect) or die ("Cannot
connect to Dbase");
?>
```

index.php

```
<html><head>
<title>Enzyme Subfamily Class Prediction Application</title>
<script language="JavaScript" type="text/JavaScript"
src="images/myfreetemplates.js"></script>
<link href="images/myfreetemplates.css" rel="stylesheet"
type="text/css">
</head>
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topmargin="0" marginwidth="0" marginheight="0"
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over.gif','images/products_btn-over.gif')">
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                                                <a
href="view_file.php" class="sidelinks">View
Lectures</a><br><br>
                                    <a href="take_exam.php"
class="sidelinks">Take Exam</a><br>
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WIDTH=53 HEIGHT=26></TD>
        <TD width="722"
background="images/pixi_med_grey.gif">&copy;
          Copyright 2006. </TD>
       </TR>
     </TABLE></td>
  </tr>
</table>
</body></html>
```

login2.php

```
<?          session_register("sysad");
            session_unregister("sysad");
            $msge="Welcome! Please enter your username and
password to login.";
            if($error){
                        if($error==1) $msge="<font
color=\"#FFFF80\">Sorry, your account could not be
verified.</font>";
                        else $msge ="<font
color=\"#FFFF80\">Please login properly to access
services.</font>";

            }
?>
<html><head>
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in</title>
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src="images/myfreetemplates.js"></script>
<link href="images/myfreetemplates.css" rel="stylesheet"
type="text/css">
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                        <table align="center" cellspacing="0"
cellpadding="0" border="0">
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                                <td align="right"
valign="center" class="label">Username: </td>
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valign="center">  <input type="text"
name="user_id" maxlength="12" size="20"></td></tr>
                                <tr><td align="right"
valign="center" class="label">Password: </td>
                                <td align="left"
valign="center">  <input type="password"
name="password" maxlength="12" size="20"></td></tr>
                                <tr><td align="center"
valign="center"></td>
                                <td align="center"
valign="center"><br><input type="submit" class="submit"
value="Login"><input type="reset" class="submit"
value="Clear"></td></tr>
                        </table></form>
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class="sidelinks">Predict</a><br><br>
            <a href="view_file.php" class="sidelinks">View
Lectures</a><br><br>
            <a href="take_exam.php" class="sidelinks">Take
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        <TD width="722"
background="images/pixi_med_grey.gif">&copy; Copyright
2006. </TD>
      </TR>
     </TABLE></td>
  </tr>
</table>
</body></html>
```

login.php

```
<?
include("scripts/connect.php");
$query="Select user_id, password from SysAd";
$result=mysql_query($query);
while($data=mysql_fetch_array($result)){
if($data[0]==$user_id && $data[1]==$password){
session_start();
session_register("sysad");
$sysad=$user_id;
header("Location:http://localhost/enzyme3/sysad/index.php");
exit();
}}
header("Location:http://localhost/enzyme3/login2.php?error=1"
?>
```

logout.php

```
<?
session_start();
session_unregister("sysad");
session_destroy();
header("Location:http://localhost/enzyme3/index.php");
?>
```

FAQ.php

```
<html><head>
<title>Enzyme Subfamily Class Prediction Application</title>
<script language="JavaScript" type="text/JavaScript"
src="images/myfreetemplates.js"></script>
<link href="images/myfreetemplates.css" rel="stylesheet"
type="text/css">
</head>
<body background="images/pixi_lightblue.jpg" leftmargin="0"
topmargin="0" marginwidth="0" marginheight="0"
onLoad="MM_preloadImages('images/btn_main-
over.gif','images/btn_overview-over.gif','images/btn_services-
over.gif','images/products_btn-over.gif')">
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SRC="images/spacer.gif" WIDTH=423 HEIGHT=7></TD>
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style="font-size: 11pt; font-weight: 700"><b>Enzyme
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```

```
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                    <h2>Oxidoreductases</h2>
      <p>The oxidoreductases catalyse oxido-reductions. The
substrate oxidised is regarded as an hydrogen or electron donor.
</p>
      <p> The E.C. classification for these enzymes classifies
them firstly by the donor group that undergoes oxidation, then
by the acceptor, and lastly by the enzyme. </p>
      <p>The recommended name for these enzymes is
dehydrogenase. An alternative name is reductase. The name
oxidase is only used where O(2) is the acceptor. </p>
      <p>Oxidoreductases are classified as EC 1 in the EC
number classification of enzymes. Oxidoreductases can be further
classified into 16 subclasses:</p>
      <ul>
          <li>EC 1.1 includes oxidoreductases that act on the
CH-OH group of donors
          <li>EC 1.2 includes oxidoreductases that act on the
aldehyde or oxo group of donors
          <li>EC 1.3 includes oxidoreductases that act on the
CH-CH group of donors
          <li>EC 1.4 includes oxidoreductases that act on the
CH-NH2 group of donors
          <li>EC 1.5 includes oxidoreductases that act on CH-
NH group of donors
          <li>EC 1.6 includes oxidoreductases that act on NADH
or NADPH
          <li>EC 1.7 includes oxidoreductases that act on other
nitrogenous compounds as donors
          <li>EC 1.8 includes oxidoreductases that act on a
sulfur group of donors
          <li>EC 1.9 includes oxidoreductases that act on a
heme group of donors
          <li>EC 1.10 includes oxidoreductases that act on
diphenols and related substances as donors
          <li>EC 1.11 includes oxidoreductases that act on
peroxide as an acceptor (peroxidases)
          <li>EC 1.12 includes oxidoreductases that act on
single donors with incorporation of molecular oxygen
(oxygenases)
          <li>EC 1.13 includes oxidoreductases that act on
paired donors with incorporation of molecular oxygen
          <li>EC 1.14 includes oxidoreductases that act on
superoxide radicals as acceptors
          <li>EC 1.15 includes oxidoreductases that act on CH
or CH2 groups
          <li>EC 1.16 includes oxidoreductases that act on iron-
sulfur proteins as donors
       </ul>
See also:
      <a href="FAQ.php?sub=T" class="sidelinks2">
Transferases </a>
      <a href="FAQ.php?sub=Hy" class="sidelinks2">
Hydrolases </a>
      <a href="FAQ.php?sub=Ly" class="sidelinks2"> Lyases
</a>
      <a href="FAQ.php?sub=Is" class="sidelinks2"> Isomerases
</a>
      <a href="FAQ.php?sub=L" class="sidelinks2"> Ligases
</a>
      <a href="FAQ.php" class="sidelinks2"> Enzyme </a>
<?}else if($sub=='T'){?>
                    <h2>Transferases</h2>
      <p>Transferases are enzymes that transfer a group (eg a
methyl or glycosyl group) from one compound (which is generally
regarded as the donor) to another compound (generally regarded
as the acceptor).  </p>
      <p> The E.C. classification for these enzymes classifies
them firstly by the donor group, then by the acceptor, and lastly
by the enzyme. </p>
      <p>The recommended names are normally formed as:
acceptor-group transferase, or donor-group transferase. In many
cases the donor is a cofactor (coenzyme) charged with the group
to be transferred. </p>
      <p>Transferases are classified as EC 2 in the EC number
classification. Transferases can be further classified into nine
subclasses:</p>
      <ul>
          <li>EC 2.1 includes enzymes that transfer one-carbon
groups
          <li>EC 2.2 includes enzymes that transfer aldehyde or
ketone groups
          <li>EC 2.3 includes acyltransferases
          <li>EC 2.4 includes glycosyltransferases
          <li>EC 2.5 includes enzymes that transfer alkyl or
aryl groups, other than methyl groups
          <li>EC 2.6 includes enzymes that transfer nitrogenous
groups
          <li>EC 2.7 includes enzymes that transfer
phosphorus-containing groups
          <li>EC 2.8 includes enzymes that transfer sulfur-
containing groups
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            <li>EC 2.9 includes enzymes that transfer selenium-
containing groups
        </ul>
        See also: <a href="FAQ.php?sub=T" class="sidelinks2">
Oxidoreductases </a>
        <a href="FAQ.php?sub=Hy" class="sidelinks2">
Hydrolases </a>
        <a href="FAQ.php?sub=Ly" class="sidelinks2"> Lyases
</a>
        <a href="FAQ.php?sub=Is" class="sidelinks2"> Isomerases
</a>
        <a href="FAQ.php?sub=L" class="sidelinks2"> Ligases
</a>
        <a href="FAQ.php" class="sidelinks2"> Enzyme </a>
<?}else if($sub=='Hy'){?>
                        <h2>Hydrolases</h2>
        <p>The hydrolases catalyse the hydrolytic cleavage of C-O,
C-N, C-C and some other bonds, including phosphoric anhydride
bonds.   </p>
        <p> The E.C. classification for these enzymes generally
classifies them firstly by the nature of the bond hydrolysed, then
by the nature of the substrate, and lastly by the enzyme.  </p>
        <p>Although the systematic name always includes
hydrolase, the recommended name is, in many cases, formed by
the name of the substrate with the suffix -ase. It is understood
that the name of the substrate with this suffix means a hydrolytic
enzyme. </p>
        <p>Hydrolases are classified as EC 3 in the EC number
classification of enzymes. Hydrolases can be further classified
into four subclasses:</p>
        <ul>
        <li>EC 3.1 includes hydrolases that act on ester bonds
         <li>EC 3.2 includes hydrolases that act on sugars
(glycosylases)
         <li>EC 3.3 includes hydrolases that act on ether bonds
         <li>EC 3.4 includes hydrolases that act on peptide bonds
(peptidases)
        </ul>
        See also:
        <a href="FAQ.php?sub=Hy" class="sidelinks2">
Oxidoreductases </a>
        <a href="FAQ.php?sub=T" class="sidelinks2">
Transferases </a>
        <a href="FAQ.php?sub=Ly" class="sidelinks2"> Lyases
</a>
        <a href="FAQ.php?sub=Is" class="sidelinks2"> Isomerases
</a>
        <a href="FAQ.php?sub=L" class="sidelinks2"> Ligases
</a>
        <a href="FAQ.php" class="sidelinks2"> Enzyme </a>
<?}else if($sub=='Ly'){?>
                        <h2>Lyases</h2>
        <p>The lyases are enzymes cleaving C-C, C-O, C-N, and
other bonds by elimination, leaving double bonds or rings, or
conversely adding groups to double bonds  </p>
        <p> Lysases are classified as EC 4 in the EC number
classification of enzymes. Lyases can be further classified into
seven subclasses:</p>
        <ul>
            <li>EC 4.1 includes lyases that cleave carbon-carbon
bonds, such as decarboxylases
            <li>EC 4.2 includes lyases that cleave carbon-oxygen
bonds, such as dehydratases
            <li>EC 4.3 includes lyases that cleave carbon-nitrogen
bonds
            <li>EC 4.4 includes lyases that cleave carbon-sulfur
bonds
            <li>EC 4.5 includes lyases that cleave carbon-halide
bonds
            <li>EC 4.6 includes lyases that cleave phosphorus-
oxygen bonds, such as adenylate cyclase
            <li>EC 4.99 includes other lyases
        </ul>
        See also:
        <a href="FAQ.php?sub=Hy" class="sidelinks2">
Oxidoreductases </a>
        <a href="FAQ.php?sub=T" class="sidelinks2">
Transferases </a>
        <a href="FAQ.php?sub=Ly" class="sidelinks2"> Hydrolases
</a>
        <a href="FAQ.php?sub=Is" class="sidelinks2"> Isomerases
</a>
        <a href="FAQ.php?sub=L" class="sidelinks2"> Ligases
</a>
        <a href="FAQ.php" class="sidelinks2"> Enzyme </a>
<?}else if($sub=='Is'){?>
                        <h2>Isomerases</h2>
        <p>The isomerases catalyse geometric or structural
changes within one molecule.   </p>
        <p>According to the type of isomerism, they may be called
racemases, epimerases, cis-tran-isomerases, isomerases,
tautomerases, mutases or cylcoisomerases. </p>
        <p>The subclasses are defined according to the type of
isomerism, the sub-subclasses to the type of substrates. </p>
        <p> Isomerases are classified as EC 5 in the EC number
classification of enzymes. Isomerases can be further classified
into six subclasses:</p>
        <ul>
            <li>EC 5.1 includes enzymes that catalyze
racemization (racemases) and epimerization (epimerases)
            <li>EC 5.2 includes enzymes that catalyze the
isomerization of geometric isomers (cis-trans isomerases)
            <li>EC 5.3 includes intramolecular oxidoreductases
            <li>EC 5.4 includes intramolecular transferases
(mutases)
            <li>EC 5.5 includes intramolecular lyases
<li>EC 5.99 includes other isomerases
        </ul>
        See also:
        <a href="FAQ.php?sub=Hy" class="sidelinks2">
Oxidoreductases </a>
        <a href="FAQ.php?sub=T" class="sidelinks2">
Transferases </a>
        <a href="FAQ.php?sub=L" class="sidelinks2"> Hydrolases
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        <a href="FAQ.php?sub=Ly" class="sidelinks2"> Lyases
</a>
        <a href="FAQ.php?sub=L" class="sidelinks2"> Ligases
</a>
        <a href="FAQ.php" class="sidelinks2"> Enzyme </a>
<?}else if($sub=='L'){?>
                        <h2>Ligases</h2>
        <p>The ligases catalyse the joining together of two
molecules coupled with the hydrolysis of a pyrophosphate bond
in ATP or a similar triphosphate. The bonds formed are often
high-energy bonds. </p>
        <p>The subclasses are defined according to the type of
bond formed; the sub-subclasses are only used in the C-N
ligases. </p>
        <p>Ligases are classified as EC 6 in the EC number
classification of enzymes. Ligases can be further classified into
six subclasses:</p>
        <ul>
            <li>EC 6.1 includes ligases used to form carbon-
oxygen bonds
            <li>EC 6.2 includes ligases used to form carbon-sulfur
bonds
            <li>EC 6.3 includes ligases used to form carbon-
nitrogen bonds
            <li>EC 6.4 includes ligases used to form carbon-
carbon bonds
            <li>EC 6.5 includes ligases used to form phosphoric
ester bonds
            <li>EC 6.6 includes ligases used to form nitrogen-
metal bonds
        </ul>
        See also:
        <a href="FAQ.php?sub=Hy" class="sidelinks2">
Oxidoreductases </a>
        <a href="FAQ.php?sub=T" class="sidelinks2">
Transferases </a>
        <a href="FAQ.php?sub=L" class="sidelinks2"> Hydrolases
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        <a href="FAQ.php?sub=Ly" class="sidelinks2"> Lyases
</a>
        <a href="FAQ.php?sub=Is" class="sidelinks2"> Isomerases
</a>
        <a href="FAQ.php" class="sidelinks2"> Enzyme </a>
<?}else{?>
            <h2>Enzymes</h2>
        <p>Enzymes are proteins produced by all living organisms,
and, like all proteins, they consist of amino acids. By definition,
enzymes are catalysts that make many essential biochemical
reactions 'happen' and are not used up or chemically altered in
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the process. Like all catalysts, enzymes accelerate the rates of
reactions while experiencing no permanent chemical modification
as a result of their participation. </p>
      <p> The mechanism by which enzymes work is by lowering
the activation energy of whatever reaction the specific enzyme is
to catalyse.  </p>
      <p>There are approximately 3000 enzymes which have
been characterized.  These are grouped into six main classes
according to the type of reaction catalysed. The names of
enzymes, both common and systematic, are controlled by the
Enzyme Commission. The common name is often derived by
simply adding the suffix '-ase' to the name of the substrate upon
which it works.  The six main classes of enzymes are as follows:
</p>
      <ol>
            <li> <a href="FAQ.php?sub=O"
class="sidelinks2">Oxidoreductases</a>
            <li> <a href="FAQ.php?sub=T"
class="sidelinks2">Transferases</a>
            <li> <a href="FAQ.php?sub=Hy"
class="sidelinks2">Hydrolases</a>
            <li> <a href="FAQ.php?sub=Ly"
class="sidelinks2">Lyases</a>
            <li> <a href="FAQ.php?sub=Is"
class="sidelinks2">Isomerases</a>
            <li> <a href="FAQ.php?sub=L"
class="sidelinks2">Ligases</a>
      </ol>
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Lectures</a><br><br>
                                      <a href="take_exam.php"
class="sidelinks">Take Exam</a><br>

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          Copyright 2006. </TD>
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</body></html>
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about.php

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by:</b></td></tr>
            <tr><td> <br>Anna Lisa R. Solis</td></tr>
                  <tr><td> BSCS, UP Manila</td></tr>
                  <tr><td> Email: <a
href="mailto:anna_lisa02@yahoo.com"
class="sidelinks">anna_lisa02@yahoo.com</a></td></tr>
                  <tr><td> in fulfillment of the requirements for
CS199</td></tr>
                  <tr><td> <br><b>Adviser:</b> Dr. Vincent
Peter C. Magboo</td></tr>
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class="sidelinks">View Lectures</a><br><br>
                  <a href="take_exam.php"
class="sidelinks">Take Exam</a><br>

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      <TD width="722"
background="images/pixi_med_grey.gif">&copy;
        Copyright 2006. </TD>
    </TR>
  </TABLE></td>
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</body></html>
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predict.php

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the sequence."; unset($submit);
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}?>
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<link href="images/myfreetemplates.css" rel="stylesheet"
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onLoad="MM_preloadImages('images/btn_main-
over.gif','images/btn_overview-over.gif','images/btn_services-
over.gif','images/products_btn-over.gif')">
<table width="775" height="100%" border="0" align="center"
cellpadding="0" cellspacing="0"
background="images/pixi_darkblue.jpg">
<tr>
<td height="7" colspan="2" valign="top"> <TABLE width="775"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD width="336"><IMG SRC="images/pixi_lightblue.jpg"
WIDTH=336 HEIGHT=7></TD>
      <TD width="16"><IMG SRC="images/topangle.jpg"
WIDTH=16 HEIGHT=7></TD>
      <TD background="images/pixi_light_grey.gif"><IMG
SRC="images/spacer.gif" WIDTH=423 HEIGHT=7></TD>
    </TR>
  </TABLE></td>
</tr>
<tr>
<td height="118" colspan="2" valign="top"> <table border="0"
cellpadding="0" cellspacing="0" id="navtable">
    <tr>
      <td width="352" rowspan="3"><TABLE width="352"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
        <TR>
          <TD><IMG SRC="images/logo.gif"  width=219
height=118></TD>
          <TD><IMG SRC="images/toptreatment1.jpg"
WIDTH=133 HEIGHT=118></TD>
        </TR>
      </TABLE></td>
      <td width="423" background="images/pixi_light_grey.gif">
<TABLE BORDER=0 CELLPADDING=0 CELLSPACING=0>
        <TR>
          <TD width="87"><IMG SRC="images/topcurve2.jpg"
WIDTH="87" HEIGHT="43"></TD>
          <TD width="336"
background="images/pixi_light_grey.gif" align="center">
```

```
        <font color="#000000" face ="Lucida Handwriting"
style="font-size: 11pt; font-weight: 700"><b>Enzyme
Subfamily Class Prediction Application</b></font></TD>
        </TR>
       </TABLE></td>
   </tr>
   <tr>
    <td width="423" background="images/pixi_light_grey.gif">
<TABLE width="100%" BORDER=0 CELLPADDING=0
CELLSPACING=0>
        <TR>
         <TD width="277"><IMG SRC="images/topcurve3.jpg"
WIDTH=277 HEIGHT=20></TD>
         <TD width="146"
background="images/pixi_light_grey.gif"><IMG
SRC="images/spacer.gif" WIDTH=146 HEIGHT=20></TD>
        </TR>
       </TABLE></td>
   </tr>
   <tr>
    <td width="423"> <TABLE BORDER=0 CELLPADDING=0
CELLSPACING=0>
        <TR>
         <TD width="66"><IMG
SRC="images/toptreatment1a.jpg" WIDTH=66
HEIGHT=55></TD>
         <TD width="72"><A HREF="index.php"><IMG
SRC="images/home.jpg" NAME="btn_main" WIDTH=72
HEIGHT=55 BORDER=0 ></A></TD>
         <TD width="89"><A HREF="login2.php"><IMG
SRC="images/log-in.jpg" NAME="btn_overview" WIDTH=89
HEIGHT=55 BORDER=0 ></A></TD>
         <TD width="81"><A HREF="FAQ.php"><IMG
SRC="images/blank2.jpg" NAME="btn_services" WIDTH=81
HEIGHT=55 BORDER=0 ></A></TD>
         <TD width="72"><A HREF="about.php"><IMG
SRC="images/blank1.jpg" NAME="products" WIDTH=72
HEIGHT=55 BORDER=0 ></A></TD>
         <TD width="43"><IMG SRC="images/topnavend.jpg"
WIDTH=43 HEIGHT=55></TD>
        </TR>
       </TABLE></td>
   </tr>
  </table></td>
</tr>
<tr>
<td height="69" colspan="2" valign="top">
  <TABLE BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD ROWSPAN=2 WIDTH=219 HEIGHT=69></TD>
      <TD><IMG SRC="images/toptreatment2.jpg" WIDTH=199
HEIGHT=20></TD>
      <TD ROWSPAN=2><IMG SRC="images/pixi_darkblue.jpg"
WIDTH=182 HEIGHT=69></TD>
      <TD ROWSPAN=2><img src="images/sidetop.jpg"
width="175" height="69"></TD>
    </TR>
    <TR>
      <TD background="images/pixi_darkblue.jpg"><IMG
SRC="images/spacer.gif" WIDTH=199 HEIGHT=49></TD>
    </TR>
  </TABLE>
</td>
</tr>
<tr>
<td width="600" valign="top">
  <TABLE BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD width="53"><IMG SRC="images/spacer.gif" WIDTH=10
HEIGHT=213></TD>
      <TD valign="top"><IMG SRC="images/spacer.gif"
WIDTH=579 HEIGHT=8><br>
<? if (isset($submit)){
if(!$file=fopen($filename,"r")){
                echo("Could not open the file");
}else{
        $file_name=basename($filename);
        if($vectorFileName==''){
                $vectorFileName=basename($filename);}
?>
        <form  name="frm" method="post"
action="composition.php">
                <table width="100%">
                        <tr>
                                <td
class="label" valign="center" align = "center"
colspan="2"><h2>PREDICT ENZYME SUBFAMILY</h2></td>
                        </tr>

                        <tr>
                                <td
class="label" valign="center"><b>File contains the following
Sequence: </b><br><br></td>

        <td><input type="hidden" name="filename"
value=<? echo "\"$filename\"";?> size="50"></td>
                        </tr>
                        <tr>
        <td class="label" valign="center" colspan="2">

<?
        $cnt=0;
        $x=2;
        $mul=10;
        while(!feof($file)){
                $ch=fgetc($file);
                if($ch=='A'||$ch=='C'||$ch=='D'||
$ch=='E'||$ch=='F'||$ch=='G'||$ch=='H'||$ch=='I'||$ch=='K'||
$ch=='L'||$ch=='M'||$ch=='N'||$ch=='P'||$ch=='Q'||
$ch=='R'||$ch=='S'||$ch=='T'||$ch=='V'||$ch=='W'||$ch=='Y')
{
                        $seq.=$ch;
                        $cnt++;
                        if($cnt%10==0){
                                $seq.="  ";
                                if($cnt%
($mul*10)==0){
                         $x++; $mul*=10;
                                }
                         for($j=1;$j<=10-$x;$j++){
                                 $hd.=" ";
                                }
                        $hd.=$cnt."  ";
                        }
                     if($cnt%60==0){     echo "<font
face=\"COURIER\" class=\"nb\">$hd <BR> $seq
</font><BR><BR>";
                        $row++;$seq='';$hd='';
                        }
                }
        }
        if($seq!=''){
                echo "<font face=\"COURIER\"
class=\"nb\">$hd <BR> $seq </font><BR><BR>";
        }
        echo "<br><br><b>Sequence Length:</b>$cnt";
}
fclose($file);
?>
                        </td></tr>
                        <tr>
                        <td colspan="2"
align="center"><br><input name="predict" type="submit"
class="submit" value="Predict Subfamily"></td></tr>
                        <tr><td colspan="2"
align="center"><br><a href="predict.php"
class="sidelinks2">BACK</a></td></tr>
        </table>
        </form>
<?}else{        ?>
    <form  name="frm" method="post" action="predict.php">
                <table>
                        <tr><td class="label"
valign="center" align = "center" colspan="2"><h2>PREDICT
ENZYME SUBFAMILY</h2></td></tr>
<?if(isset($err_msge)){?>
                        <tr><td class="label"
valign="center" align="center" colspan="2"><font
color="YELLOW"><?echo "$err_msge";?
></font><br><br></td></tr>
<? } ?>                 <tr><td class="label"
valign="center" colspan="2" align="center"><b>Upload file
containig the sequence of an enzyme<br><br></b></td></tr>
```

```
                                    <tr><td class="label"
valign="center">File Path:</td>
                                <td><input type="file" name="filename"
value=<? echo "\"$filename\"";?> size="50"></td></tr>
                                    <tr><td colspan="2"
align="center"><br><input name="submit" type="submit"
class="submit" value="View File"><input type="reset"
class="submit" value="Clear"></td></tr>
            </table>
            </form>
<? } ?>
     </TD>
     <TD width="21"><IMG SRC="images/spacer.gif" WIDTH=11
HEIGHT=213></TD>
   </TR>
  </TABLE></td>
<td width="175" valign="top"
background="images/sidebg.jpg"><img src="images/spacer.gif"
width=175 height=23>
  <a href="#" class="sidelinks"></a>
  <table width="175" border="0" cellspacing="0"
cellpadding="0">
    <tr>
     <td width="13%"> </td>
     <td width="75%"><a href="predict.php"
class="sidelinks">Predict</a><br><br>
            <a href="view_file.php" class="sidelinks">View
Lectures</a><br><br>
            <a href="take_exam.php" class="sidelinks">Take
Exam</a><br>
     </td>
     <td width="12%"> </td>
    </tr>
  </table>
</td>
</tr>
<tr>
<td height="67" colspan="2" valign="top"><TABLE width="775"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
   <TR>
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HEIGHT=67></TD>
     <TD width="175"><IMG SRC="images/base2.jpg"
WIDTH=175 HEIGHT=67></TD>
   </TR>
  </TABLE></td>
</tr>
<tr>
<td height="26" colspan="2" valign="top"> <TABLE
width="775" BORDER=0 CELLPADDING=0 CELLSPACING=0>
   <TR>
     <TD width="53"><IMG SRC="images/pixi_med_grey.gif"
WIDTH=53 HEIGHT=26></TD>
     <TD width="722"
background="images/pixi_med_grey.gif">&copy;
      Copyright 2006.</TD>
   </TR>
  </TABLE></td>
</tr>
</table>
</body></html>
```

composition.php

```
<html><head>
<title>Enzyme Subfamily Class Prediction Application -
Predict</title>
<script language="JavaScript" type="text/JavaScript"
src="images/myfreetemplates.js"></script>
<link href="images/myfreetemplates.css" rel="stylesheet"
type="text/css">
</head>
<body background="images/pixi_lightblue.jpg" leftmargin="0"
topmargin="0" marginwidth="0" marginheight="0"
onLoad="MM_preloadImages('images/btn_main-
over.gif','images/btn_overview-over.gif','images/btn_services-
over.gif','images/products_btn-over.gif')">
<table width="775" height="100%" border="0" align="center"
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WIDTH=16 HEIGHT=7></TD>
     <TD background="images/pixi_light_grey.gif"><IMG
SRC="images/spacer.gif" WIDTH=423 HEIGHT=7></TD>
   </TR>
  </TABLE></td>
</tr>
<tr>
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cellpadding="0" cellspacing="0" id="navtable">
   <tr>
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        <TR>
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height=118></TD>
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WIDTH=133 HEIGHT=118></TD>
        </TR>
       </TABLE></td>
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<TABLE BORDER=0 CELLPADDING=0 CELLSPACING=0>
        <TR>
         <TD width="87"><IMG SRC="images/topcurve2.jpg"
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         <TD width="336"
background="images/pixi_light_grey.gif" align="center">
         <font color="#000000" face ="Lucida Handwriting"
style="font-size: 11pt; font-weight: 700"><b>Enzyme
Subfamily Class Prediction Application</b></font></TD>
        </TR>
       </TABLE></td>
   </tr>
   <tr>
     <td width="423" background="images/pixi_light_grey.gif">
<TABLE width="100%" BORDER=0 CELLPADDING=0
CELLSPACING=0>
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         <TD width="277"><IMG SRC="images/topcurve3.jpg"
WIDTH=277 HEIGHT=20></TD>
         <TD width="146"
background="images/pixi_light_grey.gif"><IMG
SRC="images/spacer.gif" WIDTH=146 HEIGHT=20></TD>
        </TR>
       </TABLE></td>
   </tr>
   <tr>
     <td width="423"> <TABLE BORDER=0 CELLPADDING=0
CELLSPACING=0>
        <TR>
         <TD width="66"><IMG
SRC="images/toptreatment1a.jpg" WIDTH=66
HEIGHT=55></TD>
         <TD width="72"><A HREF="index.php"><IMG
SRC="images/home.jpg" NAME="btn_main" WIDTH=72
HEIGHT=55 BORDER=0 ></A></TD>
         <TD width="89"><A HREF="login2.php"><IMG
SRC="images/log-in.jpg" NAME="btn_overview" WIDTH=89
HEIGHT=55 BORDER=0 ></A></TD>
         <TD width="81"><A HREF="FAQ.php"><IMG
SRC="images/blank2.jpg" NAME="btn_services" WIDTH=81
HEIGHT=55 BORDER=0 ></A></TD>
         <TD width="72"><A HREF="about.php"><IMG
SRC="images/blank1.jpg" NAME="products" WIDTH=72
HEIGHT=55 BORDER=0 ></A></TD>
         <TD width="43"><IMG SRC="images/topnavend.jpg"
WIDTH=43 HEIGHT=55></TD>
        </TR>
       </TABLE></td>
   </tr>
  </table></td>
</tr>
<tr>
<td height="69" colspan="2" valign="top">
  <TABLE BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
     <TD ROWSPAN=2 WIDTH=219 HEIGHT=69></TD>
     <TD><IMG SRC="images/toptreatment2.jpg" WIDTH=199
HEIGHT=20></TD>
```

```
    <TD ROWSPAN=2><IMG SRC="images/pixi_darkblue.jpg"
WIDTH=182 HEIGHT=69></TD>
    <TD ROWSPAN=2><img src="images/sidetop.jpg"
width="175" height="69"></TD>
   </TR>
   <TR>
    <TD background="images/pixi_darkblue.jpg"><IMG
SRC="images/spacer.gif" WIDTH=199 HEIGHT=49></TD>
   </TR>
  </TABLE>
</td>
</tr>
<tr>
<td width="600" valign="top" align="center" >
<? include("scripts/connect.php");
if(isset($predict)){
            //assign hydrophobicity and hydrophilicity values
            $pho[1]=0.616;$phi[1]=-0.5;
            $pho[2]=0.680;$phi[2]=-1.0;
            $pho[3]=0.028;$phi[3]=+3.0 ;
            $pho[4]=0.043;$phi[4]=+3.0 ;
            $pho[5]=1.00;$phi[5]=-2.5;
            $pho[6]=0.501;$phi[6]=0;
            $pho[7]=0.165;$phi[7]=-0.5;
            $pho[8]=0.943;$phi[8]=-1.8;
            $pho[9]=0.283;$phi[9]=+3.0;
            $pho[10]=0.943;$phi[10]=-1.8;
            $pho[11]=0.738;$phi[11]=-1.3;
            $pho[12]=0.236;$phi[12]=+0.2;
            $pho[13]=0.711;$phi[13]=-0.5;
            $pho[14]=0.251;$phi[14]=+0.2;
            $pho[15]=0.000;$phi[15]=+3.0;
            $pho[16]=0.359;$phi[16]=+0.3;
            $pho[17]=0.450;$phi[17]=-0.4;
            $pho[18]=0.825;$phi[18]=-1.5;
            $pho[19]=0.878;$phi[19]=-3.4;
            $pho[20]=0.880;$phi[20]=-2.3;
             if(!$file=fopen($filename,"r")){
                        echo("Could not open the file");
             }else{
                        $length=0;
                        while(!feof($file)){
                                    $ch=fgetc($file);
                                    if($ch=='A'||$ch=='C'||
$ch=='D'||$ch=='E'||$ch=='F'||$ch=='G'||$ch=='H'||$ch=='I'||
$ch=='K'||$ch=='L'||$ch=='M'||$ch=='N'||$ch=='P'||
$ch=='Q'||$ch=='R'||$ch=='S'||$ch=='T'||$ch=='V'||
$ch=='W'||$ch=='Y'){
                                                $length++;

            $sequence[$length]=$ch;
                                    }
                        }
                        fclose($file);
                        //count occurrence frequency of each AA
and assign original hydrophobicity and hydrophilicity values
                        for($i=1;$i<=$length;$i++){
                                    switch($sequence[$i]){
                                    case "A":
                                    case "a":$h01[$i]=$pho[1];
$h02[$i]=$phi[1];$amino[0]++;break;
                                    case "C":
                                    case "c":$h01[$i]=$pho[2];
$h02[$i]=$phi[2];$amino[1]++;break;
                                    case "D":
                                    case "d":$h01[$i]=$pho[3];
$h02[$i]=$phi[3];$amino[2]++;break;
                                    case "E":
                                    case "e":$h01[$i]=$pho[4];
$h02[$i]=$phi[4];$amino[3]++;break;
                                    case "F":
                                    case "f":$h01[$i]=$pho[5];
$h02[$i]=$phi[5];$amino[4]++;break;
                                    case "G":
                                    case "g":$h01[$i]=$pho[6];
$h02[$i]=$phi[6];$amino[5]++;break;
                                    case "H":
                                    case "h":$h01[$i]=$pho[7];
$h02[$i]=$phi[7];$amino[6]++;break;
                                    case "I":
                                    case "i":$h01[$i]=$pho[8];
$h02[$i]=$phi[8];$amino[7]++;break;
                                    case "K":
                                    case "k":$h01[$i]=$pho[9];
$h02[$i]=$phi[9];$amino[8]++;break;
                                    case "L":
                                    case "l":$h01[$i]=$pho[10];
$h02[$i]=$phi[10];$amino[9]++;break;
                                    case "M":
                                    case "m":$h01[$i]=$pho[11];
$h02[$i]=$phi[11];$amino[10]++;break;
                                    case "N":
                                    case "n":$h01[$i]=$pho[12];
$h02[$i]=$phi[12];$amino[11]++;break;
                                    case "P":
                                    case "p":$h01[$i]=$pho[13];
$h02[$i]=$phi[13];$amino[12]++;break;
                                    case "Q":
                                    case "q":$h01[$i]=$pho[14];
$h02[$i]=$phi[14];$amino[13]++;break;
                                    case "R":
                                    case "r":$h01[$i]=$pho[15];
$h02[$i]=$phi[15];$amino[14]++;break;
                                    case "S":
                                    case "s":$h01[$i]=$pho[16];
$h02[$i]=$phi[16];$amino[15]++;break;
                                    case "T":
                                    case "t":$h01[$i]=$pho[17];
$h02[$i]=$phi[17];$amino[16]++;break;
                                    case "V":
                                    case "v":$h01[$i]=$pho[18];
$h02[$i]=$phi[18];$amino[17]++;break;
                                    case "W":
                                    case "w":$h01[$i]=$pho[19];
$h02[$i]=$phi[19];$amino[18]++;break;
                                    case "Y":
                                    case "y":$h01[$i]=$pho[20];
$h02[$i]=$phi[20];$amino[19]++;break;
                                    default:break;
                                    }
                        }
                        //standard conversion of the
hydrophobicity values
                        $sum=0;
                        for($k=1;$k<=20;$k++){
                                    $sum=$sum+$pho[$k];
                        }
                        $sum=$sum/20;
                        $sumU=0;
                        for($u=1;$u<=20;$u++){
                                    $sumU=$sumU+($pho[$u]-
$sum)*($pho[$u]-$sum);
                        }
                        $sumU=sqrt($sumU/20);
                        for($i=1;$i<=$length;$i++){
                                    $h1[$i]=($h01[$i]-$sum)/
$sumU;
                        }
                        $sum=0;
                        for($k=1;$k<=20;$k++){
                                    $sum=$sum+$phi[$k];
                        }
                        $sum=$sum/20;
                        $sumU=0;
                        for($u=1;$u<=20;$u++){
                                    $sumU=$sumU+($phi[$u]-
$sum)*($phi[$u]-$sum);
                        }
                        $sumU=sqrt($sumU/20);
                        for($i=1;$i<=$length;$i++){
                                    $h2[$i]=($h02[$i]-$sum)/
$sumU;
                        }
                        //correlation factors
                        $k=0;
                        for($j=1;$j<=18;$j++){
                                    if(($j%2)!=0)
                                                $k++;

                                    $l=$length-$k;
                                    $sum=0;
                                    for($i=1;$i<=$l;$i++){
                                                if(($j%2)!=0){
```

```
		$sum=$sum+$h1[$i]*$h1[$i+$k];
                                        }else{

		$sum=$sum+$h2[$i]*$h2[$i+$k];
                                        }
                                }
                                $T[$j]=$sum/$l;
                        }
                        //compute the amphiphilic pseudo amino
acid composition P[u]
                        $sum=0;
                        for($i=1;$i<=20;$i++){
                                $sum=$sum+$amino[$i-1];
                        }
                        $sumT=0;
                        for($j=1;$j<=18;$j++){
                                $sumT=$sumT+$T[$j];
                        }
                        for($u=1;$u<=38;$u++){
                                if($u<=20){
                                        $P[$u]=$amino[$u-
1]/($sum+0.5*$sumT);
                                }else{
                                        $P[$u]=(0.5*$T[$u-
20])/($sum+0.5*$sumT);
                                }
                        }
                        //save vector to file
                        $file_name=basename($filename);
                        $vFileName="vector/".$file_name;
                        if(!$file=fopen($vFileName,"w")){
                                        echo("Could not open
the file");
                        }
                        else{
                                for($i=1;$i<=38;$i++){
                                        fputs($file,$P[$i]);
                                        fputs($file,"\n");

                                }
                                fclose($file);
                        }
                }
$file_name=basename($filename);
?>

                <form  name="frm" method="post"
action="augmentedCDP2.php">
                        <table width="90%">
                                <tr><td class="label"
valign="center" align = "center" colspan="2"><h2>PREDICT
ENZYME SUBFAMILY</h2></td></tr>
                                <tr><td class="label"
valign="center" align="center"><h5>The Amphiphilic Pseudo
Amino Acid Composition of the Query Enzyme </h5></td>
                        <td><input type="hidden"
name="filename" value=<? echo "\"$filename\"";?>
size="50"></td></tr>
                        <tr><td class="label" valign="center"
align = "justify" colspan="2"><p>This composition is a discrete
form to represent an enzyme  that will allow accommodation of
partial, if not all, sequence-order information. For a more
detailed discussion about this composition see lecture about
<i><a href="APAAC.php" class="sidelinks2"
target="_blank">Predicting Subfamily
Classes</a>.</i></p></td></tr>
                        <tr><td class="label" valign="center"
colspan="2" align="center">
<?
                if(!$file=fopen($vFileName,"r")){
                        echo("Could not open the file");
                }else{
                        $arrText=file($vFileName);
                        echo("<TABLE border=\"0\"
cellpadding=\"0\" cellspacing=\"0\">");
                        echo("<TR><TD align=\"center\">");
                        for($b=0;$b<38;$b++){
                                printf("<br> %.15f ",
$arrText[$b]);
                        }
                        echo("<br><br></TD></TR>");
                                echo("</TABLE>");
                }

                fclose($file);
?>
                                        </td></tr>
                                        <tr><td colspan="2"
align="right"><br><input name="next" type="submit"
class="submit" value="Continue"></td></tr>
                                </table>
                        </form>
<?}?>
</td>
<td width="175" valign="top"
background="images/sidebg.jpg"><img src="images/spacer.gif"
width=175 height=23>
  <a href="#" class="sidelinks"></a>
  <table width="175" border="0" cellspacing="0"
cellpadding="0">
    <tr> <td width="13%"> </td>
      <td width="75%"><a href="predict.php"
class="sidelinks">Predict</a><br><br>
      <a href="view_file.php" class="sidelinks">View
Lectures</a><br><br>
       <a href="take_exam.php" class="sidelinks">Take
Exam</a><br>
      </td>
      <td width="12%"> </td>
  </tr></table>
</td></tr>
<tr>
<td height="67" colspan="2" valign="top"><TABLE width="775"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD><IMG SRC="images/base1.jpg" WIDTH=600
HEIGHT=67></TD>
      <TD width="175"><IMG SRC="images/base2.jpg"
WIDTH=175 HEIGHT=67></TD>
    </TR>
  </TABLE></td>
</tr>
<tr>
<td height="26" colspan="2" valign="top"> <TABLE
width="775" BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD width="53"><IMG SRC="images/pixi_med_grey.gif"
WIDTH=53 HEIGHT=26></TD>
      <TD width="722"
background="images/pixi_med_grey.gif">&copy;
       Copyright 2006.</TD>
    </TR>
  </TABLE></td>
</tr>
</table>
</body></html>
```

augmentedCDP2.php

```
<html><head>
<title>Enzyme Subfamily Class Prediction Application -
Predict</title>
<script language="JavaScript" type="text/JavaScript"
src="images/myfreetemplates.js"></script>
<link href="images/myfreetemplates.css" rel="stylesheet"
type="text/css">
</head>
<body background="images/pixi_lightblue.jpg" leftmargin="0"
topmargin="0" marginwidth="0" marginheight="0"
onLoad="MM_preloadImages('images/btn_main-
over.gif','images/btn_overview-over.gif','images/btn_services-
over.gif','images/products_btn-over.gif')">
<table width="775" height="100%" border="0" align="center"
cellpadding="0" cellspacing="0"
background="images/pixi_darkblue.jpg">
<tr>
<td height="7" colspan="2" valign="top"> <TABLE width="775"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD width="336"><IMG SRC="images/pixi_lightblue.jpg"
WIDTH=336 HEIGHT=7></TD>
      <TD width="16"><IMG SRC="images/topangle.jpg"
WIDTH=16 HEIGHT=7></TD>
```

```
    <TD background="images/pixi_light_grey.gif"><IMG
SRC="images/spacer.gif" WIDTH=423 HEIGHT=7></TD>
   </TR>
  </TABLE></td>
</tr>
<tr>
<td height="118" colspan="2" valign="top"> <table border="0"
cellpadding="0" cellspacing="0" id="navtable">
   <tr>
    <td width="352" rowspan="3"><TABLE width="352"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
       <TR>
        <TD><IMG SRC="images/logo.gif"  width=219
height=118></TD>
        <TD><IMG SRC="images/toptreatment1.jpg"
WIDTH=133 HEIGHT=118></TD>
       </TR>
      </TABLE></td>
    <td width="423" background="images/pixi_light_grey.gif">
<TABLE BORDER=0 CELLPADDING=0 CELLSPACING=0>
       <TR>
        <TD width="87"><IMG SRC="images/topcurve2.jpg"
WIDTH="87" HEIGHT="43"></TD>
        <TD width="336"
background="images/pixi_light_grey.gif" align="center">
        <font color="#000000" face ="Lucida Handwriting"
style="font-size: 11pt; font-weight: 700"><b>Enzyme
Subfamily Class Prediction Application</b></font></TD>
       </TR>
      </TABLE></td>
   </tr>
   <tr>
    <td width="423" background="images/pixi_light_grey.gif">
<TABLE width="100%" BORDER=0 CELLPADDING=0
CELLSPACING=0>
       <TR>
        <TD width="277"><IMG SRC="images/topcurve3.jpg"
WIDTH=277 HEIGHT=20></TD>
        <TD width="146"
background="images/pixi_light_grey.gif"><IMG
SRC="images/spacer.gif" WIDTH=146 HEIGHT=20></TD>
       </TR>
      </TABLE></td>
   </tr>
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    <td width="423"> <TABLE BORDER=0 CELLPADDING=0
CELLSPACING=0>
       <TR>
        <TD width="66"><IMG
SRC="images/toptreatment1a.jpg" WIDTH=66
HEIGHT=55></TD>
        <TD width="72"><A HREF="index.php"><IMG
SRC="images/home.jpg" NAME="btn_main" WIDTH=72
HEIGHT=55 BORDER=0 ></A></TD>
        <TD width="89"><A HREF="login2.php"><IMG
SRC="images/log-in.jpg" NAME="btn_overview" WIDTH=89
HEIGHT=55 BORDER=0 ></A></TD>
        <TD width="81"><A HREF="FAQ.php"><IMG
SRC="images/blank2.jpg" NAME="btn_services" WIDTH=81
HEIGHT=55 BORDER=0 ></A></TD>
        <TD width="72"><A HREF="about.php"><IMG
SRC="images/blank1.jpg" NAME="products" WIDTH=72
HEIGHT=55 BORDER=0 ></A></TD>
        <TD width="43"><IMG SRC="images/topnavend.jpg"
WIDTH=43 HEIGHT=55></TD>
       </TR>
      </TABLE></td>
   </tr>
  </table></td>
</tr>
<tr>
<td height="69" colspan="2" valign="top">
  <TABLE BORDER=0 CELLPADDING=0 CELLSPACING=0>
   <TR>
    <TD ROWSPAN=2 WIDTH=219 HEIGHT=69></TD>
    <TD><IMG SRC="images/toptreatment2.jpg" WIDTH=199
HEIGHT=20></TD>
    <TD ROWSPAN=2><IMG SRC="images/pixi_darkblue.jpg"
WIDTH=182 HEIGHT=69></TD>
    <TD ROWSPAN=2><img src="images/sidetop.jpg"
width="175" height="69"></TD>
   </TR>
   <TR>
    <TD background="images/pixi_darkblue.jpg"><IMG
SRC="images/spacer.gif" WIDTH=199 HEIGHT=49></TD>
   </TR>
  </TABLE>
</td>
</tr>
<tr>
<td width="600" valign="top" align="center" >
<?
if(isset($next))
{
echo "<h2>PREDICT ENZYME SUBFAMILY<br><br></h2>";
echo "<br><b>The following table summarizes the difference
between the query enzyme and <br> the norm of each
class/subfamily.</b><br><br>";
?>
        <TABLE BORDER=1 CELLPADDING=0
CELLSPACING=0>
   <TR><TD COLSPAN="2" valign="justify" align =
"center"></h2></TD></TR>
   <TR><TD ALIGN="center"><b>SUBFAMILY</b></TD>
        <TD ALIGN="center"><b>DIFFERENCE</b></TD>
   </TR>
<?
$file_name=basename($filename);
$enfilename="vector/".$file_name;
include("scripts/connect.php");
//finds distinct class m
$query="Select distinct(subfamily) from sequence where
family='O' order by subfamily";
$res=mysql_query($query);
$rowsSub=mysql_num_rows($res);
for($i=1;$i<=$rowsSub;$i++){
        $sub = mysql_fetch_row($res);
        $subfam[$i]=0;
        $subfam[$i]=$sub[0];
        //obtains the vector for each enzyme in each class m
        $S2 = array(array());
        $qeur="Select vfilename from sequence where
subfamily='$subfam[$i]'";
        $rslt=mysql_query($qeur);
        $rows=mysql_num_rows($rslt);
        for($k=1;$k<=$rows;$k++){
                $data = mysql_fetch_row($rslt);
                $name=$data[0];
                $fylname="vector/$subfam[$i]/".$name;
                if(!$file=fopen($fylname,"r")){
                                        echo("Could not open
the file");
                }else{

        $arrText=file($fylname);

        for($n=1;$n<=38;$n++){
                                                $S2[$k]
[$n]=$arrText[$n-1];

        $sumP[$n]=$sumP[$n]+$arrText[$n-1];
                                        }
                }
        }
        //standard vector for class m
        for($a=1;$a<=38;$a++){
                $PSub[$a]=$sumP[$a]/$rows;
        }
        //compute P-PSub
        if(!$file=fopen($enfilename,"r")){
                echo("Could not open the file");
        }else{
                $arr=file($enfilename);
                $PS=array();
                for($a=1;$a<=38;$a++){
                        $PS[$a]=$arr[$a-1]-$PSub[$a];
                }
        }
//compute difference between query enzyme P and the norm of
class m using Mahalanobis distance
        //obtain covariance matrix
        $EX="A:=[[";
        $AMat=array(array());
        for($n=1;$n<=38;$n++){
```

```
                        for($k=1;$k<=$rows;$k++){
                                $AMat[$n][$k]=($S2[$k][$n]-
$PSub[$n])/(sqrt($rows-1));
                                $EX=$EX.$AMat[$n][$k];
                                if($k<$rows)
                                {
                                        $EX=$EX.",";
                                }
                        }
                        if($n<38)
                                $EX=$EX."],[";
                }
                $EX=$EX."]];";
                //input matrix PST
                $EX=$EX."PST:=[";
                for($b=1;$b<=38;$b++)
                {
                        $EX=$EX.$PS[$b];
                        if($b<=37)
                        {
                                $EX=$EX." , ";
                        }
                }
                        $EX=$EX."];";
                $EX=$EX."with(linalg): AMat := convert(A,Matrix);
ATrans:=transpose(AMat); Cov:=multiply(AMat, ATrans); PT :=
convert(PST,Matrix); SIn:=inverse( Cov ); P:=transpose(PT);
DT:=det(Cov); M:=multiply(PT, SIn, P); deter:=
convert([ln(DT)],Matrix); A:= convert(M,Matrix); di:=A +
deter;";
                $error          = 0;
                $path           =
"c:/apache/htdocs/enzyme3/";
                $fname          = "MapleCommands.txt";
                $bname          = "BatchFile.bat";
                $rname          = "Result.txt";
                $filename  = $path."".$fname;
                $batch          = $path."".$bname;
                $resname  = $path."".$rname;
                $pathmod = "path=%path%;C:/Program Files/Maple
8/bin.win;C:/Program Files/Maple 8/LIB\n";
                $bcontent = $pathmod."cmaple8 -i \"".$fname."\"
-e0";
                $content   = "restart;\n$EX\nExpEval := eval[8]
(%);\nExpEval := convert(ExpEval,'name'):\nFileDesc :=
fopen(\"".$rname."\",
WRITE):\nfprintf(FileDesc,\"%s\",ExpEval):\nfclose(FileDesc):\nq
uit;";
                if (!empty($EX)){
                    if (!$handle = fopen($filename, 'w+')){
                                echo "Cannot open file
($filename)";
                                exit;
                }
                if (fwrite($handle, $content) == FALSE){
                      echo "Cannot write to file ($filename)";
                    exit;
                }
                fclose($handle);
                }
                if(is_writable($filename) && $error==0){
                if (!$bhandle = fopen($batch, 'w+b')) {
                                echo "Cannot open file
($batch)<br>";
                                exit;
                        }
                        if (fwrite($bhandle, $bcontent) == FALSE)
{
                                echo "Cannot write to file
($batch)<br>";
                                exit;
                        }
                        fclose($bhandle);
                }
                if(is_writable($batch) && $error==0){
                        system($bname.">BatchFileResults.txt");
                }
                if(is_writable($rname) && $error==0){
                        $handle = fopen($rname, "rb");
                        $ans = '';
                        while (!feof($handle)) {
                                $ans .= fread($handle, 8192);
                        }
                        fclose($handle);
                }
                if( strstr($ans,']') && strstr($ans,'[') ){
                        $string=$ans; $a=array();

                        $tok = strtok($string, "[]");
                        while ($tok) {
                                if(trim($tok)!=","){
                                        $b = preg_split("/,/",
$tok);
                                        array_push($a,$b);
                                }
                                $tok = strtok("[]");
                        }
                }
                $diff[$i]=abs($a[1][0]);
                  //choose minimum difference
                        if($diff[$i]<$MinDiff || $i==1)
                        {
                        $MinDiff=$diff[$i];
                        $EnSub=$subfam[$i];
                }
}
fclose($file);
unlink("$enfilename");
for($i=1;$i<=$rowsSub;$i++){
                if($subfam[$i]==$EnSub){
                        echo "<TR><TD align=\"center\"
bgcolor=\"GRAY\"><font color=\"BLACK\"><b> $subfam[$i]
</b></font></TD>";
                        printf( "<TD align=\"right\"
bgcolor=\"GRAY\"><font color=\"BLACK\"><b> %.3f
</b></font></TD></TR>",$diff[$i]);
                }else{
                        echo "<TR><TD align=\"center\">
$subfam[$i] </TD>";
                        printf( "<TD align=\"right\"> %.3f
</TD></TR>",$diff[$i]);
                        }
}
                echo("</TABLE><br><br><b>The query enzyme
belongs to subfamily $EnSub.</b><br><br>");
                switch($EnSub){
                case 1:echo("Subfamily 1 includes oxidoreductases
that act on the CH-OH group of donors. ");
                                break;
                case 2:echo("Subfamily 2 includes oxidoreductases
that act on the aldehyde or oxo group of donors. ");
                                break;
                case 3:echo("Subfamily 3 includes oxidoreductases
that act on the CH-CH group of donors. ");
                                break;
                case 4:echo("Subfamily 4 includes oxidoreductases
that act on the CH-NH2 group of donors.");
                                break;
                case 5:echo("Subfamily 5 includes oxidoreductases
that act on CH-NH group of donors. ");
                                break;
                case 6:echo("Subfamily 6 includes oxidoreductases
that act on NADH or NADPH. ");
                                break;
                case 7:echo("Subfamily 7 includes oxidoreductases
that act on other nitrogenous compounds as donors. ");
                                break;
                case 8:echo("Subfamily 8 includes oxidoreductases
that act on a sulfur group of donors. ");
                                break;
                case 9:echo("Subfamily 9 includes oxidoreductases
that act on a heme group of donors. ");
                                break;
                case 10:echo("Subfamily 10 includes oxidoreductases
that act on diphenols and related substances as donors.");
                                break;
                case 11:echo("Subfamily 11 includes oxidoreductases
that act on peroxide as an acceptor (peroxidases). ");
                                break;
                case 12:echo("Subfamily 12 includes oxidoreductases
that act on single donors with incorporation of molecular oxygen
(oxygenases). ");
                                break;
```

```
            case 13:echo("Subfamily 13 includes oxidoreductases
that act on paired donors with incorporation of molecular oxygen.
");
                                    break;
            case 14:echo("Subfamily 14 includes oxidoreductases
that act on superoxide radicals as acceptors. ");
                                    break;
            case 15:echo("Subfamily 15 includes oxidoreductases
that act on CH or CH2 groups. ");
                                    break;
            case 16:echo("Subfamily 16 includes oxidoreductases
that act on iron-sulfur proteins as donors. ");
                                break;
            }
            if($MinDiff>10000)
                            echo "<br><br>Note: The difference is
quite large. Most likely the enzyme belongs to other subfamily or
outside of the family oxidoreductases.";
            ?><br><br><br><a href="predict.php"
class="sidelinks2" ><b>Predict another enzyme<b></a>
<?
}
?>
</td>
<td width="175" valign="top"
background="images/sidebg.jpg"><img src="images/spacer.gif"
width=175 height=23>
  <a href="#" class="sidelinks"></a>
  <table width="175" border="0" cellspacing="0"
cellpadding="0">
    <tr>
      <td width="13%"> </td>
      <td width="75%"><a href="predict.php"
class="sidelinks">Predict</a><br><br>
                                                    <a
href="view_file.php" class="sidelinks">View
Lectures</a><br><br>
                                        <a href="take_exam.php"
class="sidelinks">Take Exam</a><br>

      </td>
      <td width="12%"> </td>
    </tr>
  </table>
</td>
</tr>
<tr>
<td height="67" colspan="2" valign="top"><TABLE width="775"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD><IMG SRC="images/base1.jpg" WIDTH=600
HEIGHT=67></TD>
      <TD width="175"><IMG SRC="images/base2.jpg"
WIDTH=175 HEIGHT=67></TD>
    </TR>
  </TABLE></td>
</tr>
<tr>
<td height="26" colspan="2" valign="top"> <TABLE
width="775" BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD width="53"><IMG SRC="images/pixi_med_grey.gif"
WIDTH=53 HEIGHT=26></TD>
      <TD width="722"
background="images/pixi_med_grey.gif">&copy;
       Copyright 2006.</TD>
    </TR>
  </TABLE></td>
</tr>
</table>
</body></html>
```

view_file.php

```
<html><head>
<title>Enzyme Subfamily Class Prediction Application - View
Lectures</title>
<script language="JavaScript" type="text/JavaScript"
src="images/myfreetemplates.js"></script>
<link href="images/myfreetemplates.css" rel="stylesheet"
type="text/css">
</head>
<body background="images/pixi_lightblue.jpg" leftmargin="0"
topmargin="0" marginwidth="0" marginheight="0"
onLoad="MM_preloadImages('images/btn_main-
over.gif','images/btn_overview-over.gif','images/btn_services-
over.gif','images/products_btn-over.gif')">
<table width="775" height="100%" border="0" align="center"
cellpadding="0" cellspacing="0"
background="images/pixi_darkblue.jpg">
<tr>
<td height="7" colspan="2" valign="top"> <TABLE width="775"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
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WIDTH=16 HEIGHT=7></TD>
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SRC="images/spacer.gif" WIDTH=423 HEIGHT=7></TD>
    </TR>
  </TABLE></td>
</tr>
<tr>
<td height="118" colspan="2" valign="top"> <table border="0"
cellpadding="0" cellspacing="0" id="navtable">
    <tr>
      <td width="352" rowspan="3"><TABLE width="352"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
        <TR>
          <TD><IMG SRC="images/logo.gif"  width=219
height=118></TD>
          <TD><IMG SRC="images/toptreatment1.jpg"
WIDTH=133 HEIGHT=118></TD>
        </TR>
       </TABLE></td>
      <td width="423" background="images/pixi_light_grey.gif">
<TABLE BORDER=0 CELLPADDING=0 CELLSPACING=0>
        <TR>
          <TD width="87"><IMG SRC="images/topcurve2.jpg"
WIDTH="87" HEIGHT="43"></TD>
          <TD width="336"
background="images/pixi_light_grey.gif" align="center">
          <font color="#000000" face ="Lucida Handwriting"
style="font-size: 11pt; font-weight: 700"><b>Enzyme
Subfamily Class Prediction Application</b></font></TD>
        </TR>
       </TABLE></td>
    </tr>
    <tr>
      <td width="423" background="images/pixi_light_grey.gif">
<TABLE width="100%" BORDER=0 CELLPADDING=0
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        <TR>
          <TD width="277"><IMG SRC="images/topcurve3.jpg"
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background="images/pixi_light_grey.gif"><IMG
SRC="images/spacer.gif" WIDTH=146 HEIGHT=20></TD>
        </TR>
       </TABLE></td>
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    <tr>
      <td width="423"> <TABLE BORDER=0 CELLPADDING=0
CELLSPACING=0>
        <TR>
          <TD width="66"><IMG
SRC="images/toptreatment1a.jpg" WIDTH=66
HEIGHT=55></TD>
          <TD width="72"><A HREF="index.php"><IMG
SRC="images/home.jpg" NAME="btn_main" WIDTH=72
HEIGHT=55 BORDER=0 ></A></TD>
          <TD width="89"><A HREF="login2.php"><IMG
SRC="images/log-in.jpg" NAME="btn_overview" WIDTH=89
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SRC="images/blank2.jpg" NAME="btn_services" WIDTH=81
HEIGHT=55 BORDER=0 ></A></TD>
          <TD width="72"><A HREF="about.php"><IMG
SRC="images/blank1.jpg" NAME="products" WIDTH=72
HEIGHT=55 BORDER=0 ></A></TD>
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WIDTH=43 HEIGHT=55></TD>
        </TR>
```

```
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   </tr>
  </table></td>
</tr>
<tr>
<td height="69" colspan="2" valign="top">
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      <TD ROWSPAN=2 WIDTH=219 HEIGHT=69></TD>
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HEIGHT=20></TD>
      <TD ROWSPAN=2><IMG SRC="images/pixi_darkblue.jpg"
WIDTH=182 HEIGHT=69></TD>
      <TD ROWSPAN=2><img src="images/sidetop.jpg"
width="175" height="69"></TD>
    </TR>
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      <TD background="images/pixi_darkblue.jpg"><IMG
SRC="images/spacer.gif" WIDTH=199 HEIGHT=49></TD>
    </TR>
  </TABLE>
</td>
</tr>
<tr>
<td width="600" valign="top">
  <TABLE BORDER=0 CELLPADDING=0 CELLSPACING=0
height="213">
    <TR>
      <TD width="600" >
<?include("/scripts/connect.php");           ?>
            <table class="main" align="center" cellspacing="0"
cellpadding="0" border="0">

                        <tr>
                                    <td colspan="2"  align="center"
valign="top">
                        <br><h2>VIEW LECTURES</h2>
<?$query="Select title,filename,uploaded_by,comment from
Lecture order by lec_no";
$result=mysql_query($query);
$rows1=mysql_num_rows($result);
$lowerlim=0;
$returnrows=10;
if((!empty($limit))&&($rows1>$limit)){
            $lowerlim=$limit;
}
$last=$returnrows-1;
if((!empty($last))&&($rows>$last)){
            $last=$last;
}
$quer="Select title,filename,uploaded_by,comment from Lecture
order by lec_no ASC limit $lowerlim, $returnrows";
$rslt=mysql_query($quer);
$rows=mysql_num_rows($rslt);
if($rows){
?>                                                          <table
width="90%" align="center" cellspacing="2" cellpadding="2"
border="1">

                                                            <tr>


            <td class="dark" align="center" width="5%"></td>

            <td class="dark" align="center"
width="30%">Title</td>

            <td class="dark" align="center">Description</td>
                                                            </tr>
<?                  $k=$limit;
            for($i = 0; $i < $rows; $i++){
                        $k++;
                        $data = mysql_fetch_row($rslt);
?>

            <tr>

                        <td class="light" align="center"><p
align="center"><? echo $k;?></td>

                        <td class="light" align="center"><p
align="left"><a href="../<?echo "enzyme3/lectures/$data[1]";?
>" class="sidelinks2" target="_blank"><?echo $data[0];?
></a></p></td>

                        <td class="light" align="center"><p
align="left"><?echo $data[3];?></p></td>

            </tr>
<?}?>
                                                            <tr><td
colspan="3" align="center">Note: To view a lecture, simply click
the title of the lecture you want to view. The lecture file will be
opened on a new window.

            </td></tr>
                                                </table><br><br>
<?                  mysql_free_result($result);
            if($lowerlim > ($returnrows-1)){
                        echo "<a href=\"view_file.php?limit=".
($lowerlim-$returnrows)."&last=".$last."\">Previous</a>";
            }
            echo "  Showing lectures ". ($limit+1) ." to ".($limit+
$rows)."  ";
            if(!($rows<$returnrows) && (($limit+$rows-1)<
($rows1-1))){
                        echo"<a href=\"view_file.php?limit=".
($lowerlim+$returnrows)."&last=".($lowerlim+$rows-
1)."\">Next</a>";
            }
}else{
?>                  <table width="90%" align="center"
cellspacing="2" cellpadding="2" border="0">
                        <tr><td class="light" colspan="2"
            align="center">  No files yet.</td></tr>
                        </table>
<?}?>               <br><br>
                        </td></tr>
            </table>
      </TD>
    </TR>
  </TABLE></td>
<td width="175" valign="top"
background="images/sidebg.jpg"><img src="images/spacer.gif"
width=175 height=23>
  <table width="175" border="0" cellspacing="0"
cellpadding="0">
    <tr>
      <td width="13%"> </td>
      <td width="75%"><a href="predict.php"
class="sidelinks">Predict</a><br><br>
                                                            <a
href="view_file.php" class="sidelinks">View
Lectures</a><br><br>
                                                <a href="take_exam.php"
class="sidelinks">Take Exam</a><br>
      </td>
      <td width="12%"> </td>
    </tr>
  </table>
</td>
</tr>
<tr>
<td height="67" colspan="2" valign="top"><TABLE width="775"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD><IMG SRC="images/base1.jpg" WIDTH=600
HEIGHT=67></TD>
      <TD width="175"><IMG SRC="images/base2.jpg"
WIDTH=175 HEIGHT=67></TD>
    </TR>
  </TABLE></td>
</tr>
<tr>
<td height="26" colspan="2" valign="top"> <TABLE
width="775" BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD width="53"><IMG SRC="images/pixi_med_grey.gif"
WIDTH=53 HEIGHT=26></TD>
      <TD width="722"
background="images/pixi_med_grey.gif">&copy;
        Copyright 2006. </TD>
    </TR>
  </TABLE></td>
```

```
</tr>
</table>
</body></html>
```

take_exam.php

```
<html><head>
<title>Enzyme Subfamily Class Prediction Application - Take
Exam</title>
<script language="JavaScript" type="text/JavaScript"
src="images/myfreetemplates.js"></script>
<link href="images/myfreetemplates.css" rel="stylesheet"
type="text/css">
</head>
<body background="images/pixi_lightblue.jpg" leftmargin="0"
topmargin="0" marginwidth="0" marginheight="0"
onLoad="MM_preloadImages('images/btn_main-
over.gif','images/btn_overview-over.gif','images/btn_services-
over.gif','images/products_btn-over.gif')">
<table width="775" height="100%" border="0" align="center"
cellpadding="0" cellspacing="0"
background="images/pixi_darkblue.jpg">
<tr>
<td height="7" colspan="2" valign="top"> <TABLE width="775"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
     <TD width="336"><IMG SRC="images/pixi_lightblue.jpg"
WIDTH=336 HEIGHT=7></TD>
     <TD width="16"><IMG SRC="images/topangle.jpg"
WIDTH=16 HEIGHT=7></TD>
     <TD background="images/pixi_light_grey.gif"><IMG
SRC="images/spacer.gif" WIDTH=423 HEIGHT=7></TD>
    </TR>
  </TABLE></td>
</tr>
<tr>
<td height="118" colspan="2" valign="top"> <table border="0"
cellpadding="0" cellspacing="0" id="navtable">
    <tr>
     <td width="352" rowspan="3"><TABLE width="352"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
        <TR>
         <TD><IMG SRC="images/logo.gif"  width=219
height=118></TD>
         <TD><IMG SRC="images/toptreatment1.jpg"
WIDTH=133 HEIGHT=118></TD>
        </TR>
       </TABLE></td>
     <td width="423" background="images/pixi_light_grey.gif">
<TABLE BORDER=0 CELLPADDING=0 CELLSPACING=0>
        <TR>
         <TD width="87"><IMG SRC="images/topcurve2.jpg"
WIDTH="87" HEIGHT="43"></TD>
         <TD width="336"
background="images/pixi_light_grey.gif" align="center">
                                <font color="#000000" face
="Lucida Handwriting" style="font-size: 11pt; font-weight:
700"><b>Enzyme Subfamily Class Prediction
Application</b></font></TD>
        </TR>
       </TABLE></td>
    </tr>
    <tr>
     <td width="423" background="images/pixi_light_grey.gif">
<TABLE width="100%" BORDER=0 CELLPADDING=0
CELLSPACING=0>
        <TR>
         <TD width="277"><IMG SRC="images/topcurve3.jpg"
WIDTH=277 HEIGHT=20></TD>
         <TD width="146"
background="images/pixi_light_grey.gif"><IMG
SRC="images/spacer.gif" WIDTH=146 HEIGHT=20></TD>
        </TR>
       </TABLE></td>
    </tr>
    <tr>
     <td width="423"> <TABLE BORDER=0 CELLPADDING=0
CELLSPACING=0>
        <TR>
         <TD width="66"><IMG
SRC="images/toptreatment1a.jpg" WIDTH=66
HEIGHT=55></TD>
         <TD width="72"><A HREF="index.php"><IMG
SRC="images/home.jpg" NAME="btn_main" WIDTH=72
HEIGHT=55 BORDER=0 ></A></TD>
         <TD width="89"><A HREF="login2.php"><IMG
SRC="images/log-in.jpg" NAME="btn_overview" WIDTH=89
HEIGHT=55 BORDER=0 ></A></TD>
         <TD width="81"><A HREF="FAQ.php"><IMG
SRC="images/blank2.jpg" NAME="btn_services" WIDTH=81
HEIGHT=55 BORDER=0 ></A></TD>
         <TD width="72"><A HREF="about.php"><IMG
SRC="images/blank1.jpg" NAME="products" WIDTH=72
HEIGHT=55 BORDER=0 ></A></TD>
         <TD width="43"><IMG SRC="images/topnavend.jpg"
WIDTH=43 HEIGHT=55></TD>
        </TR>
       </TABLE></td>
    </tr>
  </table></td>
</tr>
<tr>
<td height="69" colspan="2" valign="top">
  <TABLE BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
     <TD ROWSPAN=2 WIDTH=219 HEIGHT=69></TD>
     <TD><IMG SRC="images/toptreatment2.jpg" WIDTH=199
HEIGHT=20></TD>
     <TD ROWSPAN=2><IMG SRC="images/pixi_darkblue.jpg"
WIDTH=182 HEIGHT=69></TD>
     <TD ROWSPAN=2><img src="images/sidetop.jpg"
width="175" height="69"></TD>
    </TR>
    <TR>
     <TD background="images/pixi_darkblue.jpg"><IMG
SRC="images/spacer.gif" WIDTH=199 HEIGHT=49></TD>
    </TR>
  </TABLE>
</td>
</tr>
<tr>
<td width="600" valign="top">
  <TABLE BORDER=0 CELLPADDING=0 CELLSPACING=0
height="213">
    <TR>
     <TD width="600">
<?          include("scripts/connect.php");?>
           <table class="main" width="100%" align="center"
cellspacing="0" cellpadding="0" border="0">
<? if(!$done){?>
                        <tr>
                                <td colspan="2" align="center"
valign="top">
                                        <br><h2>TAKE AN
EXAM</h2>
                                        <table align="center"
width="90%" cellspacing="2" cellpadding="0" border="0">
<?          if(!(isset($topic))){
                        $query="Select distinct(topic) from
Questions ";
                        $result=mysql_query($query);
                        $rows=mysql_num_rows($result);
                        if(!$rows){
?><tr><td class="light" colspan="2"
align="center">  No exams yet.</td></tr>
<? }else{
                        $j=0;
                        for($i=0;$i<$rows;$i++){
                                $data =
mysql_fetch_row($result);
                                $quer="Select count(*) from
Questions where topic='$data[0]'";
                                $res=mysql_query($quer);
                                $ndata =
mysql_fetch_row($res);
                                if($ndata[0]>=5){
                                        $j++;
                                        if($j==1){
?>
                        <tr><td colspan="2" align="center">Click
the topic of the exam you want to take.<br><br></td></tr>
<?
                                        }
```

```
?>
                                        <tr><td
class="label"><br></td></tr>
                                <tr><td  colspan="2"><? echo
"$j. "; ?><a href="../<?echo "enzyme3/take_exam.php?
topic=$data[0]";?>" class="sidelinks2" ><? echo $data[0]; ?
></a></td></tr>
<?                                              }

                        }
                        if(!$j){
?>
                                        <tr>
                                                <td
class="light" colspan="2" align="center">  No
exams yet.</td>
                                        </tr>
<?
                        }
                }
 } else {
?>
                                                <tr>

                <td colspan="2"  align="center" valign="top">

                        <table align="center" width="90%"
cellspacing="2" cellpadding="0" border="0">

                                <tr>

                                        <td class="label"
align= "center" colspan="2"> <? echo "<b>TOPIC:
$topic</b><br><br>"; ?></td>

                                </tr>

                                <tr valign="top">

                                        <td
class="label">Instruction:</td>

                                        <td
class="simple">To answer a question, click the circle on the left
of the letter of your choice.   After you finish
answering all the questions, click the <i>Done</i> button at the
bottom of the page.</td>

                                </tr>

                                <tr>

                                        <td class="label"
colspan="2"><br>Questions:</td>

                                </tr>

                        </table>

                        <form  name="frm" method="post"
action="take_exam.php">

                        <table align="center" width="100%"
cellspacing="2" cellpadding="0" border="0">
<?                              $query="Select
question,A,B,C,D,q_no from Questions where topic='$topic' order
by RAND() limit 5";
                                $result=mysql_query($query);

                $rows=mysql_num_rows($result);
                                for($i=0;$i<$rows;$i++){
                                        $data =
mysql_fetch_row($result);
                                        $j=$i+1;
?>

                                        <tr>

                                                <td
width="6%" valign="top" align="right" class="label"><?echo
"$j";?>. </td>

                                                <td
class="simple" colspan="6"><p align="justify"><?echo
"$data[0]";?></p>

                                                <input
type="hidden" name="QNo[<?echo "$i";?>]" class="check"
value="<?echo "$data[5]";?>">

                                                <input
type="hidden" name="QNum" class="check" value="<?echo
"$rows";?>"></td></tr>
                                                <tr valign="top">
                                                <td></td>
                                                <td align="center"
width="3%"><input type="radio" name="pick[<?echo "$i";?>]"
class="check" value="A"></td>
                                                <td align="right"
width="2%" class="label">A. </td>
                                                <td width="42%"
class="simple"><?echo "$data[1]";?></td>
                                                <td align="center"
width="3%"><input type="radio" name="pick[<?echo "$i";?>]"
class="check" value="C"></td>
                                                <td align="right"
width="2%" class="label">C. </td>
                                                <td
class="simple"><?echo "$data[3]";?></td></tr>
                                                <tr valign="top">
                                                <td></td>
                                                <td align="center"
width="3%"><input type="radio" name="pick[<?echo "$i";?>]"
class="check" value="B"></td>
                                                <td align="right"
width="2%" class="label">B. </td>
                                                <td width="42%"
class="simple"><?echo "$data[2]";?></td>
                                                <td align="center"
width="3%"><input type="radio" name="pick[<?echo "$i";?>]"
class="check" value="D"></td>
                                                <td align="right"
width="2%" class="label">D. </td>
                                                <td
class="simple"><?echo "$data[4]";?></td></tr>
<?
                                }mysql_free_result($result);
?>

                                                <tr><td colspan="7"
align="center"><br>
                                <input type="hidden"
name="items" value="<?echo "$i";?>">
                                <input type="hidden"
name="topic" value="<?echo "$topic";?>">
                                <input type="submit"
class="submit" name="done" value=" Done "><input
type="reset" class="submit"></td></tr>
                        </table></form>
                <br><br></td></tr>
                                <tr><td  align="center"><a
href="take_exam.php" class="sidelinks2">Back to Topics</a>
                                </td></tr>
<? } ?>
                </table>
                                <br><br></td></tr>
<?} else {?>
                                <tr align="center"><td
colspan="2" align="center" valign="top">
                <br><h2>TAKE AN EXAM</h2>
                                <table width="600" align="center">


<?              include("scripts/connect.php");
                $score=0;
                for($in=0; $in<$QNum; $in++){
                        $query="Select correct from questions
where topic='$topic' and q_no=$QNo[$in] ";
                        $result=mysql_query($query);
                        $data = mysql_fetch_row($result);
                        if($pick[$in]==$data[0]) $score++;
                        mysql_free_result($result);
                }
```

```
            $score=100*($score/$QNum);
            for($in=0; $in<$QNum; $in++){
                        $query="Select question, correct,A,B,C,D
from questions where topic='$topic' and q_no=$QNo[$in] ";
                        $result=mysql_query($query);
                        $data = mysql_fetch_row($result);
                        $j=$in+1;
?>


            <tr><td align="justify" colspan="5"><? echo
("<br><b>$j.</b>   $data[0]");?>          </td></tr>

            <tr valign="top">

                        <td></td>

                        <td align="right" width="2%"
class="label">A. </td>


                        <td width="42%" class="simple"><?echo
"$data[2]";?></td>
                                    <td align="right" width="2%"
class="label">C. </td>
                                    <td class="simple"><?echo
"$data[4]";?></td>  </tr>
                        <tr valign="top"><td></td>
                                    <td align="right" width="2%"
class="label">B. </td>
                        <td width="42%" class="simple"><?echo
"$data[3]";?></td>
                        <td align="right" width="2%"
class="label">D. </td>
                        <td class="simple"><?echo "$data[5]";?
></td></tr>                 <tr><td align="justify"
colspan="5"><? if($pick[$in]==''){$pick[$in]="blank";} echo
("Your answer is $pick[$in].       <br><b>Correct answer is
$data[1].</b><br>");?>          </td></tr>
<?  } ?>
                        <tr><td align="center"
colspan=5><br><? printf ("<b>Your score is %.2f ",$score);
echo "  %!</b>";?></td></tr>
            </table>
</td></tr>
            <tr><td align="center"><a href="take_exam.php"
class="sidelinks2">Back to Topics</a>
            </td></tr>
<?} ?>
            </table>
      </TD>
    </TR>
  </TABLE></td>
<td width="175" valign="top"
background="images/sidebg.jpg"><img src="images/spacer.gif"
width=175 height=23>
  <table width="175" border="0" cellspacing="0"
cellpadding="0">
    <tr>
      <td width="13%"> </td>
      <td width="75%"><a href="predict.php"
class="sidelinks">Predict</a><br><br>
                                                <a
href="view_file.php" class="sidelinks">View
Lectures</a><br><br>
                                    <a href="take_exam.php"
class="sidelinks">Take Exam</a><br>
      </td>
      <td width="12%"> </td>
    </tr>
  </table>
</td>
</tr>
<tr>
<td height="67" colspan="2" valign="top"><TABLE width="775"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD><IMG SRC="images/base1.jpg" WIDTH=600
HEIGHT=67></TD>
      <TD width="175"><IMG SRC="images/base2.jpg"
WIDTH=175 HEIGHT=67></TD>
    </TR>
  </TABLE></td>
</tr>
<tr>
<td height="26" colspan="2" valign="top"> <TABLE
width="775" BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD width="53"><IMG SRC="images/pixi_med_grey.gif"
WIDTH=53 HEIGHT=26></TD>
      <TD width="722"
background="images/pixi_med_grey.gif">&copy;
Copyright 2006. </TD>
    </TR>
  </TABLE></td>
</tr>
</table>
</body></html>
```

/sysad/index.php

```
<?          session_register("sysad");        ?>
<html><head>
<title>Enzyme Subfamily Class Prediction Application</title>
<script language="JavaScript" type="text/JavaScript"
src="../images/myfreetemplates.js"></script>
<link href="../images/myfreetemplates.css" rel="stylesheet"
type="text/css">
</head>
<body background="../images/pixi_lightblue.jpg" leftmargin="0"
topmargin="0" marginwidth="0" marginheight="0"
onLoad="MM_preloadImages('../images/btn_main-
over.gif','../images/btn_overview-
over.gif','../images/btn_services-
over.gif','../images/products_btn-over.gif')">
<table width="775" height="100%" border="0" align="center"
cellpadding="0" cellspacing="0"
background="../images/pixi_darkblue.jpg">
<tr>
<td height="7" colspan="2" valign="top"> <TABLE width="775"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD width="336"><IMG SRC="../images/pixi_lightblue.jpg"
WIDTH=336 HEIGHT=7></TD>
      <TD width="16"><IMG SRC="../images/topangle.jpg"
WIDTH=16 HEIGHT=7></TD>
      <TD background="../images/pixi_light_grey.gif"><IMG
SRC="../images/spacer.gif" WIDTH=423 HEIGHT=7></TD>
    </TR>
  </TABLE></td>
</tr>
<tr>
<td height="118" colspan="2" valign="top"> <table border="0"
cellpadding="0" cellspacing="0" id="navtable">
    <tr>
      <td width="352" rowspan="3"><TABLE width="352"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
          <TR>
              <TD><IMG SRC="../images/logo.gif"  width=219
height=118></TD>
          <TD><IMG SRC="../images/toptreatment1.jpg"
WIDTH=133 HEIGHT=118></TD>
          </TR>
        </TABLE></td>
      <td width="423"
background="../images/pixi_light_grey.gif"> <TABLE BORDER=0
CELLPADDING=0 CELLSPACING=0>
          <TR>
            <TD width="87"><IMG SRC="../images/topcurve2.jpg"
WIDTH="87" HEIGHT="43"></TD>
          <TD width="336"
background="../images/pixi_light_grey.gif" align="center">
          <font color="#000000" face ="Lucida Handwriting"
style="font-size: 11pt; font-weight: 700"><b>Enzyme
Subfamily Class Prediction Application</b></font></TD>
          </TR>
        </TABLE></td>
    </tr>
    <tr>
      <td width="423"
background="../images/pixi_light_grey.gif"> <TABLE
width="100%" BORDER=0 CELLPADDING=0 CELLSPACING=0>
          <TR>
            <TD width="277"><IMG SRC="../images/topcurve3.jpg"
WIDTH=277 HEIGHT=20></TD>
```

```
        <TD width="146"
background="../images/pixi_light_grey.gif"><IMG
SRC="../images/spacer.gif" WIDTH=146 HEIGHT=20></TD>
        </TR>
      </TABLE></td>
   </tr>
   <tr>
    <td width="423"> <TABLE BORDER=0 CELLPADDING=0
CELLSPACING=0>
        <TR>
         <TD width="66"><IMG
SRC="../images/toptreatment1a.jpg" WIDTH=66
HEIGHT=55></TD>
         <TD width="72"><A HREF="index.php"><IMG
SRC="../images/home.jpg" NAME="btn_main" WIDTH=72
HEIGHT=55 BORDER=0 ></A></TD>
                                  <TD width="89"><A
HREF="../logout.php"><IMG SRC="../images/log-out.jpg"
NAME="btn_overview" WIDTH=89 HEIGHT=55 BORDER=0
></A></TD>
         <TD width="81"><A HREF="FAQ.php"><IMG
SRC="../images/blank2.jpg" NAME="btn_services" WIDTH=81
HEIGHT=55 BORDER=0 ></A></TD>
         <TD width="72"><A HREF="about.php"><IMG
SRC="../images/blank1.jpg" NAME="products" WIDTH=72
HEIGHT=55 BORDER=0 ></A></TD>
         <TD width="43"><IMG SRC="../images/topnavend.jpg"
WIDTH=43 HEIGHT=55></TD>
        </TR>
      </TABLE></td>
   </tr>
  </table></td>
</tr>
<tr>
<td height="69" colspan="2" valign="top">
  <TABLE BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
     <TD ROWSPAN=2 WIDTH=219 HEIGHT=69></TD>
     <TD><IMG SRC="../images/toptreatment2.jpg" WIDTH=199
HEIGHT=20></TD>
     <TD ROWSPAN=2><IMG SRC="../images/pixi_darkblue.jpg"
WIDTH=182 HEIGHT=69></TD>
     <TD ROWSPAN=2><img src="../images/sidetop.jpg"
width="175" height="69"></TD>
    </TR>
    <TR>
     <TD background="../images/pixi_darkblue.jpg">
<?                      echo "System Administrator:
<i>$sysad</i>"; ?>
     </TD>
    </TR>
  </TABLE>
</td>
</tr>
<tr>
<td width="600" valign="top">
  <TABLE BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
     <TD width="53"><IMG SRC="../images/spacer.gif"
WIDTH=53 HEIGHT=213></TD>
     <TD valign="top"><IMG SRC="../images/spacer.gif"
WIDTH=526 HEIGHT=8><br>
          <IMG SRC="../images/enzyme.gif"
USEMAP="#enzyme" WIDTH=526 HEIGHT=422
BORDER="0"></TD>
          <MAP NAME="enzyme">
                      <AREA HREF="FAQ.php" SHAPE=poly
coords="193,146,350,154,348,295,261,328,156,238">
                      <AREA HREF="FAQ.php?sub=O"
SHAPE=poly
coords="220,4,320,4,320,53,267,68,213,52,194,31,216,19">
                      <AREA HREF="FAQ.php?sub=T"
SHAPE=poly
coords="41,105,517,105,512,159,464,169,413,156,394,134">
                      <AREA HREF="FAQ.php?sub=Hy"
SHAPE=poly
coords="403,239,505,291,504,340,446,351,381,321">
                      <AREA HREF="FAQ.php?sub=Ly"
SHAPE=poly
coords="219,337,318,379,315,430,25,440,193,405">
                      <AREA HREF="FAQ.php?sub=Is"
SHAPE=poly coords="25,292,125,298,125,345,26,348,2,321">
                      <AREA HREF="FAQ.php?sub=L"
SHAPE=poly coords="31,94,131,100,124,147,70,156,4,123">

          </MAP>
     <TD width="21"><IMG SRC="../images/spacer.gif"
WIDTH=21 HEIGHT=213></TD>
    </TR>
  </TABLE></td>
<td width="175" valign="top"
background="../images/sidebg.jpg"><img
src="../images/spacer.gif" width=175 height=23>
  <a href="#" class="sidelinks"></a>
  <table width="175" border="0" cellspacing="0"
cellpadding="0">
    <tr>
     <td width="13%"> </td>
     <td width="75%"><a href="predict.php"
class="sidelinks">Predict</a><br><br>

                                                  <a
href="changepassword.php" class="sidelinks">Change
Password</a><br><br><br>

Lectures<br><br>
                                                  <a
href="add_lecture.php" class="sidelinks">Add Lecture</a><br>
                                                  <a
href="edit_lecture.php" class="sidelinks">Edit Lecture</a><br>
                                  <a href="view_lecture.php"
class="sidelinks">View Lecture</a><br>
                                  <a href="delete_lecture.php"
class="sidelinks">Delete Lecture</a><br><br><br>
                                                  Questions<br><br>
                                                  <a
href="add_question.php" class="sidelinks">Add
Question</a><br>
                                                  <a
href="edit_question.php" class="sidelinks">Edit
Question</a><br>
                                  <a href="view_question.php"
class="sidelinks">View Question</a><br>
                                  <a href="delete_question.php"
class="sidelinks">Delete Question</a><br><br><br>
     </td>
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<tr>
<td height="67" colspan="2" valign="top"><TABLE width="775"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
     <TD><IMG SRC="../images/base1.jpg" WIDTH=600
HEIGHT=67></TD>
     <TD width="175"><IMG SRC="../images/base2.jpg"
WIDTH=175 HEIGHT=67></TD>
    </TR>
  </TABLE></td>
</tr>
<tr>
<td height="26" colspan="2" valign="top"> <TABLE
width="775" BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
     <TD width="53"><IMG SRC="../images/pixi_med_grey.gif"
WIDTH=53 HEIGHT=26></TD>
     <TD width="722"
background="../images/pixi_med_grey.gif">&copy;
       Copyright 2006. </TD>
    </TR>
  </TABLE></td>
</tr>
</table>
</body></html>
```

/sysad/add_lecture.php

```
<?session_register("sysad");
if(!isset($sysad)){

header("Location:http://localhost/enzyme3/index.php?error=2");
          exit();
}
```

```
include("../scripts/connect.php");
if(isset($add)){
	$no_error=1;
	foreach($HTTP_POST_VARS as $field)	{
		if(trim($field)=="")		{
			$err_msge="Please fill up all
fields.";
			$no_error=0;
			break;
		}
	}
	if($no_error)		{
		include("../scripts/connect.php");
		if(isset($pos))			{
			$query="Select lec_no from
lecture where lec_no>$pos order by lec_no desc";
			$result=mysql_query($query);

	$rows=mysql_num_rows($result);
			for($i=0;$i<$rows;$i++){
				$data =
mysql_fetch_row($result);

	$old_lec_no=$data[0];

	$new_lec_no=$old_lec_no+1;
					$query2="Update
lecture set lec_no=$new_lec_no where lec_no=$old_lec_no";

	mysql_query($query2);
			}
		}else
			$pos=0;
		$file_name=basename($filename);
		$pos++;
		$sql="Insert into
Lecture(lec_no,title,filename, comment, uploaded_by)
Values('$pos','$title','$file_name', '$comment', '$sysad')";
		if(mysql_query($sql)){
			$dest="../lectures/$file_name";
			copy($filename, $dest);
			$succ="Lecture file has been
successfully uploaded.";
		}

	}
}
?>
<html>
<head>
<title>Enzyme Subfamily Class Prediction Application - Add
Lecture</title>
<script language="JavaScript" type="text/JavaScript"
src="../images/myfreetemplates.js"></script>
<link href="../images/myfreetemplates.css" rel="stylesheet"
type="text/css">
</head>
<body background="../images/pixi_lightblue.jpg" leftmargin="0"
topmargin="0" marginwidth="0" marginheight="0"
onLoad="MM_preloadImages('../images/btn_main-
over.gif','../images/btn_overview-
over.gif','../images/btn_services-
over.gif','../images/products_btn-over.gif')">
<table width="775" height="100%" border="0" align="center"
cellpadding="0" cellspacing="0"
background="../images/pixi_darkblue.jpg">
<tr>
<td height="7" colspan="2" valign="top"> <TABLE width="775"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
  <TR>
    <TD width="336"><IMG SRC="../images/pixi_lightblue.jpg"
WIDTH=336 HEIGHT=7></TD>
    <TD width="16"><IMG SRC="../images/topangle.jpg"
WIDTH=16 HEIGHT=7></TD>
    <TD background="../images/pixi_light_grey.gif"><IMG
SRC="../images/spacer.gif" WIDTH=423 HEIGHT=7></TD>
  </TR>
 </TABLE></td>
</tr>
<tr>
<td height="118" colspan="2" valign="top"> <table border="0"
cellpadding="0" cellspacing="0" id="navtable">
  <tr>
    <td width="352" rowspan="3"><TABLE width="352"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
      <TR>
        <TD><IMG SRC="../images/logo.gif"  width=219
height=118></TD>
        <TD><IMG SRC="../images/toptreatment1.jpg"
WIDTH=133 HEIGHT=118></TD>
      </TR>
     </TABLE></td>
    <td width="423"
background="../images/pixi_light_grey.gif"> <TABLE BORDER=0
CELLPADDING=0 CELLSPACING=0>
      <TR>
        <TD width="87"><IMG SRC="../images/topcurve2.jpg"
WIDTH="87" HEIGHT="43"></TD>
        <TD width="336"
background="../images/pixi_light_grey.gif" align="center">
        <font color="#000000" face ="Lucida Handwriting"
style="font-size: 11pt; font-weight: 700"><b>Enzyme
Subfamily Class Prediction Application</b></font></TD>
      </TR>
     </TABLE></td>
  </tr>
  <tr>
    <td width="423"
background="../images/pixi_light_grey.gif"> <TABLE
width="100%" BORDER=0 CELLPADDING=0 CELLSPACING=0>
      <TR>
        <TD width="277"><IMG SRC="../images/topcurve3.jpg"
WIDTH=277 HEIGHT=20></TD>
        <TD width="146"
background="../images/pixi_light_grey.gif"><IMG
SRC="../images/spacer.gif" WIDTH=146 HEIGHT=20></TD>
      </TR>
     </TABLE></td>
  </tr>
  <tr>
    <td width="423"> <TABLE BORDER=0 CELLPADDING=0
CELLSPACING=0>
      <TR>
        <TD width="66"><IMG
SRC="../images/toptreatment1a.jpg" WIDTH=66
HEIGHT=55></TD>
        <TD width="72"><A HREF="index.php"><IMG
SRC="../images/home.jpg" NAME="btn_main" WIDTH=72
HEIGHT=55 BORDER=0 ></A></TD>
                                <TD width="89"><A
HREF="../logout.php"><IMG SRC="../images/log-out.jpg"
NAME="btn_overview" WIDTH=89 HEIGHT=55 BORDER=0
></A></TD>
        <TD width="81"><A HREF="FAQ.php"><IMG
SRC="../images/blank2.jpg" NAME="btn_services" WIDTH=81
HEIGHT=55 BORDER=0 ></A></TD>
        <TD width="72"><A HREF="about.php"><IMG
SRC="../images/blank1.jpg" NAME="products" WIDTH=72
HEIGHT=55 BORDER=0 ></A></TD>
        <TD width="43"><IMG SRC="../images/topnavend.jpg"
WIDTH=43 HEIGHT=55></TD>
      </TR>
     </TABLE></td>
  </tr>
 </table></td>
</tr>
<tr>
<td height="69" colspan="2" valign="top">
 <TABLE BORDER=0 CELLPADDING=0 CELLSPACING=0>
  <TR>
    <TD ROWSPAN=2 WIDTH=219 HEIGHT=69></TD>
    <TD><IMG SRC="../images/toptreatment2.jpg" WIDTH=199
HEIGHT=20></TD>
    <TD ROWSPAN=2><IMG SRC="../images/pixi_darkblue.jpg"
WIDTH=182 HEIGHT=69></TD>
    <TD ROWSPAN=2><img src="../images/sidetop.jpg"
width="175" height="69"></TD>
  </TR>
  <TR>
    <TD background="../images/pixi_darkblue.jpg">System
Administrator: <i><? echo $sysad; ?></i></TD>
  </TR>
 </TABLE>
</td>
```

```
</tr>
<tr>
<td width="600" valign="top">
  <TABLE BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD width="600" align="center">
<?          if((!$no_error) || $succ){?>

            <br><h2><center>ADD LECTURE</center></h2>
<?          if($err_msge){?>
                        <br><h5><?echo $err_msge;?></h5>
<?}
if($succ)
{?>
                        <br><h5><?echo $succ;?></h5>
<?          $title='';
            $comment='';
            }
?>
<form  name="frm" method="post" action="add_lecture.php">
<table align="center" width="55%" cellspacing="0"
cellpadding="0" border="0">
            <tr><td class="label" valign="center">Title:</td>
            <td>  <input type="text" name="title" value=<?
echo "\"$title\""; ?> size="50"></td></tr>
            <tr><td class="label" valign="center">File
Path:</td>
            <td><input type="file" name="filename" value=<?
echo "\"$filename\"";?> size="50"></td></tr>
            <tr><td class="label"
valign="center">Description:  </td>
            <td> <input name="comment" value=<? echo
"\"$comment\"";  ?> size="61" maxlength="255"></td></tr>
<?$quer="Select title,lec_no from Lecture order by lec_no";
$rslt=mysql_query($quer);
$rows=mysql_num_rows($rslt);
if($rows){?>
            <tr><td class="label" valign="top">Add
lecture:</td>
            <td colspan="4"><select name="pos">
            <option value="<?echo $rows;?>"> At End of the
list</option>
            <option value=0>At Beginning of the list</option>
<?for($i = 0; $i < $rows; $i++){
            $data = mysql_fetch_row($rslt);
?>
            <option value="<?echo "$data[1]";?>">After <?echo
"$data[0]";?></option>
<?}?>
</select>
            </td></tr>
<?}?>
                        <tr><td colspan="2" align="center"><br>
            <input name="add" type="submit" class="submit"
value="Upload"><input type="reset" class="submit"
value="Reset"></td></tr>
            <tr><td colspan="2" class="note">
            <br><p align="justify"><b>Note:</b> To upload a
file, select first the file by clicking the browse
button.    Then look for the file and
double-click-it.    Type a title and
description for the file and finally click the <i>Upload</i>
button.</p><br></td></tr>
                        </table>
            </form>
<?include("../scripts/connect.php");
            $query="Select title,filename,uploaded_by,comment
from Lecture order by lec_no";
            $result=mysql_query($query);
            $rows1=mysql_num_rows($result);
            $lowerlim=0;
            $returnrows=10;
            if((!empty($limit))&&($rows1>$limit)){
                        $lowerlim=$limit;
            }
            $last=$returnrows-1;
            if((!empty($last))&&($rows>$last)){
                        $last=$last;
            }
            $quer="Select title,filename,uploaded_by,comment
from Lecture order by lec_no ASC limit $lowerlim, $returnrows";
            $rslt=mysql_query($quer);
            $rows=mysql_num_rows($rslt);
            if($rows){
?>                                                  <table
align="center" width="90%" cellspacing="2" cellpadding="2"
border="1">
                                                    <tr>

            <td class="dark" align="center" width="5%"></td>

            <td class="dark" align="center"
width="30%">Title</td>

            <td class="dark" align="center">Description</td>
                                                    </tr>
<?
                        $k=$limit;
                        for($i = 0; $i < $rows; $i++){
                                    $k++;
                                    $data = mysql_fetch_row($rslt);
?>
                                                    <tr
valign="top">

            <td class="light" align="center"><p
align="center"><?echo $k ." .";?></p></td>

            <td class="light" align="center"><a href="../<?echo
"/lectures/$data[1]";?>" class="sidelinks2" target="_blank"><p
align="left"><?echo $data[0];?></p></a></td>

            <td class="light" align="center"><p align="left"><?
echo $data[3];?></p></td>
                                                    </tr>
<?
                        }
                        echo"</table><br><br>";
                        mysql_free_result($result);
                        if($lowerlim > ($returnrows-1)){
                                    echo "<a
href=\"add_lecture.php?limit=".($lowerlim-
$returnrows)."&last=".$last."\">Previous</a>";
                        }
                        echo "  Showing lectures ". ($limit+1) ." to
".($limit+$rows)."  ";
                        if(!($rows<$returnrows) && (($limit+
$rows-1)< ($rows1-1))){
                                    echo"<a
href=\"add_lecture.php?limit=".($lowerlim+
$returnrows)."&last=".($lowerlim+$rows-1)."\">Next</a>";
                        }
            }
}
?>
    </TD>
   </TR>
  </TABLE></td>
<td width="175" valign="top"
background="../images/sidebg.jpg"><img
src="../images/spacer.gif" width=175 height=23>
  <a href="#" class="sidelinks"></a>
  <table width="175" border="0" cellspacing="0"
cellpadding="0">
    <tr>
      <td width="13%"> </td>
      <td width="75%"><a href="predict.php"
class="sidelinks">Predict</a><br><br>

                                                    <a
href="changepassword.php" class="sidelinks">Change
Password</a><br><br>

Lectures<br><br>
                                                    <a
href="add_lecture.php" class="sidelinks">Add Lecture</a><br>
                                                    <a
href="edit_lecture.php" class="sidelinks">Edit Lecture</a><br>
                                          <a href="view_lecture.php"
class="sidelinks">View Lecture</a><br>
                                          <a href="delete_lecture.php"
class="sidelinks">Delete Lecture</a><br><br><br>
                                                    Questions<br><br>
```

```
                                        <a
href="add_question.php" class="sidelinks">Add
Question</a><br>
                                        <a
href="edit_question.php" class="sidelinks">Edit
Question</a><br>
                                <a href="view_question.php"
class="sidelinks">View Question</a><br>
                                <a href="delete_question.php"
class="sidelinks">Delete Question</a><br><br><br>
            </td>
    <td width="12%"> </td>
   </tr>
  </table>
</td>
</tr>
<tr>
<td height="67" colspan="2" valign="top"><TABLE width="775"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
   <TR>
    <TD><IMG SRC="../images/base1.jpg" WIDTH=600
HEIGHT=67></TD>
    <TD width="175"><IMG SRC="../images/base2.jpg"
WIDTH=175 HEIGHT=67></TD>
   </TR>
  </TABLE></td>
</tr>
<tr>
<td height="26" colspan="2" valign="top"> <TABLE
width="775" BORDER=0 CELLPADDING=0 CELLSPACING=0>
   <TR>
    <TD width="53"><IMG SRC="../images/pixi_med_grey.gif"
WIDTH=53 HEIGHT=26></TD>
    <TD width="722"
background="../images/pixi_med_grey.gif">&copy;
      Copyright 2006. </TD>
   </TR>
  </TABLE></td>
</tr>
</table>
</body></html>
```

/sysad/edit_lecture.php

```
<?session_register("sysad");
if(!isset($sysad)){
        header("Location:http://localhost/enzyme/index.php?
error=2");
        exit();
}
include("../scripts/connect.php");
if(isset($edit)){
        $no_error=1;
        if($comment==''){
                $no_error=0;
                $err_msge="Please fill up all fields.";
        }
        if($no_error){
                include("../scripts/connect.php");
                if($filename!=''){

        $file_name=basename($filename);
                }else{
                        $file_name=$oldfilename;
                }
                $sql="Update Lecture Set title='$title',
filename='$file_name', comment='$comment',
uploaded_by='$sysad' where title='$oldtitle'";
                if(mysql_query($sql)){
                        if($file_name!=$oldfilename){
                                $dest="../lectures/
$file_name";
                                copy($filename,
$dest);
                                unlink("../lectures/
$oldfilename");
                        }
                        $err_msge="Lecture file has
been successfully editted";
                }else{
                        $err_msge="That file already
exist.";
                        $no_error=0;
                }
        }
}
if(isset($ok)){
        if(!isset($filename)){
                $err_msge="Please select one lecture.";
                unset($ok);
        }
}?>
<html><head>
<title>Enzyme Subfamily Class Prediction Application - Edit
Lectures</title>
<script language="JavaScript" type="text/JavaScript"
src="../images/myfreetemplates.js"></script>
<link href="../images/myfreetemplates.css" rel="stylesheet"
type="text/css">
</head>
<body background="../images/pixi_lightblue.jpg" leftmargin="0"
topmargin="0" marginwidth="0" marginheight="0"
onLoad="MM_preloadImages('../images/btn_main-
over.gif','../images/btn_overview-
over.gif','../images/btn_services-
over.gif','../images/products_btn-over.gif')">
<table width="775" height="100%" border="0" align="center"
cellpadding="0" cellspacing="0"
background="../images/pixi_darkblue.jpg">
<tr>
<td height="7" colspan="2" valign="top"> <TABLE width="775"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
   <TR>
    <TD width="336"><IMG SRC="../images/pixi_lightblue.jpg"
WIDTH=336 HEIGHT=7></TD>
    <TD width="16"><IMG SRC="../images/topangle.jpg"
WIDTH=16 HEIGHT=7></TD>
    <TD background="../images/pixi_light_grey.gif"><IMG
SRC="../images/spacer.gif" WIDTH=423 HEIGHT=7></TD>
   </TR>
  </TABLE></td>
</tr>
<tr>
<td height="118" colspan="2" valign="top"> <table border="0"
cellpadding="0" cellspacing="0" id="navtable">
   <tr>
    <td width="352" rowspan="3"><TABLE width="352"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
       <TR>
        <TD><IMG SRC="../images/logo.gif"  width=219
height=118></TD>
        <TD><IMG SRC="../images/toptreatment1.jpg"
WIDTH=133 HEIGHT=118></TD>
       </TR>
      </TABLE></td>
    <td width="423"
background="../images/pixi_light_grey.gif"> <TABLE BORDER=0
CELLPADDING=0 CELLSPACING=0>
       <TR>
        <TD width="87"><IMG SRC="../images/topcurve2.jpg"
WIDTH="87" HEIGHT="43"></TD>
        <TD width="336"
background="../images/pixi_light_grey.gif" align="center">
        <font color="#000000" face ="Lucida Handwriting"
style="font-size: 11pt; font-weight: 700"><b>Enzyme
Subfamily Class Prediction Application</b></font></TD>
       </TR>
      </TABLE></td>
   </tr>
   <tr>
    <td width="423"
background="../images/pixi_light_grey.gif"> <TABLE
width="100%" BORDER=0 CELLPADDING=0 CELLSPACING=0>
       <TR>
        <TD width="277"><IMG SRC="../images/topcurve3.jpg"
WIDTH=277 HEIGHT=20></TD>
        <TD width="146"
background="../images/pixi_light_grey.gif"><IMG
SRC="../images/spacer.gif" WIDTH=146 HEIGHT=20></TD>
       </TR>
      </TABLE></td>
   </tr>
   <tr>
    <td width="423"> <TABLE BORDER=0 CELLPADDING=0
CELLSPACING=0>
```

```
        <TR>
          <TD width="66"><IMG
SRC="../images/toptreatment1a.jpg" WIDTH=66
HEIGHT=55></TD>
          <TD width="72"><A HREF="index.php"><IMG
SRC="../images/home.jpg" NAME="btn_main" WIDTH=72
HEIGHT=55 BORDER=0 ></A></TD>
                                <TD width="89"><A
HREF="../logout.php"><IMG SRC="../images/log-out.jpg"
NAME="btn_overview" WIDTH=89 HEIGHT=55 BORDER=0
></A></TD>
          <TD width="81"><A HREF="FAQ.php"><IMG
SRC="../images/blank2.jpg" NAME="btn_services" WIDTH=81
HEIGHT=55 BORDER=0 ></A></TD>
          <TD width="72"><A HREF="about.php"><IMG
SRC="../images/blank1.jpg" NAME="products" WIDTH=72
HEIGHT=55 BORDER=0 ></A></TD>
          <TD width="43"><IMG SRC="../images/topnavend.jpg"
WIDTH=43 HEIGHT=55></TD>
        </TR>
      </TABLE></td>
    </tr>
  </table></td>
</tr>
<tr>
<td height="69" colspan="2" valign="top">
  <TABLE BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD ROWSPAN=2 WIDTH=219 HEIGHT=69></TD>
      <TD><IMG SRC="../images/toptreatment2.jpg" WIDTH=199
HEIGHT=20></TD>
      <TD ROWSPAN=2><IMG SRC="../images/pixi_darkblue.jpg"
WIDTH=182 HEIGHT=69></TD>
      <TD ROWSPAN=2><img src="../images/sidetop.jpg"
width="175" height="69"></TD>
    </TR>
    <TR>
      <TD background="../images/pixi_darkblue.jpg">System
Administrator: <i><? echo $sysad; ?></i></TD>
    </TR>
  </TABLE>
</td>
</tr>
<tr>
<td width="600" valign="top">
  <TABLE BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD width="600" align="center">
            <br><h2>EDIT LECTURES </h2>
<?if(isset($err_msge)){?>
            <br><h5><font color="YELLOW"><? echo
$err_msge;?></font></h5><br>
<? }
if(!isset($ok)){
            include("../scripts/connect.php");
            $query="Select title,filename,uploaded_by,comment
from Lecture order by lec_no";
            $result=mysql_query($query);
            $rows1=mysql_num_rows($result);
            $lowerlim=0;
            $returnrows=10;
            if((!empty($limit))&&($rows1>$limit)){
                  $lowerlim=$limit;
            }
            $last=$returnrows-1;
            if((!empty($last))&&($rows>$last)){
                  $last=$last;
            }
            $quer="Select title,filename,uploaded_by,comment
from Lecture order by lec_no ASC limit $lowerlim, $returnrows";
            $rslt=mysql_query($quer);
            $rows=mysql_num_rows($rslt);
            if($rows){
?>                                                  <form
name="frm" method="post" action="edit_lecture.php">

                                          <table width="80%"
align="center" cellspacing="2" cellpadding="2" border="1">

                                                  <tr>

            <td width="5%"></td>

            <td class="dark" align="center"
width="30%">Title</td>

            <td class="dark" align="center">Description</td>
                                                  </tr>

<?
                  for($i = 0; $i < $rows; $i++){
                        $data = mysql_fetch_row($rslt);
?>
                                                  <tr
valign="top">

            <td class="light" align="center"><p
align="justify"><input type="radio" name="filename"
class="check" value="<? echo $data[1]; ?>"></p></td>



            <td class="light" align="center"><a href="../<?echo
"/lectures/$data[1]";?>" class="sidelinks2" target="_blank"><p
align="left"><?echo $data[0];?></p></a></td>

            <td class="light" align="center"><p align="left"><?
echo $data[3];?></p></td>
                                                  </tr>

<?}?>
            <tr>

            <td class="dark" align="center" colspan="3">Note:
To edit lecture means to edit lecture details such as title, file and
description. To edit a lecture, click the radio button beside the
lecture you want to edit.</td>
                                                  </tr>
                                                  </table>


                  <br>

                  <input name="ok" type="submit"
class="submit" value="EDIT"><input type="reset"
class="submit" value="Clear">

                                          </form>
<?
                  if($lowerlim > ($returnrows-1)){
                        echo "<a
href=\"edit_lecture.php?limit=".($lowerlim-
$returnrows)."&last=".$last."\">Previous</a>";
                  }
                  echo "  Showing lectures ". ($limit+1) ." to
".($limit+$rows)."  ";
                  if(!($rows<$returnrows) && (($limit+
$rows-1)< ($rows1-1))){
                        echo"<a
href=\"edit_lecture.php?limit=".($lowerlim+
$returnrows)."&last=".($lowerlim+$rows-1)."\">Next</a>";
                  }
            }else{
?>                                                  <table
width="80%" align="center" cellspacing="2" cellpadding="2"
border="0">
                                                  <tr>

            <td class="light" colspan="2"
align="center">  No files yet.</td>
                                                  </tr>
                                          </table>
<?} mysql_free_result($result);
} else {
            $oldfilename=$filename;
            include("../scripts/connect.php");
            $query="Select title,comment from Lecture where
filename='$filename'";
            $result=mysql_query($query);
            $data = mysql_fetch_row($result);
            $title=$data[0];
            $oldtitle=$data[0];
            $comment=$data[1];
?>
```

```
                                    <table width="80%"
align="center" cellspacing="2" cellpadding="2" border="0">
                                                <tr>
                                                <td>
                                                <form  name="frm"
method="post" action="edit_lecture.php">
                                                                <table
align="center" width="55%" cellspacing="0" cellpadding="0"
border="0">

            <tr>

                        <td class="label"
valign="center">Title:</td>

                        <td><input name="title" value=<? echo
"\"$title\"";?> size="50"></td>

                        <td><input type="hidden" name="oldtitle"
value=<? echo "\"$oldtitle\"";?> size="50"></td>

                        <td><input type="hidden"
name="oldfilename" value=<? echo "\"$oldfilename\"";?>
size="50"></td>

            </tr>

            <tr>

                        <td class="label" valign="center">File
Path:</td>

                        <td><input type="file" name="filename"
value=<? echo "\"$filename\"";?> size="50"></td>

            </tr>

            <tr>

                        <td class="label"
valign="center">Description:  </td>

                        <td><input name="comment" value=<?
echo "\"$comment\"";?> size="61" maxlength="255"></td>

            </tr>

            <tr>

                        <td colspan="2" align="center">

                                    <br>

                                    <input name="edit"
type="submit" class="submit" value="UPLOAD"><input
type="reset" class="submit" value="Reset">

                        </td>

            </tr>

            <tr>

                        <td colspan="2" class="note">

                                    <br><p
align="justify"><b>Note:</b> To upload a file, select first the
file by clicking the browse
button.    Then look for the file and
double-click-it.    Type a title and
description for the file and finally click the <i>Upload</i>
button.</p><br>

                        </td>

            </tr>

            <tr>

                        <td colspan="3" align="center">

                                    <br>

                                                <a href="edit_lecture.php"
class="sidelinks2">BACK TO TOPICS</a>

                        </td>

            </tr>
                                                                </table>
                                                </form>
                                                </td></tr>
                                                </table>
<?}?>
                        <br><br>
    </TD>
   </TR>
  </TABLE></td>
<td width="175" valign="top"
background="../images/sidebg.jpg"><img
src="../images/spacer.gif" width=175 height=23>
  <a href="#" class="sidelinks"></a>
  <table width="175" border="0" cellspacing="0"
cellpadding="0">
    <tr>
      <td width="13%"> </td>
      <td width="75%"><a href="predict.php"
class="sidelinks">Predict</a><br><br>

                                                                <a
href="changepassword.php" class="sidelinks">Change
Password</a><br><br>

Lectures<br><br>
                                                <a
href="add_lecture.php" class="sidelinks">Add Lecture</a><br>
                                                <a
href="edit_lecture.php" class="sidelinks">Edit Lecture</a><br>
                                    <a href="view_lecture.php"
class="sidelinks">View Lecture</a><br>
                                    <a href="delete_lecture.php"
class="sidelinks">Delete Lecture</a><br><br><br>
                                                Questions<br><br>
                                                <a
href="add_question.php" class="sidelinks">Add
Question</a><br>
                                                <a
href="edit_question.php" class="sidelinks">Edit
Question</a><br>
                                    <a href="view_question.php"
class="sidelinks">View Question</a><br>
                                    <a href="delete_question.php"
class="sidelinks">Delete Question</a><br><br><br>
                  </td>
      <td width="12%"> </td>
    </tr>
  </table>
</td>
</tr>
<tr>
<td height="67" colspan="2" valign="top"><TABLE width="775"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD><IMG SRC="../images/base1.jpg" WIDTH=600
HEIGHT=67></TD>
      <TD width="175"><IMG SRC="../images/base2.jpg"
WIDTH=175 HEIGHT=67></TD>
    </TR>
  </TABLE></td>
</tr>
<tr>
<td height="26" colspan="2" valign="top"> <TABLE
width="775" BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD width="53"><IMG SRC="../images/pixi_med_grey.gif"
WIDTH=53 HEIGHT=26></TD>
      <TD width="722"
background="../images/pixi_med_grey.gif">&copy;
        Copyright 2006. </TD>
    </TR>
  </TABLE></td>
</tr>
</table>
</body></html>
```

/sysad/view_lecture.php

```
<?session_register("sysad");
if(!isset($sysad)){
            header("Location:http://localhost/enzyme/index.php?
error=2");
            exit();
}
include("../scripts/connect.php");
?>
<html><head>
<title>Enzyme Subfamily Class Prediction Application - View
Lectures</title>
<script language="JavaScript" type="text/JavaScript"
src="../images/myfreetemplates.js"></script>
<link href="../images/myfreetemplates.css" rel="stylesheet"
type="text/css">
</head>
<body background="../images/pixi_lightblue.jpg" leftmargin="0"
topmargin="0" marginwidth="0" marginheight="0"
onLoad="MM_preloadImages('../images/btn_main-
over.gif','../images/btn_overview-
over.gif','../images/btn_services-
over.gif','../images/products_btn-over.gif')">
<table width="775" height="100%" border="0" align="center"
cellpadding="0" cellspacing="0"
background="../images/pixi_darkblue.jpg">
<tr>
<td height="7" colspan="2" valign="top"> <TABLE width="775"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
   <TR>
     <TD width="336"><IMG SRC="../images/pixi_lightblue.jpg"
WIDTH=336 HEIGHT=7></TD>
     <TD width="16"><IMG SRC="../images/topangle.jpg"
WIDTH=16 HEIGHT=7></TD>
     <TD background="../images/pixi_light_grey.gif"><IMG
SRC="../images/spacer.gif" WIDTH=423 HEIGHT=7></TD>
   </TR>
  </TABLE></td>
</tr>
<tr>
<td height="118" colspan="2" valign="top"> <table border="0"
cellpadding="0" cellspacing="0" id="navtable">
   <tr>
     <td width="352" rowspan="3"><TABLE width="352"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
        <TR>
          <TD><IMG SRC="../images/logo.gif"  width=219
height=118></TD>
          <TD><IMG SRC="../images/toptreatment1.jpg"
WIDTH=133 HEIGHT=118></TD>
        </TR>
      </TABLE></td>
     <td width="423"
background="../images/pixi_light_grey.gif"> <TABLE BORDER=0
CELLPADDING=0 CELLSPACING=0>
        <TR>
          <TD width="87"><IMG SRC="../images/topcurve2.jpg"
WIDTH="87" HEIGHT="43"></TD>
          <TD width="336"
background="../images/pixi_light_grey.gif" align="center">
          <font color="#000000" face ="Lucida Handwriting"
style="font-size: 11pt; font-weight: 700"><b>Enzyme
Subfamily Class Prediction Application</b></font></TD>
        </TR>
      </TABLE></td>
   </tr>
   <tr>
     <td width="423"
background="../images/pixi_light_grey.gif"> <TABLE
width="100%" BORDER=0 CELLPADDING=0 CELLSPACING=0>
        <TR>
          <TD width="277"><IMG SRC="../images/topcurve3.jpg"
WIDTH=277 HEIGHT=20></TD>
          <TD width="146"
background="../images/pixi_light_grey.gif"><IMG
SRC="../images/spacer.gif" WIDTH=146 HEIGHT=20></TD>
        </TR>
      </TABLE></td>
   </tr>
   <tr>
     <td width="423"> <TABLE BORDER=0 CELLPADDING=0
CELLSPACING=0>
        <TR>
          <TD width="66"><IMG
SRC="../images/toptreatment1a.jpg" WIDTH=66
HEIGHT=55></TD>
          <TD width="72"><A HREF="index.php"><IMG
SRC="../images/home.jpg" NAME="btn_main" WIDTH=72
HEIGHT=55 BORDER=0 ></A></TD>
                                    <TD width="89"><A
HREF="../logout.php"><IMG SRC="../images/log-out.jpg"
NAME="btn_overview" WIDTH=89 HEIGHT=55 BORDER=0
></A></TD>
          <TD width="81"><A HREF="FAQ.php"><IMG
SRC="../images/blank2.jpg" NAME="btn_services" WIDTH=81
HEIGHT=55 BORDER=0 ></A></TD>
          <TD width="72"><A HREF="about.php"><IMG
SRC="../images/blank1.jpg" NAME="products" WIDTH=72
HEIGHT=55 BORDER=0 ></A></TD>
          <TD width="43"><IMG SRC="../images/topnavend.jpg"
WIDTH=43 HEIGHT=55></TD>
        </TR>
       </TABLE></td>
   </tr>
  </table></td>
</tr>
<tr>
<td height="69" colspan="2" valign="top">
  <TABLE BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD ROWSPAN=2 WIDTH=219 HEIGHT=69></TD>
      <TD><IMG SRC="../images/toptreatment2.jpg" WIDTH=199
HEIGHT=20></TD>
      <TD ROWSPAN=2><IMG SRC="../images/pixi_darkblue.jpg"
WIDTH=182 HEIGHT=69></TD>
      <TD ROWSPAN=2><img src="../images/sidetop.jpg"
width="175" height="69"></TD>
    </TR>
    <TR>
      <TD background="../images/pixi_darkblue.jpg">System
Administrator: <i><? echo $sysad; ?></i></TD>
    </TR>
  </TABLE>
</td>
</tr>
<tr>
<td width="600" valign="top">
  <TABLE BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD width="600" align="center">
      <br><h2>VIEW LECTURES </h2>
<?include("../scripts/connect.php");
$query="Select title,filename,uploaded_by,comment from
Lecture order by lec_no";
$result=mysql_query($query);
$rows1=mysql_num_rows($result);
$lowerlim=0;
$returnrows=10;
if((!empty($limit))&&($rows1>$limit)){
            $lowerlim=$limit;
}
$last=$returnrows-1;
if((!empty($last))&&($rows>$last)){
            $last=$last;
}
$quer="Select title,filename,uploaded_by,comment from Lecture
order by lec_no ASC limit $lowerlim, $returnrows";
$rslt=mysql_query($quer);
$rows=mysql_num_rows($rslt);
if($rows){
?>
                                                <table width="80%"
align="center" cellspacing="2" cellpadding="2" border="1">
                                                        <tr>

            <td class="dark" align="center" width="5%"></td>

            <td class="dark" align="center"
width="30%">Title</td>

            <td class="dark" align="center">Description</td>
                                                        </tr>
```

```
<?
	$k=$limit;
	for($i = 0; $i < $rows; $i++){
		$k++;
		$data = mysql_fetch_row($rslt);
?>
                                                        <tr
valign="top">

	<td class="light" align="center"><p
align="justify"><?echo $k ." .";?></p></td>

	<td class="light" align="center"><p align="left"><a
href="../<?echo "/lectures/$data[1]";?>" class="sidelinks2"
target="_blank"><?echo $data[0];?></a></p></td>

	<td class="light" align="center"><p
align="justify"><?echo $data[3];?></p></td>
                                                        </tr>
<?}?>
                                                        <tr
valign="top">

	<td class="light" align="center" colspan="3">Note:
To view a lecture, simply clik the title of the lecture you want to
view. The lecture file will be opened on a new window.</td>
                                                        </tr>
		</table><br><br>
<?		mysql_free_result($result);
	if($lowerlim > ($returnrows-1)){
		echo "<a href=\"view_lecture.php?limit=".
($lowerlim-$returnrows)."&last=".$last."
class=\"sidelinks2\"\">Previous</a>";
	}
	echo "  Showing lectures ". ($limit+1) ." to ".($limit+
$rows)."  ";
	if(!($rows<$returnrows) && (($limit+$rows-1)<
($rows1-1))){
		echo"<a href=\"view_lecture.php?limit=".
($lowerlim+$returnrows)."&last=".($lowerlim+$rows-1)."
class=\"sidelinks2\"\">Next</a>";
	}
}else{?>
                                                <table width="80%"
align="center" cellspacing="2" cellpadding="2" border="0">
                                                        <tr>

	<td class="light" colspan="2"
align="center">  No files yet.</td>
                                                        </tr>
                                                </table>
<?}?>                                           <br><br>
    </TD>
   </TR>
  </TABLE></td>
<td width="175" valign="top"
background="../images/sidebg.jpg"><img
src="../images/spacer.gif" width=175 height=23>
  <a href="#" class="sidelinks"></a>
  <table width="175" border="0" cellspacing="0"
cellpadding="0">
    <tr>
      <td width="13%"> </td>
      <td width="75%"><a href="predict.php"
class="sidelinks">Predict</a><br><br>

                                                        <a
href="changepassword.php" class="sidelinks">Change
Password</a><br><br>

Lectures<br><br>
                                                <a
href="add_lecture.php" class="sidelinks">Add Lecture</a><br>
                                                <a
href="edit_lecture.php" class="sidelinks">Edit Lecture</a><br>
                                        <a href="view_lecture.php"
class="sidelinks">View Lecture</a><br>
                                        <a href="delete_lecture.php"
class="sidelinks">Delete Lecture</a><br><br><br>
                                                Questions<br><br>
                                                <a
href="add_question.php" class="sidelinks">Add
Question</a><br>
                                                <a
href="edit_question.php" class="sidelinks">Edit
Question</a><br>
                                        <a href="view_question.php"
class="sidelinks">View Question</a><br>
                                                <a href="delete_question.php"
class="sidelinks">Delete Question</a><br><br><br>
              </td>
    <td width="12%"> </td>
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WIDTH=175 HEIGHT=67></TD>
   </TR>
  </TABLE></td>
</tr>
<tr>
<td height="26" colspan="2" valign="top"> <TABLE
width="775" BORDER=0 CELLPADDING=0 CELLSPACING=0>
   <TR>
    <TD width="53"><IMG SRC="../images/pixi_med_grey.gif"
WIDTH=53 HEIGHT=26></TD>
    <TD width="722"
background="../images/pixi_med_grey.gif">&copy;
      Copyright 2006. </TD>
   </TR>
  </TABLE></td>
</tr>
</table>
</body></html>
```

/sysad/delete_lecture.php

```
<?session_register("sysad");
if(!isset($sysad)){
	header("Location:http://localhost/enzyme/index.php?
error=2");
	exit();
}
if(isset($delete)){
	if (isset($pick)){
		include("../scripts/connect.php");
		$j = count($pick);
		for($i=$j-1; $i>=0; $i--){
                                        $quer="Select filename from
Lecture where lec_no=$pick[$i]";
                                        $res=mysql_query($quer);
                                        $data = mysql_fetch_row($res);
                                        $fylname=$data[0];
                                        $sql="Delete from Lecture
where lec_no=$pick[$i]";
                                        if(mysql_query($sql)){
                                                unlink("../lectures/
$fylname");
                                                if($j>1){

	$succ="Lecture files have been successfully deleted.";
                                                }else{

	$succ="Lecture file has been successfully deleted.";
                                                }

                                        }
                                        $query="Select lec_no from
Lecture where lec_no>$pick[$i]";
                                        $result=mysql_query($query);

	$rows=mysql_num_rows($result);
                                        for($k=0;$k<$rows;$k++){
                                                $data =
mysql_fetch_row($result);
```

```
		$old_lec_no=$data[0];

		$new_lec_no=$old_lec_no-1;
                                        $query2="Update
Lecture set lec_no=$new_lec_no where lec_no=$old_lec_no";

		mysql_query($query2);
                                        }
                        }
		}else{
                        $succ="Please select atleast one lecture";
		}
}
?>
<html>
<head>
<title>Enzyme Subfamily Class Prediction Application - Delete
Lecture</title>
<script language="JavaScript" type="text/JavaScript"
src="../images/myfreetemplates.js"></script>
<script language="JavaScript">
                        function warnUser(){
                                <!--
                                return confirm("Are you sure
you want to delete?! Click OK to delete.");
                                -->
                        }
</script>
<link href="../images/myfreetemplates.css" rel="stylesheet"
type="text/css">
</head>
<body background="../images/pixi_lightblue.jpg" leftmargin="0"
topmargin="0" marginwidth="0" marginheight="0"
onLoad="MM_preloadImages('../images/btn_main-
over.gif','../images/btn_overview-
over.gif','../images/btn_services-
over.gif','../images/products_btn-over.gif')">
<table width="775" height="100%" border="0" align="center"
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WIDTH=336 HEIGHT=7></TD>
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WIDTH=16 HEIGHT=7></TD>
     <TD background="../images/pixi_light_grey.gif"><IMG
SRC="../images/spacer.gif" WIDTH=423 HEIGHT=7></TD>
   </TR>
  </TABLE></td>
</tr>
<tr>
<td height="118" colspan="2" valign="top"> <table border="0"
cellpadding="0" cellspacing="0" id="navtable">
   <tr>
     <td width="352" rowspan="3"><TABLE width="352"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
        <TR>
          <TD><IMG SRC="../images/logo.gif"  width=219
height=118></TD>
          <TD><IMG SRC="../images/toptreatment1.jpg"
WIDTH=133 HEIGHT=118></TD>
        </TR>
       </TABLE></td>
     <td width="423"
background="../images/pixi_light_grey.gif"> <TABLE BORDER=0
CELLPADDING=0 CELLSPACING=0>
        <TR>
          <TD width="87"><IMG SRC="../images/topcurve2.jpg"
WIDTH="87" HEIGHT="43"></TD>
          <TD width="336"
background="../images/pixi_light_grey.gif" align="center">
          <font color="#000000" face ="Lucida Handwriting"
style="font-size: 11pt; font-weight: 700"><b>Enzyme
Subfamily Class Prediction Application</b></font></TD>
        </TR>
       </TABLE></td>
   </tr>
   <tr>
     <td width="423"
background="../images/pixi_light_grey.gif"> <TABLE
width="100%" BORDER=0 CELLPADDING=0 CELLSPACING=0>
        <TR>
          <TD width="277"><IMG SRC="../images/topcurve3.jpg"
WIDTH=277 HEIGHT=20></TD>
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background="../images/pixi_light_grey.gif"><IMG
SRC="../images/spacer.gif" WIDTH=146 HEIGHT=20></TD>
        </TR>
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   </tr>
   <tr>
     <td width="423"> <TABLE BORDER=0 CELLPADDING=0
CELLSPACING=0>
        <TR>
          <TD width="66"><IMG
SRC="../images/toptreatment1a.jpg" WIDTH=66
HEIGHT=55></TD>
          <TD width="72"><A HREF="index.php"><IMG
SRC="../images/home.jpg" NAME="btn_main" WIDTH=72
HEIGHT=55 BORDER=0 ></A></TD>
                                        <TD width="89"><A
HREF="../logout.php"><IMG SRC="../images/log-out.jpg"
NAME="btn_overview" WIDTH=89 HEIGHT=55 BORDER=0
></A></TD>
          <TD width="81"><A HREF="FAQ.php"><IMG
SRC="../images/blank2.jpg" NAME="btn_services" WIDTH=81
HEIGHT=55 BORDER=0 ></A></TD>
          <TD width="72"><A HREF="about.php"><IMG
SRC="../images/blank1.jpg" NAME="products" WIDTH=72
HEIGHT=55 BORDER=0 ></A></TD>
          <TD width="43"><IMG SRC="../images/topnavend.jpg"
WIDTH=43 HEIGHT=55></TD>
        </TR>
       </TABLE></td>
   </tr>
  </table></td>
</tr>
<tr>
<td height="69" colspan="2" valign="top">
  <TABLE BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD ROWSPAN=2 WIDTH=219 HEIGHT=69></TD>
      <TD><IMG SRC="../images/toptreatment2.jpg" WIDTH=199
HEIGHT=20></TD>
     <TD ROWSPAN=2><IMG SRC="../images/pixi_darkblue.jpg"
WIDTH=182 HEIGHT=69></TD>
     <TD ROWSPAN=2><img src="../images/sidetop.jpg"
width="175" height="69"></TD>
    </TR>
    <TR>
      <TD background="../images/pixi_darkblue.jpg">System
Administrator: <i><? echo $sysad; ?></i></TD>
    </TR>
  </TABLE>
</td>
</tr>
<tr>
<td width="600" valign="top">
  <TABLE BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD width="600" align="center">
      <br><h2>DELETE LECTURES</h2>
<?include("../scripts/connect.php");
$query="Select title,filename,uploaded_by,comment from
Lecture order by lec_no";
$result=mysql_query($query);
$rows1=mysql_num_rows($result);
$lowerlim=0;
$returnrows=10;
if((!empty($limit))&&($rows1>$limit)){
		$lowerlim=$limit;
}
$last=$returnrows-1;
if((!empty($last))&&($rows>$last)){
		$last=$last;
}
$quer="Select title,lec_no,uploaded_by,comment from Lecture
order by lec_no ASC limit $lowerlim, $returnrows";
$rslt=mysql_query($quer);
$rows=mysql_num_rows($rslt);
```

```
if($rows){
	if($succ){
?>
<br><h5><?echo $succ;?></h5>
<?}?>
<form  name="frm" method="post" action="delete_lecture.php">
<table width="90%" align="center" cellspacing="2" cellpadding="2" border="1">
<tr>

	<td class="dark" align="center" width="5%"></td>

	<td class="dark" align="center" width="30%">Title</td>

	<td class="dark" align="center">Description</td>
</tr>
<?
	for($i = 0; $i < $rows; $i++){
		$data = mysql_fetch_row($rslt);
?>
<tr valign="top"><td class="light" align="center"><input type="checkbox" class="check" name="pick[]" value="<?echo $data[1];?>"></td>

	<td class="light" align="left"><a href="../<?echo "/lectures/$data[1]";?>" class="sidelinks2" target="_blank"><p align="left"><?echo $data[0];?></p></a></td>

	<td class="light" align="center"><p align="justify"><?echo $data[3];?></p></td>
</tr>
<?} mysql_free_result($result);?>
<tr>

	<td colspan=6 class="note">

		<br>

		<p align="justify"><b>Note:</b>   To delete lectures, simply check the corresponding checkboxes and click the <i>Delete</i> button.</p>

	</td>
</tr>


</table>
<br>
<input name="delete" type="submit" class="submit" value="Delete" onclick="return warnUser();"><input type="reset" class="submit" value="Clear All">
</form>
<br><br>
<?if($lowerlim > ($returnrows-1)){
		echo "<a href=\"delete_lecture.php?limit=".($lowerlim-$returnrows)."&last=".$last."\">Previous</a>";
	}
	echo "  Showing lectures ". ($limit+1) ." to ".($limit+$rows)."  ";
	if(!($rows<$returnrows) && (($limit+$rows-1)<($rows1-1))){
		echo"<a href=\"delete_lecture.php?limit=".($lowerlim+$returnrows)."&last=".($lowerlim+$rows-1)."\">Next</a>";
	}
}else{
?>
<table width="75%" align="center" cellspacing="2" cellpadding="0" border="0">
<tr>

	<td class="light" colspan="3" align="center">  No files to delete.</td>
</tr>
</table>
<?}?>
    </TD>
   </TR>
  </TABLE></td>
<td width="175" valign="top" background="../images/sidebg.jpg"><img src="../images/spacer.gif" width=175 height=23>
  <a href="#" class="sidelinks"></a>
  <table width="175" border="0" cellspacing="0" cellpadding="0">
    <tr>
      <td width="13%"> </td>
      <td width="75%"><a href="predict.php" class="sidelinks">Predict</a><br><br>

<a href="changepassword.php" class="sidelinks">Change Password</a><br><br>

Lectures<br><br>
<a href="add_lecture.php" class="sidelinks">Add Lecture</a><br>
<a href="edit_lecture.php" class="sidelinks">Edit Lecture</a><br>
<a href="view_lecture.php" class="sidelinks">View Lecture</a><br>
<a href="delete_lecture.php" class="sidelinks">Delete Lecture</a><br><br><br>
Questions<br><br>
<a href="add_question.php" class="sidelinks">Add Question</a><br>
<a href="edit_question.php" class="sidelinks">Edit Question</a><br>
<a href="view_question.php" class="sidelinks">View Question</a><br>
<a href="delete_question.php" class="sidelinks">Delete Question</a><br><br><br>
	</td>
      <td width="12%"> </td>
    </tr>
  </table>
</td>
</tr>
<tr>
<td height="67" colspan="2" valign="top"><TABLE width="775" BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
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      <TD width="175"><IMG SRC="../images/base2.jpg" WIDTH=175 HEIGHT=67></TD>
    </TR>
  </TABLE></td>
</tr>
<tr>
<td height="26" colspan="2" valign="top"> <TABLE width="775" BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD width="53"><IMG SRC="../images/pixi_med_grey.gif" WIDTH=53 HEIGHT=26></TD>
      <TD width="722" background="../images/pixi_med_grey.gif">&copy;
        Copyright 2006. </TD>
    </TR>
  </TABLE></td>
</tr>
</table>
</body></html>
```

/sysad/add_question.php

```
<?session_register("sysad");
if(!isset($sysad)){
	header("Location:http://localhost/enzyme/index.php?error=2");
	exit();
}
include("../scripts/connect.php");
if(isset($ok)){
	$oldtopic=$topic;
	$no_error=1;
```

```
		foreach($HTTP_POST_VARS as $field){
			if(trim($field)==""){
				$err_msge="Please enter a
topic.";
				$no_error=0;
				unset($ok);
				$topic=$oldtopic;
				break;
			}
		}
}
if(isset($add)){
		$oldtopic=$topic;
		$no_error=1;
		foreach($HTTP_POST_VARS as $field){
			if(trim($field)==""){
				$err_msge="Please fill all the
fields.";
				$no_error=0;
				$ok=1;
				$topic=$oldtopic;
				break;
			}
		}
		if($no_error){
			$oldtopic=$topic;
			$query="Select q_no from Questions where
topic='$topic' order by q_no desc" ;
			$result=mysql_query($query);
			$data_quest = mysql_fetch_row($result);
			$QNo=$data_quest[0]+1;
			$sql="Insert into
Questions(question,A,B,C,D,correct,topic,q_no)
Values('$question','$A','$B','$C','$D','$correct','$topic','$QNo')";
			if(mysql_query($sql))
			{
				$ok=1;
				$topic=$oldtopic;
				$succ="Question has been
added successfully.";
			}
			mysql_free_result($result);
		}
}
?>
<html><head>
<title>Enzyme Subfamily Class Prediction Application - Add
Question</title>
<script language="JavaScript" type="text/JavaScript"
src="../images/myfreetemplates.js"></script>
<link href="../images/myfreetemplates.css" rel="stylesheet"
type="text/css">
</head>
<body background="../images/pixi_lightblue.jpg" leftmargin="0"
topmargin="0" marginwidth="0" marginheight="0"
onLoad="MM_preloadImages('../images/btn_main-
over.gif','../images/btn_overview-
over.gif','../images/btn_services-
over.gif','../images/products_btn-over.gif')">
<table width="775" height="100%" border="0" align="center"
cellpadding="0" cellspacing="0"
background="../images/pixi_darkblue.jpg">
<tr>
<td height="7" colspan="2" valign="top"> <TABLE width="775"
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  <TR>
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WIDTH=336 HEIGHT=7></TD>
    <TD width="16"><IMG SRC="../images/topangle.jpg"
WIDTH=16 HEIGHT=7></TD>
    <TD background="../images/pixi_light_grey.gif"><IMG
SRC="../images/spacer.gif" WIDTH=423 HEIGHT=7></TD>
  </TR>
 </TABLE></td>
</tr>
<tr>
<td height="118" colspan="2" valign="top"> <table border="0"
cellpadding="0" cellspacing="0" id="navtable">
  <tr>
    <td width="352" rowspan="3"><TABLE width="352"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
      <TR>
        <TD><IMG SRC="../images/logo.gif"  width=219
height=118></TD>
        <TD><IMG SRC="../images/toptreatment1.jpg"
WIDTH=133 HEIGHT=118></TD>
      </TR>
    </TABLE></td>
  <td width="423"
background="../images/pixi_light_grey.gif"> <TABLE BORDER=0
CELLPADDING=0 CELLSPACING=0>
      <TR>
        <TD width="87"><IMG SRC="../images/topcurve2.jpg"
WIDTH="87" HEIGHT="43"></TD>
        <TD width="336"
background="../images/pixi_light_grey.gif" align="center">
        <font color="#000000" face ="Lucida Handwriting"
style="font-size: 11pt; font-weight: 700"><b>Enzyme
Subfamily Class Prediction Application</b></font></TD>
      </TR>
    </TABLE></td>
  </tr>
  <tr>
    <td width="423"
background="../images/pixi_light_grey.gif"> <TABLE
width="100%" BORDER=0 CELLPADDING=0 CELLSPACING=0>
      <TR>
        <TD width="277"><IMG SRC="../images/topcurve3.jpg"
WIDTH=277 HEIGHT=20></TD>
        <TD width="146"
background="../images/pixi_light_grey.gif"><IMG
SRC="../images/spacer.gif" WIDTH=146 HEIGHT=20></TD>
      </TR>
    </TABLE></td>
  </tr>
  <tr>
    <td width="423"> <TABLE BORDER=0 CELLPADDING=0
CELLSPACING=0>
      <TR>
        <TD width="66"><IMG
SRC="../images/toptreatment1a.jpg" WIDTH=66
HEIGHT=55></TD>
        <TD width="72"><A HREF="index.php"><IMG
SRC="../images/home.jpg" NAME="btn_main" WIDTH=72
HEIGHT=55 BORDER=0 ></A></TD>
                                <TD width="89"><A
HREF="../logout.php"><IMG SRC="../images/log-out.jpg"
NAME="btn_overview" WIDTH=89 HEIGHT=55 BORDER=0
></A></TD>
        <TD width="81"><A HREF="FAQ.php"><IMG
SRC="../images/blank2.jpg" NAME="btn_services" WIDTH=81
HEIGHT=55 BORDER=0 ></A></TD>
        <TD width="72"><A HREF="about.php"><IMG
SRC="../images/blank1.jpg" NAME="products" WIDTH=72
HEIGHT=55 BORDER=0 ></A></TD>
        <TD width="43"><IMG SRC="../images/topnavend.jpg"
WIDTH=43 HEIGHT=55></TD>
      </TR>
    </TABLE></td>
  </tr>
 </table></td>
</tr>
<tr>
<td height="69" colspan="2" valign="top">
 <TABLE BORDER=0 CELLPADDING=0 CELLSPACING=0>
  <TR>
    <TD ROWSPAN=2 WIDTH=219 HEIGHT=69></TD>
    <TD><IMG SRC="../images/toptreatment2.jpg" WIDTH=199
HEIGHT=20></TD>
    <TD ROWSPAN=2><IMG SRC="../images/pixi_darkblue.jpg"
WIDTH=182 HEIGHT=69></TD>
    <TD ROWSPAN=2><img src="../images/sidetop.jpg"
width="175" height="69"></TD>
  </TR>
  <TR>
    <TD background="../images/pixi_darkblue.jpg">System
Administrator: <i><? echo $sysad; ?></i></TD>
  </TR>
 </TABLE>
</td>
</tr>
<tr>
<td width="600" valign="top">
 <TABLE BORDER=0 CELLPADDING=0 CELLSPACING=0>
```

```
   <TR>
    <TD width="600" align="center">


     <table align="center" width="90%" cellspacing="2"
cellpadding="0" border="0">
                                                  <tr><td
align="center"><br><h2>ADD QUESTION</h2></td></tr>
<?          if(!isset($ok)){
            if($err_msge){
?>
                                              <tr><td
align="center"><h5><?echo $err_msge;?></h5></td></tr>
<?}?>
                        <tr><td>Select the topic where the
question you want to add belong or create new topic.
<br><br></td></tr>
<?$query="Select distinct(topic) from Questions ";
            $result=mysql_query($query);
            $rows=mysql_num_rows($result);
            for($i=0;$i<$rows;$i++){
                        $data = mysql_fetch_row($result);
                        $j=$i+1;
?>
                                                  <tr>

            <td class="label" colspan="2"><? echo "$j. "; ?><a
href="add_question.php?ok=1&topic=<?echo "$data[0]";?>"
class="sidelinks2"><? echo "$data[0]"; ?></a></td>
                                                  </tr>
<?          }            $topic='';?>

                                              <tr>
                                                  <td
class="label" colspan="2">

            <form  name="frm" method="post"
action="add_question.php">

                        <table>

                        <tr>

                        <td rowspan="2" class="label"
valign="top">New Topic: <input type="text" name="topic"
value="<?echo "$topic";?>" size="25" maxlength="50"></td>

                        </tr>

                        <tr><td>

                        <input name="ok" type="submit"
class="submit" value=" OK "><input type="reset"
class="submit" value="Clear">

                        </td>

                        </tr>

                        </table>
                                                  </form>
                                                  </td>
                                              </tr>
                                    </table>
<? }else { ?>
                                              <tr><td>
                                              <form  name="frm"
method="post" action="add_question.php">
                                              <table align="center"
width="80%" cellspacing="2" cellpadding="0" border="0">
                                              <tr><td colspan="5"
align="center"><h5>Topic: <?echo $topic;?></h5></td></tr>
<?          if($err_msge){?>
                                              <tr><td colspan="5"
align="center"><h5><center><?echo $err_msge;?
><center></h5></td></tr>
<?}
if($succ){?>
                                              <tr><td colspan="5"
align="center"><h5><center><?echo $succ;?
><center></h5></td></tr>
<?
            $A='';
            $B='';
            $C='';
            $D='';
            }
?>
                                                  <tr>

            <td class="label" width="12%"
valign="top">Question:</td>

            <td colspan="4"><textarea name="question"
cols="60" rows="3"><?echo "$Question";?></textarea></td>
                                                  </tr>
                                                  <tr>

            <td rowspan="2" class="label"
valign="top">Choices:</td>

            <td class="simple" width="3%">A:</td>

            <td width="30%"><input name="A" value="<?echo
"$A";?>" size="25" maxlength="50"></td>

            <td class="simple" width="3%">C:</td>

            <td><input name="C" value="<?echo "$C";?>"
size="25" maxlength="50"></td>
                                                  </tr>
                                                  <tr>

            <td class="simple" width="3%">B:</td>

            <td width="30%"><input name="B" value="<?echo
"$B";?>" size="25" maxlength="50"></td>

            <td class="simple" width="3%">D:</td>

            <td><input name="D" value="<?echo "$D";?>"
size="25" maxlength="50"></td>
                                                  </tr>
                                                  <tr>

            <td class="label" valign="top">Correct:</td>

            <td colspan="4"><select name="correct">

            <option value="A">A</option>

            <option value="B">B</option>

            <option value="C">C</option>

            <option value="D">D</option>

            </select>

            </td>
                                                  </tr>
                                                  <tr>

            <td colspan="6" align="center">

            <br>

            <input type="hidden" name="topic" value="<?echo
"$topic";?>">

            <input name="add" type="submit" class="submit"
value=" Upload "><input type="reset" class="submit"
value="Reset">

            </td>
                                                  </tr>
                                                  <tr>

            <td colspan="6" class="note">

                        <br><p align="justify"><b>Note:</b> To
add a question, type the question and the choices to their
corresponding textboxes.    Then select
the letter of the correct
```

```
answer.    Finally click the
<i>Upload</i> button.</p><br>

        </td>
                                                    </tr>
                                                </table>
                                                </form>
                                                </td></tr>
                                                <tr><td>
                                                    <table
align="center" width="90%" cellspacing="2" cellpadding="0"
border="0">
<?
        $query="Select question,A,B,C,D,correct from
Questions where topic='$topic' order by q_no";
        $result=mysql_query($query);
        $rows=mysql_num_rows($result);
        for($i=0;$i<$rows;$i++){
                $data = mysql_fetch_row($result);
                $j=$i+1;
?>
                                                    <tr>

        <td width="2%" align="left" class="label"
valign="top"><?echo "$j";?>. </td>

        <td class="simple" colspan="6"><p
align="justify"><?echo "$data[0]";?></p></td>
                                                    </tr>
                                                    <tr
valign="top">

        <td align="right" width="2%"
class="label">A. </td>

        <td width="42%" class="simple"><?echo
"$data[1]";?></td>

        <td align="right" width="2%"
class="label">C. </td>

        <td class="simple"><?echo "$data[3]";?></td>
                                                    </tr>
                                                    <tr
valign="top">

        <td align="right" width="2%"
class="label">B. </td>

        <td width="42%" class="simple"><?echo
"$data[2]";?></td>

        <td align="right" width="2%"
class="label">D. </td>

        <td class="simple"><?echo "$data[4]";?></td>
                                                    </tr>
                                                    <tr>


        <td class="label" valign="top"
colspan="7">Correct:  <?echo "$data[5]";?
><br><br></td>
                                                    </tr>


<?
        }
        mysql_free_result($result);
?>
                                                </table>
                                                </td></tr>
                                                <tr>

                    <td colspan="3" align="center">

                                <br>

                                <a href="add_question.php"
class="sidelinks2">BACK TO TOPICS</a>

                    </td>
                                                </tr>
                                                </table>
<? } ?>
                                                <br><br>
    </TD>
   </TR>
  </TABLE></td>
<td width="175" valign="top"
background="../images/sidebg.jpg"><img
src="../images/spacer.gif" width=175 height=23>
  <a href="#" class="sidelinks"></a>
  <table width="175" border="0" cellspacing="0"
cellpadding="0">
    <tr>
      <td width="13%"> </td>
      <td width="75%"><a href="predict.php"
class="sidelinks">Predict</a><br><br>

                                                    <a
href="changepassword.php" class="sidelinks">Change
Password</a><br><br>

Lectures<br><br>
                                                    <a
href="add_lecture.php" class="sidelinks">Add Lecture</a><br>
                                                    <a
href="edit_lecture.php" class="sidelinks">Edit Lecture</a><br>
                                                <a href="view_lecture.php"
class="sidelinks">View Lecture</a><br>
                                                    <a href="delete_lecture.php"
class="sidelinks">Delete Lecture</a><br><br><br>
                                                    Questions<br><br>
                                                    <a
href="add_question.php" class="sidelinks">Add
Question</a><br>
                                                    <a
href="edit_question.php" class="sidelinks">Edit
Question</a><br>
                                                <a href="view_question.php"
class="sidelinks">View Question</a><br>
                                                    <a href="delete_question.php"
class="sidelinks">Delete Question</a><br><br><br>
                </td>
      <td width="12%"> </td>
    </tr>
  </table>
</td>
</tr>
<tr>
<td height="67" colspan="2" valign="top"><TABLE width="775"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD><IMG SRC="../images/base1.jpg" WIDTH=600
HEIGHT=67></TD>
      <TD width="175"><IMG SRC="../images/base2.jpg"
WIDTH=175 HEIGHT=67></TD>
    </TR>
  </TABLE></td>
</tr>
<tr>
<td height="26" colspan="2" valign="top"> <TABLE
width="775" BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD width="53"><IMG SRC="../images/pixi_med_grey.gif"
WIDTH=53 HEIGHT=26></TD>
      <TD width="722"
background="../images/pixi_med_grey.gif">&copy;
       Copyright 2006. </TD>
    </TR>
  </TABLE></td>
</tr>
</table>
</body></html>
```

/sysad/edit_question.php

```
<?session_register("sysad");
if(!isset($sysad)){
        header("Location:http://localhost/enzyme/index.php?
error=2");
            exit();
}
include("../scripts/connect.php");
if(isset($edit)){
```

```
		$no_error=1;
		foreach($HTTP_POST_VARS as $field){
			if(trim($field)==""){
				$err_msge="Please fill all the
fields.";
				$no_error=0;
				break;
			}
		}
		if($no_error){		$sql="Update Questions Set
question='$question', A='$A', B='$B', C='$C', D='$D',
correct='$correct' where topic='$topic' and q_no=$q_no";
			mysql_query($sql);
			$err_msge="Question has been
successfully editted";
			//header("Location:http://localhost/enzyme
/sysad/view_question.php?topic=$topic");
			//exit();
		}
}
if(isset($ok)){
		if(!isset($q_no)){
			$err_msge="Please select one question.";
			unset($ok);
		}
}?>
<html>
<head>
<title>Enzyme Subfamily Class Prediction Application - Edit
Question</title>
<script language="JavaScript" type="text/JavaScript"
src="../images/myfreetemplates.js"></script>
<link href="../images/myfreetemplates.css" rel="stylesheet"
type="text/css">
</head>
<body background="../images/pixi_lightblue.jpg" leftmargin="0"
topmargin="0" marginwidth="0" marginheight="0"
onLoad="MM_preloadImages('../images/btn_main-
over.gif','../images/btn_overview-
over.gif','../images/btn_services-
over.gif','../images/products_btn-over.gif')">
<table width="775" height="100%" border="0" align="center"
cellpadding="0" cellspacing="0"
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BORDER=0 CELLPADDING=0 CELLSPACING=0>
  <TR>
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WIDTH=336 HEIGHT=7></TD>
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WIDTH=16 HEIGHT=7></TD>
    <TD background="../images/pixi_light_grey.gif"><IMG
SRC="../images/spacer.gif" WIDTH=423 HEIGHT=7></TD>
  </TR>
 </TABLE></td>
</tr>
<tr>
<td height="118" colspan="2" valign="top"> <table border="0"
cellpadding="0" cellspacing="0" id="navtable">
  <tr>
    <td width="352" rowspan="3"><TABLE width="352"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
      <TR>
        <TD><IMG SRC="../images/logo.gif"  width=219
height=118></TD>
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WIDTH=133 HEIGHT=118></TD>
      </TR>
     </TABLE></td>
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background="../images/pixi_light_grey.gif"> <TABLE BORDER=0
CELLPADDING=0 CELLSPACING=0>
      <TR>
        <TD width="87"><IMG SRC="../images/topcurve2.jpg"
WIDTH="87" HEIGHT="43"></TD>
        <TD width="336"
background="../images/pixi_light_grey.gif" align="center">
        <font color="#000000" face ="Lucida Handwriting"
style="font-size: 11pt; font-weight: 700"><b>Enzyme
Subfamily Class Prediction Application</b></font></TD>
      </TR>
    </TABLE></td>
  </tr>
  <tr>
   <td width="423"
background="../images/pixi_light_grey.gif"> <TABLE
width="100%" BORDER=0 CELLPADDING=0 CELLSPACING=0>
      <TR>
        <TD width="277"><IMG SRC="../images/topcurve3.jpg"
WIDTH=277 HEIGHT=20></TD>
        <TD width="146"
background="../images/pixi_light_grey.gif"><IMG
SRC="../images/spacer.gif" WIDTH=146 HEIGHT=20></TD>
      </TR>
     </TABLE></td>
  </tr>
  <tr>
   <td width="423"> <TABLE BORDER=0 CELLPADDING=0
CELLSPACING=0>
      <TR>
        <TD width="66"><IMG
SRC="../images/toptreatment1a.jpg" WIDTH=66
HEIGHT=55></TD>
        <TD width="72"><A HREF="index.php"><IMG
SRC="../images/home.jpg" NAME="btn_main" WIDTH=72
HEIGHT=55 BORDER=0 ></A></TD>
                                <TD width="89"><A
HREF="../logout.php"><IMG SRC="../images/log-out.jpg"
NAME="btn_overview" WIDTH=89 HEIGHT=55 BORDER=0
></A></TD>
        <TD width="81"><A HREF="FAQ.php"><IMG
SRC="../images/blank2.jpg" NAME="btn_services" WIDTH=81
HEIGHT=55 BORDER=0 ></A></TD>
        <TD width="72"><A HREF="about.php"><IMG
SRC="../images/blank1.jpg" NAME="products" WIDTH=72
HEIGHT=55 BORDER=0 ></A></TD>
        <TD width="43"><IMG SRC="../images/topnavend.jpg"
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<td height="69" colspan="2" valign="top">
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  <TR>
    <TD ROWSPAN=2 WIDTH=219 HEIGHT=69></TD>
    <TD><IMG SRC="../images/toptreatment2.jpg" WIDTH=199
HEIGHT=20></TD>
    <TD ROWSPAN=2><IMG SRC="../images/pixi_darkblue.jpg"
WIDTH=182 HEIGHT=69></TD>
    <TD ROWSPAN=2><img src="../images/sidetop.jpg"
width="175" height="69"></TD>
  </TR>
  <TR>
    <TD background="../images/pixi_darkblue.jpg">System
Administrator: <i><? echo $sysad; ?></i></TD>
  </TR>
 </TABLE>
</td>
</tr>
<tr>
<td width="600" valign="top">
 <TABLE BORDER=0 CELLPADDING=0 CELLSPACING=0>
  <TR>
    <TD width="600" align="center">
    <table align="center" width="90%" cellspacing="2"
cellpadding="0" border="0">
                                                <tr><td
align="center"><br><h2>EDIT QUESTION</h2></td></tr>
<? if(!isset($topic)){
		$query="Select distinct(topic) from Questions ";
		$result=mysql_query($query);
		$rows=mysql_num_rows($result);
		if($rows){
?>

		<tr><td>Select the topic where the question you
want to edit belong.<br><br></td></tr>
<?
			for($i=0;$i<$rows;$i++){
```

```
                                $data =
mysql_fetch_row($result);
                                $j=$i+1;
?>
                                                        <tr>

            <td class="label" colspan="2"><? echo "$j. "; ?><a
href="edit_question.php?topic=<?echo "$data[0]";?>"
class="sidelinks2"><? echo $data[0]; ?></a></td>
                                                        </tr>
<?                  }           ?>

<?                  }else{
?>
                                                        <tr><td
align="center">No questions to edit yet.</td></tr>
<?}?>
                                                    </table>
<?          }else {
            if($err_msge){
?>
                                                    <tr><td
align="center"><font color="YELLOW"><h5><?echo
$err_msge;?></h5></font></td></tr>
<?}?>                           <tr><td>
<?                  if(!isset($ok)){?>

                                                    <br>
                                                    <table align="center"
width="90%" cellspacing="2" cellpadding="0" border="0">
                                                    <tr><td colspan="5"
align="center"><h5>Topic: <?echo $topic;?></h5></td></tr>
                                                    <form  name="frm"
method="post" action="edit_question.php">
<?$query="Select question,A,B,C,D,correct,q_no from Questions
where topic='$topic' order by q_no";
                    $result=mysql_query($query);
                    $rows=mysql_num_rows($result);
                    for($i=0;$i<$rows;$i++){
                                $data =
mysql_fetch_row($result);
                                $j=$i+1;
?>
                                                    <tr>
                                                        <td
width="3%" valign="top"><input type="radio" name="q_no"
class="check" value="<? echo $data[6]; ?>"><input
type="hidden" name="topic" class="check" value="<? echo
$topic; ?>"></td>
                                                        <td
width="6%" align="right" class="label" valign="top"><b><?
echo "$j";?>.</b> </td>
                                                        <td
class="simple" colspan="6"><p align="justify"><?echo
"$data[0]";?></p></td>
                                                    </tr>
                                                    <tr valign="top">

            <td></td>
                                                        <td
align="right" width="2%" class="label">A. </td>
                                                        <td
width="42%" class="simple"><?echo "$data[1]";?></td>
                                                        <td
align="right" width="2%" class="label">C. </td>
                                                        <td
class="simple"><?echo "$data[3]";?></td>
                                                    </tr>
                                                    <tr valign="top">

            <td></td>
                                                        <td
align="right" width="2%" class="label">B. </td>
                                                        <td
width="42%" class="simple"><?echo "$data[2]";?></td>
                                                        <td
align="right" width="2%" class="label">D. </td>
                                                        <td
class="simple"><?echo "$data[4]";?></td>
                                                    </tr>
                                                    <tr>

            <td></td>

            <td class="label" colspan="2"
valign="top"><b>Correct: </b><?echo "$data[5]";?></td>
                                                    </tr>
<?
                    } mysql_free_result($result);
?>
                                                    <tr>
                                                        <td
colspan="6" align="center">
                                                        <br><br>
                                                        <input
name="ok" type="submit" class="submit" value=" Edit "><input
type="reset" class="submit" value="Clear All">
                                                        </td>
                                                    </tr>
                                                    <tr>
                                                        <td
class="dark" align="center" colspan="6"><br>Note: To edit a
question, click the radio button beside the question you want to
edit.</td>
                                                    </tr>
                                                    </form>

                                                    </table>
<? } else {
                    $query="Select question,A,B,C,D,correct
from Questions where topic='$topic' and q_no='$q_no'";
                    $result=mysql_query($query);
                    $data = mysql_fetch_row($result);
                    $Question=$data[0];
                    $A=$data[1];
                    $B=$data[2];
                    $C=$data[3];
                    $D=$data[4];
                    $correct=$data[5];
?>
                                                    <table align="center"
width="80%" cellspacing="2" cellpadding="0" border="0">
                                                    <tr><td colspan="5"
align="center"><h5>Topic: <?echo $topic;?></h5></td></tr>
                                                    <form  name="frm"
method="post" action="edit_question.php">
                                                    <tr>

            <td class="label" width="12%"
valign="top">Question:</td>

            <td colspan="4"><textarea name="question"
cols="60" rows="3"><?echo "$Question";?></textarea></td>
                                                    </tr>
                                                    <tr>

            <td rowspan="2" class="label"
valign="top">Choices:</td>

            <td class="simple" width="3%">A:</td>

            <td width="30%"><input name="A" value="<?echo
"$A";?>" size="25" maxlength="50"></td>

            <td class="simple" width="3%">C:</td>

            <td><input name="C" value="<?echo "$C";?>"
size="25" maxlength="50"></td>
                                                    </tr>
                                                    <tr>

            <td class="simple" width="3%">B:</td>

            <td width="30%"><input name="B" value="<?echo
"$B";?>" size="25" maxlength="50"></td>

            <td class="simple" width="3%">D:</td>

            <td><input name="D" value="<?echo "$D";?>"
size="25" maxlength="50"></td>
                                                    </tr>
                                                    <tr>
```

```
            <td class="label" valign="top">Correct:</td>

            <td colspan="4"><select name="correct">

            <option value="A" <? if($correct=='A') echo
"selected"; ?> >A</option>

            <option value="B" <? if($correct=='B') echo
"selected"; ?> >B</option>

            <option value="C" <? if($correct=='C') echo
"selected"; ?> >C</option>

            <option value="D" <? if($correct=='D') echo
"selected"; ?> >D</option>

            </select>

            </td>
                                                </tr>
                                                        <tr>

            <td colspan="6" align="center">


            <input type="hidden" name="topic" value="<?echo
"$topic";?>">

            <input type="hidden" name="q_no" value="<?echo
"$q_no";?>">

            <br><br>

            <input name="edit" type="submit" class="submit"
value=" UPLOAD "><input type="reset" class="submit"
value="Reset">

            </td>
                                                            </tr>

                                                </form>

<?} ?>
                                                </td></tr>
                                                <tr>

                        <td colspan="6" align="center">

                        <br>

                                <a href="edit_question.php"
class="sidelinks2">   BACK TO TOPICS</a>

                        </td>
                                                </tr>
                        </table>

<?          }?>
                                                <br><br>
    </TD>
   </TR>
  </TABLE></td>
<td width="175" valign="top"
background="../images/sidebg.jpg"><img
src="../images/spacer.gif" width=175 height=23>
  <a href="#" class="sidelinks"></a>
  <table width="175" border="0" cellspacing="0"
cellpadding="0">
    <tr>
      <td width="13%"> </td>
      <td width="75%"><a href="predict.php"
class="sidelinks">Predict</a><br><br>

                                                        <a
href="changepassword.php" class="sidelinks">Change
Password</a><br><br>

Lectures<br><br>
                                                <a
href="add_lecture.php" class="sidelinks">Add Lecture</a><br>
                                                        <a
href="edit_lecture.php" class="sidelinks">Edit Lecture</a><br>
                                                        <a href="view_lecture.php"
class="sidelinks">View Lecture</a><br>
                                                        <a href="delete_lecture.php"
class="sidelinks">Delete Lecture</a><br><br><br>
                                                        Questions<br><br>
                                                        <a
href="add_question.php" class="sidelinks">Add
Question</a><br>
                                                        <a
href="edit_question.php" class="sidelinks">Edit
Question</a><br>
                                                        <a href="view_question.php"
class="sidelinks">View Question</a><br>
                                                        <a href="delete_question.php"
class="sidelinks">Delete Question</a><br><br><br>
                </td>
      <td width="12%"> </td>
    </tr>
  </table>
</td>
</tr>
<tr>
<td height="67" colspan="2" valign="top"><TABLE width="775"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD><IMG SRC="../images/base1.jpg" WIDTH=600
HEIGHT=67></TD>
      <TD width="175"><IMG SRC="../images/base2.jpg"
WIDTH=175 HEIGHT=67></TD>
    </TR>
  </TABLE></td>
</tr>
<tr>
<td height="26" colspan="2" valign="top"> <TABLE
width="775" BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD width="53"><IMG SRC="../images/pixi_med_grey.gif"
WIDTH=53 HEIGHT=26></TD>
      <TD width="722"
background="../images/pixi_med_grey.gif">&copy;
        Copyright 2006. </TD>
    </TR>
  </TABLE></td>
</tr>
</table>
</body></html>
```

/sysad/view_question.php

```
<?session_register("sysad");
if(!isset($sysad)){
            header("Location:http://localhost/enzyme/index.php?
error=2");
            exit();
}
include("../scripts/connect.php");
?>
<html><head>
<title>Enzyme Subfamil Class Prediction Application - View
Question</title>
<script language="JavaScript" type="text/JavaScript"
src="../images/myfreetemplates.js"></script>
<link href="../images/myfreetemplates.css" rel="stylesheet"
type="text/css">
</head>
<body background="../images/pixi_lightblue.jpg" leftmargin="0"
topmargin="0" marginwidth="0" marginheight="0"
onLoad="MM_preloadImages('../images/btn_main-
over.gif','../images/btn_overview-
over.gif','../images/btn_services-
over.gif','../images/products_btn-over.gif')">
<table width="775" height="100%" border="0" align="center"
cellpadding="0" cellspacing="0"
background="../images/pixi_darkblue.jpg">
<tr>
<td height="7" colspan="2" valign="top"> <TABLE width="775"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD width="336"><IMG SRC="../images/pixi_lightblue.jpg"
WIDTH=336 HEIGHT=7></TD>
```

```
    <TD width="16"><IMG SRC="../images/topangle.jpg"
WIDTH=16 HEIGHT=7></TD>
    <TD background="../images/pixi_light_grey.gif"><IMG
SRC="../images/spacer.gif" WIDTH=423 HEIGHT=7></TD>
   </TR>
  </TABLE></td>
</tr>
<tr>
<td height="118" colspan="2" valign="top"> <table border="0"
cellpadding="0" cellspacing="0" id="navtable">
   <tr>
    <td width="352" rowspan="3"><TABLE width="352"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
       <TR>
        <TD><IMG SRC="../images/logo.gif"  width=219
height=118></TD>
        <TD><IMG SRC="../images/toptreatment1.jpg"
WIDTH=133 HEIGHT=118></TD>
       </TR>
      </TABLE></td>
    <td width="423"
background="../images/pixi_light_grey.gif"> <TABLE BORDER=0
CELLPADDING=0 CELLSPACING=0>
       <TR>
        <TD width="87"><IMG SRC="../images/topcurve2.jpg"
WIDTH="87" HEIGHT="43"></TD>
        <TD width="336"
background="../images/pixi_light_grey.gif" align="center">
        <font color="#000000" face ="Lucida Handwriting"
style="font-size: 11pt; font-weight: 700"><b>Enzyme
Subfamily Class Prediction Application</b></font></TD>
       </TR>
      </TABLE></td>
   </tr>
   <tr>
    <td width="423"
background="../images/pixi_light_grey.gif"> <TABLE
width="100%" BORDER=0 CELLPADDING=0 CELLSPACING=0>
       <TR>
        <TD width="277"><IMG SRC="../images/topcurve3.jpg"
WIDTH=277 HEIGHT=20></TD>
        <TD width="146"
background="../images/pixi_light_grey.gif"><IMG
SRC="../images/spacer.gif" WIDTH=146 HEIGHT=20></TD>
       </TR>
      </TABLE></td>
   </tr>
   <tr>
    <td width="423"> <TABLE BORDER=0 CELLPADDING=0
CELLSPACING=0>
       <TR>
        <TD width="66"><IMG
SRC="../images/toptreatment1a.jpg" WIDTH=66
HEIGHT=55></TD>
        <TD width="72"><A HREF="index.php"><IMG
SRC="../images/home.jpg" NAME="btn_main" WIDTH=72
HEIGHT=55 BORDER=0 ></A></TD>
                                <TD width="89"><A
HREF="../logout.php"><IMG SRC="../images/log-out.jpg"
NAME="btn_overview" WIDTH=89 HEIGHT=55 BORDER=0
></A></TD>
        <TD width="81"><A HREF="FAQ.php"><IMG
SRC="../images/blank2.jpg" NAME="btn_services" WIDTH=81
HEIGHT=55 BORDER=0 ></A></TD>
        <TD width="72"><A HREF="about.php"><IMG
SRC="../images/blank1.jpg" NAME="products" WIDTH=72
HEIGHT=55 BORDER=0 ></A></TD>
        <TD width="43"><IMG SRC="../images/topnavend.jpg"
WIDTH=43 HEIGHT=55></TD>
       </TR>
      </TABLE></td>
   </tr>
  </table></td>
</tr>
<tr>
<td height="69" colspan="2" valign="top">
  <TABLE BORDER=0 CELLPADDING=0 CELLSPACING=0>
   <TR>
    <TD ROWSPAN=2 WIDTH=219 HEIGHT=69></TD>
    <TD><IMG SRC="../images/toptreatment2.jpg" WIDTH=199
HEIGHT=20></TD>
    <TD ROWSPAN=2><IMG SRC="../images/pixi_darkblue.jpg"
WIDTH=182 HEIGHT=69></TD>
    <TD ROWSPAN=2><img src="../images/sidetop.jpg"
width="175" height="69"></TD>
   </TR>
   <TR>
    <TD background="../images/pixi_darkblue.jpg">System
Administrator: <i><? echo $sysad; ?></i></TD>
   </TR>
  </TABLE>
</td>
</tr>
<tr>
<td width="600" valign="top">
  <TABLE BORDER=0 CELLPADDING=0 CELLSPACING=0>
   <TR>
    <TD width="600" align="center">
    <table align="center" width="90%" cellspacing="2"
cellpadding="0" border="0">
                                                    <tr><td
        colspan="6"          align="center"><br><h2>VIEW
QUESTION</h2></td></tr>
<? if(!isset($topic)){
        $query="Select distinct(topic) from Questions ";
        $result=mysql_query($query);
        $rows=mysql_num_rows($result);
        if($rows){
?>

                                                    <tr><td
align="center">Click the topic to view the
questions.<br><br></td></tr>

<?              for($i=0;$i<$rows;$i++){
                        $data =
mysql_fetch_row($result);
                        $j=$i+1;
?>
                                                    <tr>

        <td class="label" colspan="2"><? echo "$j. "; ?><a
href="view_question.php?topic=<?echo "$data[0]";?>"
class="sidelinks2"><? echo $data[0]; ?></a></td>
                                                    </tr>
<?              }
        }else{
?>

                                                    <tr><td
align="center">No questions to view yet.</td></tr>

<?              }
}else {
        if($err_msge){
?>
                                        <br><h1><?echo
$err_msge;?></h1>
<?      }?>

                                        <br>
                                        <tr><td colspan="5"
align="center"><h5>Topic: <?echo $topic;?></h5></td></tr>


<?$query="Select question,A,B,C,D,correct from Questions
where topic='$topic' order by q_no";
        $result=mysql_query($query);
        $rows=mysql_num_rows($result);
        for($i=0;$i<$rows;$i++){
                $data = mysql_fetch_row($result);
                $j=$i+1;
?>
                                                    <tr>

        <td width="2%" align="left" class="label"
valign="top"><?echo "$j";?>. </td>

        <td class="simple" colspan="6"><p
align="justify"><?echo "$data[0]";?></p></td>
                                                    </tr>
                                                    <tr
valign="top">
```

```
            <td align="right" width="2%"
class="label">A. </td>

            <td width="42%" class="simple"><?echo
"$data[1]";?></td>

            <td align="right" width="2%"
class="label">C. </td>

            <td class="simple"><?echo "$data[3]";?></td>
                                                    </tr>
                                                    <tr
valign="top">

            <td align="right" width="2%"
class="label">B. </td>

            <td width="42%" class="simple"><?echo
"$data[2]";?></td>

            <td align="right" width="2%"
class="label">D. </td>

            <td class="simple"><?echo "$data[4]";?></td>
                                                    </tr>
                                                    <tr>

                        <td class="label" valign="top"
colspan="7">Correct:  <?echo "$data[5]";?
><br><br></td>
                                                    </tr>


<?} mysql_free_result($result);?>
                                                    <tr>

                        <td colspan="7" align="center">

                                    <br>

                                    <a href="view_question.php"
class="sidelinks2">BACK TO TOPICS</a>

                        </td>
                                                    </tr>
<?} ?>


                                    </table>


    </TD>
   </TR>
  </TABLE></td>
<td width="175" valign="top"
background="../images/sidebg.jpg"><img
src="../images/spacer.gif" width=175 height=23>
  <a href="#" class="sidelinks"></a>
  <table width="175" border="0" cellspacing="0"
cellpadding="0">
    <tr>
      <td width="13%"> </td>
      <td width="75%"><a href="predict.php"
class="sidelinks">Predict</a><br><br>

                                                    <a
href="changepassword.php" class="sidelinks">Change
Password</a><br><br>

Lectures<br><br>
                                                    <a
href="add_lecture.php" class="sidelinks">Add Lecture</a><br>
                                                    <a
href="edit_lecture.php" class="sidelinks">Edit Lecture</a><br>
                                    <a href="view_lecture.php"
class="sidelinks">View Lecture</a><br>
                                    <a href="delete_lecture.php"
class="sidelinks">Delete Lecture</a><br><br><br>
                                                    Questions<br><br>
                                                    <a
href="add_question.php" class="sidelinks">Add
Question</a><br>
                                                    <a
href="edit_question.php" class="sidelinks">Edit
Question</a><br>
                                    <a href="view_question.php"
class="sidelinks">View Question</a><br>
                                                    <a href="delete_question.php"
class="sidelinks">Delete Question</a><br><br><br>
                </td>
      <td width="12%"> </td>
    </tr>
  </table>
</td>
</tr>
<tr>
<td height="67" colspan="2" valign="top"><TABLE width="775"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD><IMG SRC="../images/base1.jpg" WIDTH=600
HEIGHT=67></TD>
      <TD width="175"><IMG SRC="../images/base2.jpg"
WIDTH=175 HEIGHT=67></TD>
    </TR>
  </TABLE></td>
</tr>
<tr>
<td height="26" colspan="2" valign="top"> <TABLE
width="775" BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD width="53"><IMG SRC="../images/pixi_med_grey.gif"
WIDTH=53 HEIGHT=26></TD>
      <TD width="722"
background="../images/pixi_med_grey.gif">&copy;
        Copyright 2006. </TD>
    </TR>
  </TABLE></td>
</tr>
</table>
</body></html>
```

/sysad/delete_question.php

```
<?session_register("sysad");
if(!isset($sysad)){
            header("Location:http://localhost/enzyme/index.php?
error=2");
            exit();
}
if(isset($deleteQ)){
            if(isset($item)){

            include("../scripts/connect.php");
                                    $k=count($item);
                                    $oldtopic=$topic;
                                    for($l=$k-1; $l>=0; $l--){
                                                $sql="Delete from
Questions where topic='$topic' and q_no=$item[$l]";
                                                if(mysql_query($sql))
{           $succ="Question/s deleted successfully.";

            $topic=$oldtopic;
                                                }
                                                $query="Select q_no
from Questions where topic='$topic' and q_no>$item[$l]";

            $result=mysql_query($query);

            $rows=mysql_num_rows($result);
                                                for($i=0;$i<$rows;
$i++){
                                                            $data =
mysql_fetch_row($result);

            $old_q_no=$data[0];

            $new_q_no=$old_q_no-1;

            $query2="Update Questions set q_no=$new_q_no
where topic='$topic' and q_no=$old_q_no";

            mysql_query($query2);
```

```
                                        }
                                }
                                $query="Select q_no from
Questions where topic='$topic'";
                                $result=mysql_query($query);

        $rows=mysql_num_rows($result);
                                if(!$rows){
                                        unset($topic);
                                }else{
                                        $topic=$oldtopic;
                                }
        }
        else{
                $succ="Please select atleast one question";
        }
}
?>
<html><head>
<title>Enzyme Subfamily Class Prediction Application - Delete
Question</title>
<script language="JavaScript" type="text/JavaScript"
src="../images/myfreetemplates.js"></script>
<script language="JavaScript">
                function warnUser(){
                        <!--
                        return confirm("Are you sure
you want to delete?! Click OK to delete.");
                        -->
                }
</script>
<link href="../images/myfreetemplates.css" rel="stylesheet"
type="text/css">
</head>
<body background="../images/pixi_lightblue.jpg" leftmargin="0"
topmargin="0" marginwidth="0" marginheight="0"
onLoad="MM_preloadImages('../images/btn_main-
over.gif','../images/btn_overview-
over.gif','../images/btn_services-
over.gif','../images/products_btn-over.gif')">
<table width="775" height="100%" border="0" align="center"
cellpadding="0" cellspacing="0"
background="../images/pixi_darkblue.jpg">
<tr>
<td height="7" colspan="2" valign="top"> <TABLE width="775"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
   <TR>
     <TD width="336"><IMG SRC="../images/pixi_lightblue.jpg"
WIDTH=336 HEIGHT=7></TD>
     <TD width="16"><IMG SRC="../images/topangle.jpg"
WIDTH=16 HEIGHT=7></TD>
     <TD background="../images/pixi_light_grey.gif"><IMG
SRC="../images/spacer.gif" WIDTH=423 HEIGHT=7></TD>
   </TR>
  </TABLE></td>
</tr>
<tr>
<td height="118" colspan="2" valign="top"> <table border="0"
cellpadding="0" cellspacing="0" id="navtable">
   <tr>
     <td width="352" rowspan="3"><TABLE width="352"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
       <TR>
         <TD><IMG SRC="../images/logo.gif"  width=219
height=118></TD>
         <TD><IMG SRC="../images/toptreatment1.jpg"
WIDTH=133 HEIGHT=118></TD>
       </TR>
      </TABLE></td>
     <td width="423"
background="../images/pixi_light_grey.gif"> <TABLE BORDER=0
CELLPADDING=0 CELLSPACING=0>
       <TR>
         <TD width="87"><IMG SRC="../images/topcurve2.jpg"
WIDTH="87" HEIGHT="43"></TD>
         <TD width="336"
background="../images/pixi_light_grey.gif" align="center">
         <font color="#000000" face ="Lucida Handwriting"
style="font-size: 11pt; font-weight: 700"><b>Enzyme
Subfamily Class Prediction Application</b></font></TD>
       </TR>
      </TABLE></td>
   </tr>
   <tr>
     <td width="423"
background="../images/pixi_light_grey.gif"> <TABLE
width="100%" BORDER=0 CELLPADDING=0 CELLSPACING=0>
       <TR>
         <TD width="277"><IMG SRC="../images/topcurve3.jpg"
WIDTH=277 HEIGHT=20></TD>
         <TD width="146"
background="../images/pixi_light_grey.gif"><IMG
SRC="../images/spacer.gif" WIDTH=146 HEIGHT=20></TD>
       </TR>
      </TABLE></td>
   </tr>
   <tr>
     <td width="423"> <TABLE BORDER=0 CELLPADDING=0
CELLSPACING=0>
       <TR>
         <TD width="66"><IMG
SRC="../images/toptreatment1a.jpg" WIDTH=66
HEIGHT=55></TD>
         <TD width="72"><A HREF="index.php"><IMG
SRC="../images/home.jpg" NAME="btn_main" WIDTH=72
HEIGHT=55 BORDER=0 ></A></TD>
                                        <TD width="89"><A
HREF="../logout.php"><IMG SRC="../images/log-out.jpg"
NAME="btn_overview" WIDTH=89 HEIGHT=55 BORDER=0
></A></TD>
         <TD width="81"><A HREF="FAQ.php"><IMG
SRC="../images/blank2.jpg" NAME="btn_services" WIDTH=81
HEIGHT=55 BORDER=0 ></A></TD>
         <TD width="72"><A HREF="about.php"><IMG
SRC="../images/blank1.jpg" NAME="products" WIDTH=72
HEIGHT=55 BORDER=0 ></A></TD>
         <TD width="43"><IMG SRC="../images/topnavend.jpg"
WIDTH=43 HEIGHT=55></TD>
       </TR>
      </TABLE></td>
   </tr>
  </table></td>
</tr>
<tr>
<td height="69" colspan="2" valign="top">
  <TABLE BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD ROWSPAN=2 WIDTH=219 HEIGHT=69></TD>
      <TD><IMG SRC="../images/toptreatment2.jpg" WIDTH=199
HEIGHT=20></TD>
      <TD ROWSPAN=2><IMG SRC="../images/pixi_darkblue.jpg"
WIDTH=182 HEIGHT=69></TD>
      <TD ROWSPAN=2><img src="../images/sidetop.jpg"
width="175" height="69"></TD>
    </TR>
    <TR>
      <TD background="../images/pixi_darkblue.jpg">System
Administrator: <i><? echo $sysad; ?></i></TD>
    </TR>
  </TABLE>
</td>
</tr>
<tr>
<td width="600" valign="top">
  <TABLE BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD width="600" align="center">
                                        <br><h2>DELETE
QUESTIONS</h2>
<? if(!isset($topic)){
        if($succ){
?>
                                        <br><h5><?echo
$succ;?></h5>
<?}?>
                                        <form  name="frm"
method="post" action="delete_question.php">
                                        <table width="75%"
align="center" cellspacing="2" cellpadding="0" border="0">

<?                      include("../scripts/connect.php");
        $query="Select distinct(topic) from Questions ";
        $result=mysql_query($query);
        $rows=mysql_num_rows($result);
```

```
		if($rows){
?>

		<tr><td colspan="6" align="center">Click the link to
delete questions in a topic.<br><br></td></tr>
<?			for($i=0;$i<$rows;$i++){
				$data =
mysql_fetch_row($result);
				$j=$i+1;
?>
								<tr
valign="top">


		<td class="label" colspan="6"><? echo "$j.  "; ?><a
href="delete_question.php?topic=<?echo "$data[0]";?>"
class="sidelinks2"><? echo $data[0]; ?></a></td>
								</tr>
<?			}
		mysql_free_result($result);
		}else{
?>
								<tr>

		<td class="light" colspan="3"
align="center">  No questions to delete.</td>
								</tr>
<?		}?>
			</table>
					</form>
					<br><br>

<?} else {
		include("../scripts/connect.php");
		$query="Select question,A,B,C,D,correct,q_no from
Questions where topic='$topic' order by q_no";
		$result=mysql_query($query);
		$rows=mysql_num_rows($result);
		if($rows){
			if($succ){
?>
					<br><h5><?echo
$succ;?></h5>
<?			}?>
		<form  name="frm" method="post"
action="delete_question.php">
		<table width="90%" align="center" cellspacing="2"
cellpadding="0" border="0">
			<tr><td colspan="5"
align="center"><h5>Topic: <?echo $topic;?></h5></td></tr>
			<tr><td colspan="5"
align="center">Select the question you want to
delete.<br><br></td></tr>
<?
			for($i=0;$i<$rows;$i++){
				$data =
mysql_fetch_row($result);
				$j=$i+1;
?>
								<tr>

		<td class="light" width="2%" align="center"
valign="top"><input type="checkbox" class="check"
name="item[]" value="<?echo $data[6];?>"></td>

		<td  align="left"  class="label" valign="top"><?echo
"$j";?>. </td>

		<td class="simple" colspan="3" align ="left" ><p
align="left"><?echo "$data[0]";?></p><input type="hidden"
class="check" name="topic" value="<? echo $topic;?>"></td>
								</tr>
								<tr
valign="top">

		<td></td>

		<td align="right" width="2%"
class="label">A. </td>

		<td width="42%" class="simple"><?echo
"$data[1]";?></td>

		<td align="right" width="2%"
class="label">C. </td>

		<td class="simple"><?echo "$data[3]";?></td>
								</tr>
								<tr
valign="top">

		<td></td>

		<td align="right" width="2%"
class="label">B. </td>

		<td width="42%" class="simple"><?echo
"$data[2]";?></td>

		<td align="right" width="2%"
class="label">D. </td>

		<td class="simple"><?echo "$data[4]";?></td>
								</tr>
								<tr>

			<td></td>

			<td class="label" valign="top"
colspan="4">Correct:  <? echo "$data[5]"; ?
><br><br></td>
								</tr>
<?			}
		mysql_free_result($result);?>
					<tr>

			<td colspan="5" align="center">

				<br>

				<input name="deleteQ"
type="submit" class="submit" value="Delete" onclick="return
warnUser();"><input type="reset" class="submit" value="Clear
All">

			</td>
								</tr>
								<tr>

		<td colspan=5 class="note">

			<br>

			<p
align="justify"><b>Note:</b>   To delete
questions, simply check the corresponding checkboxes and click
the <i>Delete</i> button.</p>

		</td>
								</tr>
								<tr>

			<td colspan="5" align="center">

				<br>

				<a href="delete_question.php?"
class="sidelinks2">BACK TO TOPICS</a>

			</td>
					</tr>
				</table>
				</form>

<? } }?>

    </TD>
   </TR>
  </TABLE></td>
<td width="175" valign="top"
background="../images/sidebg.jpg"><img
src="../images/spacer.gif" width=175 height=23>
  <a href="#" class="sidelinks"></a>
```

```
  <table width="175" border="0" cellspacing="0"
cellpadding="0">
    <tr>
      <td width="13%"> </td>
      <td width="75%"><a href="predict.php"
class="sidelinks">Predict</a><br><br>

                                                    <a
href="changepassword.php" class="sidelinks">Change
Password</a><br><br>

Lectures<br><br>
                                                    <a
href="add_lecture.php" class="sidelinks">Add Lecture</a><br>
                                                    <a
href="edit_lecture.php" class="sidelinks">Edit Lecture</a><br>
                                    <a href="view_lecture.php"
class="sidelinks">View Lecture</a><br>
                                    <a href="delete_lecture.php"
class="sidelinks">Delete Lecture</a><br><br><br>
                                                    Questions<br><br>
                                                    <a
href="add_question.php" class="sidelinks">Add
Question</a><br>
                                                    <a
href="edit_question.php" class="sidelinks">Edit
Question</a><br>
                                    <a href="view_question.php"
class="sidelinks">View Question</a><br>
                                    <a href="delete_question.php"
class="sidelinks">Delete Question</a><br><br><br>
              </td>
      <td width="12%"> </td>
    </tr>
  </table>
</td>
</tr>
<tr>
<td height="67" colspan="2" valign="top"><TABLE width="775"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD><IMG SRC="../images/base1.jpg" WIDTH=600
HEIGHT=67></TD>
      <TD width="175"><IMG SRC="../images/base2.jpg"
WIDTH=175 HEIGHT=67></TD>
    </TR>
  </TABLE></td>
</tr>
<tr>
<td height="26" colspan="2" valign="top"> <TABLE
width="775" BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD width="53"><IMG SRC="../images/pixi_med_grey.gif"
WIDTH=53 HEIGHT=26></TD>
      <TD width="722"
background="../images/pixi_med_grey.gif">&copy;
       Copyright 2006. </TD>
    </TR>
  </TABLE></td>
</tr>
</table>
</body></html>
```

/sysad/predict.php

```
<?session_register("sysad");
if(isset($submit)){
if($filename==''){
              $err_msge="Please select a file containing the
sequence.";
              unset($submit);
}}?>
<html>
<head>
<title>Enzyme Subfamily Class Prediction Application -
Predict</title>
<script language="JavaScript" type="text/JavaScript"
src="../images/myfreetemplates.js"></script>
<link href="../images/myfreetemplates.css" rel="stylesheet"
type="text/css">
</head>
<body background="../images/pixi_lightblue.jpg" leftmargin="0"
topmargin="0" marginwidth="0" marginheight="0"
onLoad="MM_preloadImages('../images/btn_main-
over.gif','../images/btn_overview-
over.gif','../images/btn_services-
over.gif','../images/products_btn-over.gif')">
<table width="775" height="100%" border="0" align="center"
cellpadding="0" cellspacing="0"
background="../images/pixi_darkblue.jpg">
<tr>
<td height="7" colspan="2" valign="top"> <TABLE width="775"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD width="336"><IMG SRC="../images/pixi_lightblue.jpg"
WIDTH=336 HEIGHT=7></TD>
      <TD width="16"><IMG SRC="../images/topangle.jpg"
WIDTH=16 HEIGHT=7></TD>
      <TD background="../images/pixi_light_grey.gif"><IMG
SRC="../images/spacer.gif" WIDTH=423 HEIGHT=7></TD>
    </TR>
  </TABLE></td>
</tr>
<tr>
<td height="118" colspan="2" valign="top"> <table border="0"
cellpadding="0" cellspacing="0" id="navtable">
    <tr>
      <td width="352" rowspan="3"><TABLE width="352"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
        <TR>
          <TD><IMG SRC="../images/logo.gif"  width=219
height=118></TD>
          <TD><IMG SRC="../images/toptreatment1.jpg"
WIDTH=133 HEIGHT=118></TD>
        </TR>
      </TABLE></td>
      <td width="423"
background="../images/pixi_light_grey.gif"> <TABLE BORDER=0
CELLPADDING=0 CELLSPACING=0>
        <TR>
          <TD width="87"><IMG SRC="../images/topcurve2.jpg"
WIDTH="87" HEIGHT="43"></TD>
          <TD width="336"
background="../images/pixi_light_grey.gif" align="center">
          <font color="#000000" face ="Lucida Handwriting"
style="font-size: 11pt; font-weight: 700"><b>Enzyme
Subfamily Class Prediction Application</b></font></TD>
        </TR>
      </TABLE></td>
    </tr>
    <tr>
      <td width="423"
background="../images/pixi_light_grey.gif"> <TABLE
width="100%" BORDER=0 CELLPADDING=0 CELLSPACING=0>
        <TR>
          <TD width="277"><IMG SRC="../images/topcurve3.jpg"
WIDTH=277 HEIGHT=20></TD>
          <TD width="146"
background="../images/pixi_light_grey.gif"><IMG
SRC="../images/spacer.gif" WIDTH=146 HEIGHT=20></TD>
        </TR>
      </TABLE></td>
    </tr>
    <tr>
      <td width="423"> <TABLE BORDER=0 CELLPADDING=0
CELLSPACING=0>
        <TR>
          <TD width="66"><IMG
SRC="../images/toptreatment1a.jpg" WIDTH=66
HEIGHT=55></TD>
          <TD width="72"><A HREF="index.php"><IMG
SRC="../images/home.jpg" NAME="btn_main" WIDTH=72
HEIGHT=55 BORDER=0 ></A></TD>
                                    <TD width="89"><A
HREF="../logout.php"><IMG SRC="../images/log-out.jpg"
NAME="btn_overview" WIDTH=89 HEIGHT=55 BORDER=0
></A></TD>
          <TD width="81"><A HREF="FAQ.php"><IMG
SRC="../images/blank2.jpg" NAME="btn_services" WIDTH=81
HEIGHT=55 BORDER=0 ></A></TD>
          <TD width="72"><A HREF="about.php"><IMG
SRC="../images/blank1.jpg" NAME="products" WIDTH=72
HEIGHT=55 BORDER=0 ></A></TD>
          <TD width="43"><IMG SRC="../images/topnavend.jpg"
WIDTH=43 HEIGHT=55></TD>
```

```
        </TR>
      </TABLE></td>
   </tr>
  </table></td>
</tr>
<tr>
<td height="69" colspan="2" valign="top">
  <TABLE BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD ROWSPAN=2 WIDTH=219 HEIGHT=69></TD>
      <TD><IMG SRC="../images/toptreatment2.jpg" WIDTH=199
HEIGHT=20></TD>
      <TD ROWSPAN=2><IMG SRC="../images/pixi_darkblue.jpg"
WIDTH=182 HEIGHT=69></TD>
      <TD ROWSPAN=2><img src="../images/sidetop.jpg"
width="175" height="69"></TD>
    </TR>
    <TR>
      <TD background="../images/pixi_darkblue.jpg">
<?echo "System Administrator: <i>$sysad</i>"; ?>
      </TD>
    </TR>
  </TABLE>
</td>
</tr>
<tr>
<td width="600" valign="top">
  <TABLE BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD width="53"><IMG SRC="../images/spacer.gif"
WIDTH=10 HEIGHT=213></TD>
      <TD valign="top"><IMG SRC="../images/spacer.gif"
WIDTH=579 HEIGHT=8><br>
<? if (isset($submit)){
if(!$file=fopen($filename,"r")){
                        echo("Could not open the file");
}else{
            $file_name=basename($filename);
            if($vectorFileName==''){
            $vectorFileName=basename($filename);}
?>

            <form  name="frm" method="post"
action="composition.php">
                        <table>
                                    <tr>
                                                <td
class="label" valign="center" align = "center"
colspan="2"><h2>PREDICT ENZYME SUBFAMILY</h2></td>
                                    </tr>

                                    <tr>
                                                <td
class="label" valign="center"><b>File contains the following
Sequence: </b><br><br></td>

            <td><input type="hidden" name="filename"
value=<? echo "\"$filename\"";?> size="50"></td>
                                    </tr>
                                    <tr>
                                                <td
class="label" valign="center" colspan="2">

<?          $cnt=0;
            $x=2;
            $mul=10;
            while(!feof($file)){
                        $ch=fgetc($file);
                        if($ch=='A'||$ch=='C'||$ch=='D'||
$ch=='E'||$ch=='F'||$ch=='G'||$ch=='H'||$ch=='I'||$ch=='K'||
$ch=='L'||$ch=='M'||$ch=='N'||$ch=='P'||$ch=='Q'||
$ch=='R'||$ch=='S'||$ch=='T'||$ch=='V'||$ch=='W'||$ch=='Y')
{
                                    $seq.=$ch;
                                    $cnt++;
                                    if($cnt%10==0){
                                                $seq.="  ";
                                                if($cnt%
($mul*10)==0){
                                                            $x++;

            $mul*=10;
                                                }
                                                for($j=1;$j<=10-$x;
$j++){

            $hd.=" ";
                                                }
                                                $hd.=$cnt."  ";
                                    }
                                    if($cnt%60==0){     echo
"<font face=\"COURIER\" class=\"nb\">$hd <BR> $seq
</font><BR><BR>";
                                                $row++;
                                                $seq='';
                                                $hd='';
                                    }
                        }
            }
            if($seq!=''){
                        echo "<font face=\"COURIER\"
class=\"nb\">$hd <BR> $seq </font><BR><BR>";
            }
            echo "<br><br><b>Sequence Length:</b>$cnt";
}fclose($file);?>

                                                            </td>
                                    </tr>
                                    <tr>
                                                            <td
colspan="2" align="center">

            <br>

            <input name="predict" type="submit" class="submit"
value="Predict Subfamily">
                                                            </td>
                                    </tr>
                                    <tr>
                                                            <td
colspan="2" align="center">

            <br>

            <a href="predict.php" class="sidelinks2">BACK</a>
                                                            </td>
                                    </tr>
                        </table>
            </form>
<?}else{        ?>
      <form  name="frm" method="post" action="predict.php">
                        <table>
                                    <tr>
                                                            <td
class="label" valign="center" align = "center"
colspan="2"><h2>PREDICT ENZYME SUBFAMILY</h2></td>
                                    </tr>
<?if(isset($err_msge)){?>
                                    <tr>
                                                            <td
class="label" valign="center" align="center" colspan="2"><font
color="YELLOW"><?echo "$err_msge";?
></font><br><br></td>
                                    </tr>
<? } ?>                                     <tr>
                                                            <td
class="label" valign="center" colspan="2"
align="center"><b>Upload file containig the sequence of an
enzyme<br><br></b></td>
                                    </tr>
                                    <tr>
                                                            <td
class="label" valign="center">File Path:</td>

            <td><input type="file" name="filename" value=<?
echo "\"$filename\"";?> size="50"></td>
                                    </tr>
                                    <tr>
                                                            <td
colspan="2" align="center">

            <br>

            <input name="submit" type="submit" class="submit"
```

```
value="View File"><input type="reset" class="submit"
value="Clear">
                                                        </td>
                                    </tr>
                                </table>
                        </form>
<? } ?>
     </TD>
     <TD width="21"><IMG SRC="../images/spacer.gif"
WIDTH=11 HEIGHT=213></TD>
   </TR>
  </TABLE></td>
<td width="175" valign="top"
background="../images/sidebg.jpg"><img
src="../images/spacer.gif" width=175 height=23>
  <a href="#" class="sidelinks"></a>
  <table width="175" border="0" cellspacing="0"
cellpadding="0">
    <tr>
     <td width="13%"> </td>
     <td width="75%"><a href="predict.php"
class="sidelinks">Predict</a><br><br>

                                                    <a
href="changepassword.php" class="sidelinks">Change
Password</a><br><br>

Lectures<br><br>
                                                    <a
href="add_lecture.php" class="sidelinks">Add Lecture</a><br>
                                                    <a
href="edit_lecture.php" class="sidelinks">Edit Lecture</a><br>
                                    <a href="view_lecture.php"
class="sidelinks">View Lecture</a><br>
                                    <a href="delete_lecture.php"
class="sidelinks">Delete Lecture</a><br><br><br>
                                                    Questions<br><br>
                                                    <a
href="add_question.php" class="sidelinks">Add
Question</a><br>
                                                    <a
href="edit_question.php" class="sidelinks">Edit
Question</a><br>
                                    <a href="view_question.php"
class="sidelinks">View Question</a><br>
                                    <a href="delete_question.php"
class="sidelinks">Delete Question</a><br><br><br>

     </td>
     <td width="12%"> </td>
    </tr>
  </table>
</td>
</tr>
<tr>
<td height="67" colspan="2" valign="top"><TABLE width="775"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
     <TD><IMG SRC="../images/base1.jpg" WIDTH=600
HEIGHT=67></TD>
     <TD width="175"><IMG SRC="../images/base2.jpg"
WIDTH=175 HEIGHT=67></TD>
    </TR>
  </TABLE></td>
</tr>
<tr>
<td height="26" colspan="2" valign="top"> <TABLE
width="775" BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
     <TD width="53"><IMG SRC="../images/pixi_med_grey.gif"
WIDTH=53 HEIGHT=26></TD>
     <TD width="722"
background="../images/pixi_med_grey.gif">&copy;
       Copyright 2006.</TD>
    </TR>
  </TABLE></td>
</tr>
</table>
</body></html>
```

/sysad/composition.php

```
<?session_register("sysad");     ?>
<html><head>
<title>Enzyme Subfamily Class Prediction Application -
Predict</title>
<script language="JavaScript" type="text/JavaScript"
src="../images/myfreetemplates.js"></script>
<link href="../images/myfreetemplates.css" rel="stylesheet"
type="text/css">
</head>
<body background="../images/pixi_lightblue.jpg" leftmargin="0"
topmargin="0" marginwidth="0" marginheight="0"
onLoad="MM_preloadImages('../images/btn_main-
over.gif','../images/btn_overview-
over.gif','../images/btn_services-
over.gif','../images/products_btn-over.gif')">
<table width="775" height="100%" border="0" align="center"
cellpadding="0" cellspacing="0"
background="../images/pixi_darkblue.jpg">
<tr>
<td height="7" colspan="2" valign="top"> <TABLE width="775"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
     <TD width="336"><IMG SRC="../images/pixi_lightblue.jpg"
WIDTH=336 HEIGHT=7></TD>
     <TD width="16"><IMG SRC="../images/topangle.jpg"
WIDTH=16 HEIGHT=7></TD>
     <TD background="../images/pixi_light_grey.gif"><IMG
SRC="../images/spacer.gif" WIDTH=423 HEIGHT=7></TD>
    </TR>
  </TABLE></td>
</tr>
<tr>
<td height="118" colspan="2" valign="top"> <table border="0"
cellpadding="0" cellspacing="0" id="navtable">
    <tr>
     <td width="352" rowspan="3"><TABLE width="352"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
       <TR>
        <TD><IMG SRC="../images/logo.gif"  width=219
height=118></TD>
        <TD><IMG SRC="../images/toptreatment1.jpg"
WIDTH=133 HEIGHT=118></TD>
       </TR>
      </TABLE></td>
     <td width="423"
background="../images/pixi_light_grey.gif"> <TABLE BORDER=0
CELLPADDING=0 CELLSPACING=0>
       <TR>
        <TD width="87"><IMG SRC="../images/topcurve2.jpg"
WIDTH="87" HEIGHT="43"></TD>
        <TD width="336"
background="../images/pixi_light_grey.gif" align="center">
         <font color="#000000" face ="Lucida Handwriting"
style="font-size: 11pt; font-weight: 700"><b>Enzyme
Subfamily Class Prediction Application</b></font></TD>
       </TR>
      </TABLE></td>
    </tr>
    <tr>
     <td width="423"
background="../images/pixi_light_grey.gif"> <TABLE
width="100%" BORDER=0 CELLPADDING=0 CELLSPACING=0>
       <TR>
        <TD width="277"><IMG SRC="../images/topcurve3.jpg"
WIDTH=277 HEIGHT=20></TD>
        <TD width="146"
background="../images/pixi_light_grey.gif"><IMG
SRC="../images/spacer.gif" WIDTH=146 HEIGHT=20></TD>
       </TR>
      </TABLE></td>
    </tr>
    <tr>
     <td width="423"> <TABLE BORDER=0 CELLPADDING=0
CELLSPACING=0>
       <TR>
        <TD width="66"><IMG
SRC="../images/toptreatment1a.jpg" WIDTH=66
HEIGHT=55></TD>
        <TD width="72"><A HREF="index.php"><IMG
SRC="../images/home.jpg" NAME="btn_main" WIDTH=72
HEIGHT=55 BORDER=0 ></A></TD>
                                <TD width="89"><A
HREF="../logout.php"><IMG SRC="../images/log-out.jpg"
```

```
NAME="btn_overview" WIDTH=89 HEIGHT=55 BORDER=0
></A></TD>
        <TD width="81"><A HREF="FAQ.php"><IMG
SRC="../images/blank2.jpg" NAME="btn_services" WIDTH=81
HEIGHT=55 BORDER=0 ></A></TD>
        <TD width="72"><A HREF="about.php"><IMG
SRC="../images/blank1.jpg" NAME="products" WIDTH=72
HEIGHT=55 BORDER=0 ></A></TD>
        <TD width="43"><IMG SRC="../images/topnavend.jpg"
WIDTH=43 HEIGHT=55></TD>
       </TR>
     </TABLE></td>
  </tr>
 </table></td>
</tr>
<tr>
<td height="69" colspan="2" valign="top">
 <TABLE BORDER=0 CELLPADDING=0 CELLSPACING=0>
  <TR>
   <TD ROWSPAN=2 WIDTH=219 HEIGHT=69></TD>
   <TD><IMG SRC="../images/toptreatment2.jpg" WIDTH=199
HEIGHT=20></TD>
   <TD ROWSPAN=2><IMG SRC="../images/pixi_darkblue.jpg"
WIDTH=182 HEIGHT=69></TD>
   <TD ROWSPAN=2><img src="../images/sidetop.jpg"
width="175" height="69"></TD>
  </TR>
  <TR>
   <TD background="../images/pixi_darkblue.jpg">
<?echo "System Administrator: <i>$sysad</i>"; ?>
   </TD>
  </TR>
 </TABLE>
</td>
</tr>
<tr>
<td width="600" valign="top" align="center" >
<? include("../scripts/connect.php");
if(isset($predict)){
        //assign hydrophobicity and hydrophilicity values
        $pho[1]=0.616;$phi[1]=-0.5;
        $pho[2]=0.680;$phi[2]=-1.0;
        $pho[3]=0.028;$phi[3]=+3.0 ;
        $pho[4]=0.043;$phi[4]=+3.0 ;
        $pho[5]=1.00;$phi[5]=-2.5;
        $pho[6]=0.501;$phi[6]=0;
        $pho[7]=0.165;$phi[7]=-0.5;
        $pho[8]=0.943;$phi[8]=-1.8;
        $pho[9]=0.283;$phi[9]=+3.0;
        $pho[10]=0.943;$phi[10]=-1.8;
        $pho[11]=0.738;$phi[11]=-1.3;
        $pho[12]=0.236;$phi[12]=+0.2;
        $pho[13]=0.711;$phi[13]=-0.5;
        $pho[14]=0.251;$phi[14]=+0.2;
        $pho[15]=0.000;$phi[15]=+3.0;
        $pho[16]=0.359;$phi[16]=+0.3;
        $pho[17]=0.450;$phi[17]=-0.4;
        $pho[18]=0.825;$phi[18]=-1.5;
        $pho[19]=0.878;$phi[19]=-3.4;
        $pho[20]=0.880;$phi[20]=-2.3;
         if(!$file=fopen($filename,"r")){
                echo("Could not open the file");
         }else{
                $length=0;
                while(!feof($file)){
                        $ch=fgetc($file);
                        if($ch=='A'||$ch=='C'||
$ch=='D'||$ch=='E'||$ch=='F'||$ch=='G'||$ch=='H'||$ch=='I'||
$ch=='K'||$ch=='L'||$ch=='M'||$ch=='N'||$ch=='P'||
$ch=='Q'||$ch=='R'||$ch=='S'||$ch=='T'||$ch=='V'||
$ch=='W'||$ch=='Y'){
                                $length++;

        $sequence[$length]=$ch;
                        }
                }
                fclose($file);
                //count occurrence frequency of each AA
and assign original hydrophobicity and hydrophilicity values
                for($i=1;$i<=$length;$i++){
                        switch($sequence[$i]){
                                case "A":
                                case "a":
        $h01[$i]=$pho[1];$h02[$i]=$phi[1];$amino[0]+
+;break;
                                case "C":
                                case "c":
        $h01[$i]=$pho[2];$h02[$i]=$phi[2];$amino[1]+
+;break;
                                case "D":
                                case "d":
        $h01[$i]=$pho[3];$h02[$i]=$phi[3];$amino[2]+
+;break;
                                case "E":
                                case "e":
        $h01[$i]=$pho[4];$h02[$i]=$phi[4];$amino[3]+
+;break;
                                case "F":
                                case "f":
        $h01[$i]=$pho[5];$h02[$i]=$phi[5];$amino[4]+
+;break;
                                case "G":
                                case "g":
        $h01[$i]=$pho[6];$h02[$i]=$phi[6];$amino[5]+
+;break;
                                case "H":
                                case "h":
        $h01[$i]=$pho[7];$h02[$i]=$phi[7];$amino[6]+
+;break;
                                case "I":
                                case "i":
        $h01[$i]=$pho[8];$h02[$i]=$phi[8];$amino[7]+
+;break;
                                case "K":
                                case "k":
        $h01[$i]=$pho[9];$h02[$i]=$phi[9];$amino[8]+
+;break;
                                case "L":
                                case "l":
        $h01[$i]=$pho[10];$h02[$i]=$phi[10];$amino[9]+
+;break;
                                case "M":
                                case "m":
$h01[$i]=$pho[11];$h02[$i]=$phi[11];$amino[10]++;break;
                                case "N":
                                case "n":
        $h01[$i]=$pho[12];$h02[$i]=$phi[12];$amino[11]+
+;break;
                                case "P":
                                case "p":
        $h01[$i]=$pho[13];$h02[$i]=$phi[13];$amino[12]+
+;break;
                                case "Q":
                                case "q":
        $h01[$i]=$pho[14];$h02[$i]=$phi[14];$amino[13]+
+;break;
                                case "R":
                                case "r":
        $h01[$i]=$pho[15];$h02[$i]=$phi[15];$amino[14]+
+;break;
                                case "S":
                                case "s":
        $h01[$i]=$pho[16];$h02[$i]=$phi[16];$amino[15]+
+;break;
                                case "T":
                                case "t":
        $h01[$i]=$pho[17];$h02[$i]=$phi[17];$amino[16]+
+;break;
                                case "V":
                                case "v":
        $h01[$i]=$pho[18];$h02[$i]=$phi[18];$amino[17]+
+;break;
                                case "W":
                                case "w":
        $h01[$i]=$pho[19];$h02[$i]=$phi[19];$amino[18]+
+;break;
                                case "Y":
                                case "y":
        $h01[$i]=$pho[20];$h02[$i]=$phi[20];$amino[19]+
+;break;
                                default:break;
                        }
                }
```

```
                        //standard conversion of the
hydrophobicity values
                        $sum=0;
                        for($k=1;$k<=20;$k++){
                                $sum=$sum+$pho[$k];
                        }
                        $sum=$sum/20;
                        $sumU=0;
                        for($u=1;$u<=20;$u++){
                                $sumU=$sumU+($pho[$u]-
$sum)*($pho[$u]-$sum);
                        }
                        $sumU=sqrt($sumU/20);

                        for($i=1;$i<=$length;$i++){
                                $h1[$i]=($h01[$i]-$sum)/
$sumU;
                        }
                        $sum=0;
                        for($k=1;$k<=20;$k++){
                                $sum=$sum+$phi[$k];
                        }
                        $sum=$sum/20;
                        $sumU=0;
                        for($u=1;$u<=20;$u++){
                                $sumU=$sumU+($phi[$u]-
$sum)*($phi[$u]-$sum);
                        }
                        $sumU=sqrt($sumU/20);

                        for($i=1;$i<=$length;$i++){
                                $h2[$i]=($h02[$i]-$sum)/
$sumU;
                        }
                        //correlation factors
                        $k=0;
                        for($j=1;$j<=18;$j++){
                                if(($j%2)!=0)
                                                        $k++;

                                $l=$length-$k;
                                $sum=0;
                                for($i=1;$i<=$l;$i++){
                                        if(($j%2)!=0){

        $sum=$sum+$h1[$i]*$h1[$i+$k];
                                        } else{

        $sum=$sum+$h2[$i]*$h2[$i+$k];
                                        }
                                }
                                $T[$j]=$sum/$l;
                        }

                        //compute the amphiphilic pseudo amino
acid composition P[u]
                        $sum=0;
                        for($i=1;$i<=20;$i++){
                                $sum=$sum+$amino[$i-1];
                        }
                        $sumT=0;
                        for($j=1;$j<=18;$j++){
                                $sumT=$sumT+$T[$j];
                        }
                        for($u=1;$u<=38;$u++){
                                if($u<=20)
                                {
                                        $P[$u]=$amino[$u-
1]/($sum+0.5*$sumT);
                                }
                                else
                                {
                                        $P[$u]=(0.5*$T[$u-
20])/($sum+0.5*$sumT);
                                }
                        }

                        //save ../vector to file
                        $file_name=basename($filename);
                        $vFileName="../vector/".$file_name;
                        if(!$file=fopen($vFileName,"w")){
                                                echo("Could not open
the file");
                        }else{
                                for($i=1;$i<=38;$i++){
                                        fputs($file,$P[$i]);
                                        fputs($file,"\n");

                                }
                                fclose($file);
                        }

                }
$file_name=basename($filename);
?>

                <form  name="frm" method="post"
action="augmentedCDP2.php">
                        <table width="90%">
                                <tr>
                                <td class="label"
valign="center" align = "center" colspan="2"><h2>PREDICT
ENZYME SUBFAMILY</h2></td>
                                </tr>
                                <tr>
                                <td class="label"
valign="center" align="center"><h5>The Amphiphilic Pseudo
Amino Acid Composition of the Query Enzyme </h5></td>
                                                <td><input
type="hidden" name="filename" value=<? echo
"\"$filename\"";?> size="50"></td>
                                </tr>
                                <tr>
                                <td class="label"
valign="center" align = "justify" colspan="2"><p>This
composition is a discrete
                                                                form to
represent an enzyme  that will allow accommodation of partial, if
not all, sequence-order information. For a more detailed
discussion about this composition see lecture about <i><a
href="../APAAC.php" class="sidelinks2"
target="_blank">Predicting Subfamily
Classes</a>.</i></p></td>
                                </tr>
                                <tr>
                                <td class="label"
valign="center" colspan="2" align="center">

<?
                if(!$file=fopen($vFileName,"r")){
                        echo("Could not open the file");
                }else{
                        $arrText=file($vFileName);
                        echo("<TABLE border=\"0\"
cellpadding=\"0\" cellspacing=\"0\">");
                        echo("<TR><TD align=\"center\">");
                        for($b=0;$b<38;$b++)
                        {
                                printf("<br> %.15f ",
$arrText[$b]);
                        }
                        echo("<br><br></TD></TR>");
                        echo("</TABLE>");
                }
                 fclose($file);?>

                                                                </td>
                                </tr>
                                <tr>
                                                                <td
colspan="2" align="right">

                <br>

                <input name="next" type="submit" class="submit"
value="Continue">
                                                                </td>
                                </tr>
                        </table>
                </form>
<?}?>
</td>
```

```
<td width="175" valign="top"
background="../images/sidebg.jpg"><img
src="../images/spacer.gif" width=175 height=23>
  <a href="#" class="sidelinks"></a>
  <table width="175" border="0" cellspacing="0"
cellpadding="0">
    <tr>
      <td width="13%"> </td>
      <td width="75%"><a href="predict.php"
class="sidelinks">Predict</a><br><br>

                                                  <a
href="changepassword.php" class="sidelinks">Change
Password</a><br><br>

Lectures<br><br>
                                                  <a
href="add_lecture.php" class="sidelinks">Add Lecture</a><br>
                                                  <a
href="edit_lecture.php" class="sidelinks">Edit Lecture</a><br>
                                  <a href="view_lecture.php"
class="sidelinks">View Lecture</a><br>
                                  <a href="delete_lecture.php"
class="sidelinks">Delete Lecture</a><br><br><br>
                                                  Questions<br><br>
                                                  <a
href="add_question.php" class="sidelinks">Add
Question</a><br>
                                                  <a
href="edit_question.php" class="sidelinks">Edit
Question</a><br>
                                  <a href="view_question.php"
class="sidelinks">View Question</a><br>
                                  <a href="delete_question.php"
class="sidelinks">Delete Question</a><br><br><br>

      </td>
      <td width="12%"> </td>
    </tr>
  </table>
</td>
</tr>
<tr>
<td height="67" colspan="2" valign="top"><TABLE width="775"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD><IMG SRC="../images/base1.jpg" WIDTH=600
HEIGHT=67></TD>
      <TD width="175"><IMG SRC="../images/base2.jpg"
WIDTH=175 HEIGHT=67></TD>
    </TR>
  </TABLE></td>
</tr>
<tr>
<td height="26" colspan="2" valign="top"> <TABLE
width="775" BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD width="53"><IMG SRC="../images/pixi_med_grey.gif"
WIDTH=53 HEIGHT=26></TD>
      <TD width="722"
background="../images/pixi_med_grey.gif">&copy;
        Copyright 2006.</TD>
    </TR>
  </TABLE></td>
</tr>
</table>
</body></html>
```

/sysad/augmentedCDP2.php

```
<?session_register("sysad");     ?>
<html><head>
<title>Enzyme Subfamily Class Prediction Application -
Predict</title>
<script language="JavaScript" type="text/JavaScript"
src="../images/myfreetemplates.js"></script>
<link href="../images/myfreetemplates.css" rel="stylesheet"
type="text/css">
</head>
<body background="../images/pixi_lightblue.jpg" leftmargin="0"
topmargin="0" marginwidth="0" marginheight="0"
onLoad="MM_preloadImages('../images/btn_main-
over.gif','../images/btn_overview-
over.gif','../images/btn_services-
over.gif','../images/products_btn-over.gif')">
<table width="775" height="100%" border="0" align="center"
cellpadding="0" cellspacing="0"
background="../images/pixi_darkblue.jpg">
<tr>
<td height="7" colspan="2" valign="top"> <TABLE width="775"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD width="336"><IMG SRC="../images/pixi_lightblue.jpg"
WIDTH=336 HEIGHT=7></TD>
      <TD width="16"><IMG SRC="../images/topangle.jpg"
WIDTH=16 HEIGHT=7></TD>
      <TD background="../images/pixi_light_grey.gif"><IMG
SRC="../images/spacer.gif" WIDTH=423 HEIGHT=7></TD>
    </TR>
  </TABLE></td>
</tr>
<tr>
<td height="118" colspan="2" valign="top"> <table border="0"
cellpadding="0" cellspacing="0" id="navtable">
    <tr>
      <td width="352" rowspan="3"><TABLE width="352"
BORDER=0 CELLPADDING=0 CELLSPACING=0>
        <TR>
          <TD><IMG SRC="../images/logo.gif"  width=219
height=118></TD>
          <TD><IMG SRC="../images/toptreatment1.jpg"
WIDTH=133 HEIGHT=118></TD>
        </TR>
      </TABLE></td>
      <td width="423"
background="../images/pixi_light_grey.gif"> <TABLE BORDER=0
CELLPADDING=0 CELLSPACING=0>
        <TR>
          <TD width="87"><IMG SRC="../images/topcurve2.jpg"
WIDTH="87" HEIGHT="43"></TD>
          <TD width="336"
background="../images/pixi_light_grey.gif" align="center">
          <font color="#000000" face ="Lucida Handwriting"
style="font-size: 11pt; font-weight: 700"><b>Enzyme
Subfamily Class Prediction Application</b></font></TD>
        </TR>
      </TABLE></td>
    </tr>
    <tr>
      <td width="423"
background="../images/pixi_light_grey.gif"> <TABLE
width="100%" BORDER=0 CELLPADDING=0 CELLSPACING=0>
        <TR>
          <TD width="277"><IMG SRC="../images/topcurve3.jpg"
WIDTH=277 HEIGHT=20></TD>
          <TD width="146"
background="../images/pixi_light_grey.gif"><IMG
SRC="../images/spacer.gif" WIDTH=146 HEIGHT=20></TD>
        </TR>
      </TABLE></td>
    </tr>
    <tr>
      <td width="423"> <TABLE BORDER=0 CELLPADDING=0
CELLSPACING=0>
        <TR>
          <TD width="66"><IMG
SRC="../images/toptreatment1a.jpg" WIDTH=66
HEIGHT=55></TD>
          <TD width="72"><A HREF="index.php"><IMG
SRC="../images/home.jpg" NAME="btn_main" WIDTH=72
HEIGHT=55 BORDER=0 ></A></TD>
                                    <TD width="89"><A
HREF="../logout.php"><IMG SRC="../images/log-out.jpg"
NAME="btn_overview" WIDTH=89 HEIGHT=55 BORDER=0
></A></TD>
          <TD width="81"><A HREF="FAQ.php"><IMG
SRC="../images/blank2.jpg" NAME="btn_services" WIDTH=81
HEIGHT=55 BORDER=0 ></A></TD>
          <TD width="72"><A HREF="about.php"><IMG
SRC="../images/blank1.jpg" NAME="products" WIDTH=72
HEIGHT=55 BORDER=0 ></A></TD>
          <TD width="43"><IMG SRC="../images/topnavend.jpg"
WIDTH=43 HEIGHT=55></TD>
        </TR>
      </TABLE></td>
```

```
   </tr>
  </table></td>
</tr>
<tr>
<td height="69" colspan="2" valign="top">
  <TABLE BORDER=0 CELLPADDING=0 CELLSPACING=0>
    <TR>
      <TD ROWSPAN=2 WIDTH=219 HEIGHT=69></TD>
      <TD><IMG SRC="../images/toptreatment2.jpg" WIDTH=199
HEIGHT=20></TD>
      <TD ROWSPAN=2><IMG SRC="../images/pixi_darkblue.jpg"
WIDTH=182 HEIGHT=69></TD>
      <TD ROWSPAN=2><img src="../images/sidetop.jpg"
width="175" height="69"></TD>
    </TR>
    <TR>
      <TD background="../images/pixi_darkblue.jpg">
<?          echo "System Administrator: <i>$sysad</i>"; ?>
      </TD>
    </TR>
  </TABLE>
</td>
</tr>
<tr>
<td width="600" valign="top" align="center" >
<?if(isset($next)){
echo "<h2>PREDICT ENZYME SUBFAMILY<br><br></h2>";
echo "<br><b>The following table summarizes the difference
between the query enzyme and <br> the norm of each
class/subfamily.</b><br><br>";
?>
            <TABLE BORDER=1 CELLPADDING=0
CELLSPACING=0>
    <TR><TD COLSPAN="2" valign="justify" align =
"center"></TD></TR>
    <TR><TD ALIGN="center"><b>SUBFAMILY</b></TD>
            <TD ALIGN="center"><b>DIFFERENCE</b></TD>
    </TR>
<?$file_name=basename($filename);
$enfilename="../vector/".$file_name;
include("../scripts/connect.php");
//finds distinct class m
$query="Select distinct(subfamily) from sequence where
family='O' order by subfamily";
$res=mysql_query($query);
$rowsSub=mysql_num_rows($res);
for($i=1;$i<=$rowsSub;$i++){
            $sub = mysql_fetch_row($res);
            $subfam[$i]=0;
            $subfam[$i]=$sub[0];
            //obtains the vector for each enzyme in each class m
            $S2 = array(array());
            $qeur="Select vfilename from sequence where
subfamily='$subfam[$i]'";
            $rslt=mysql_query($qeur);
            $rows=mysql_num_rows($rslt);
            for($k=1;$k<=$rows;$k++){
                        $data = mysql_fetch_row($rslt);
                        $name=$data[0];
                        $fylname="../vector/$subfam[$i]/".$name;
                        if(!$file=fopen($fylname,"r")){
                                                echo("Could not open
the file");
                        }else{

            $arrText=file($fylname);

            for($n=1;$n<=38;$n++){
                                                            $S2[$k]
[$n]=$arrText[$n-1];

            $sumP[$n]=$sumP[$n]+$arrText[$n-1];
                                                }
                        }
            }
            //standard vector for class m
            for($a=1;$a<=38;$a++){
                        $PSub[$a]=$sumP[$a]/$rows;
            }
            //compute P-PSub
            if(!$file=fopen($enfilename,"r")){
                        echo("Could not open the file");
            }else{
                        $arr=file($enfilename);
                        $PS=array();
                        for($a=1;$a<=38;$a++){
                                    $PS[$a]=$arr[$a-1]-$PSub[$a];
                        }
                        }
                        //compute difference between query
enzyme P and the norm of class m using Mahalanobis distance

            //obtain covariance matrix
            $EX="A:=[[";
            $AMat=array(array());
            for($n=1;$n<=38;$n++){
                        for($k=1;$k<=$rows;$k++){
                                    $AMat[$n][$k]=($S2[$k][$n]-
$PSub[$n])/(sqrt($rows-1));
                                    $EX=$EX.$AMat[$n][$k];
                                    if($k<$rows){
                                                $EX=$EX.",";
                                    }
                        }
                        if($n<38)
                                    $EX=$EX."],[";
            }
            $EX=$EX."]];";
            //input matrix PST
            $EX=$EX."PST:=[";
            for($b=1;$b<=38;$b++){
                        $EX=$EX.$PS[$b];
                        if($b<=37){
                                    $EX=$EX." , ";
                        }
            }
                        $EX=$EX."];";
            $EX=$EX."with(linalg): AMat := convert(A,Matrix);
ATrans:=transpose(AMat); Cov:=multiply(AMat, ATrans); PT :=
convert(PST,Matrix); SIn:=inverse( Cov ); P:=transpose(PT);
DT:=det(Cov); M:=multiply(PT, SIn, P); deter:=
convert([ln(DT)],Matrix); A:= convert(M,Matrix); di:=A +
deter;";
            $error                  = 0;
            $path                   =
"c:/apache/htdocs/enzyme3/sysad/";
            $fname                  = "MapleCommands.txt";
            $bname                  = "BatchFile.bat";
            $rname                  = "Result.txt";
            $filename  = $path."".$fname;
            $batch                  = $path."".$bname;
            $resname  = $path."".$rname;
            $pathmod  = "path=%path%;C:/Program Files/Maple
8/bin.win;C:/Program Files/Maple 8/LIB\n";
            $bcontent = $pathmod."cmaple8 -i \"".$fname."\"
-e0";
            $content   = "restart;\n$EX\nExpEval := eval[8]
(%);\nExpEval := convert(ExpEval,'name'):\nFileDesc :=
fopen(\"".$rname."\",
WRITE):\nfprintf(FileDesc,\"%s\",ExpEval):\nfclose(FileDesc):\nq
uit;";
            if (!empty($EX)){
               if (!$handle = fopen($filename, 'w+')){
                                    echo "Cannot open file
($filename)";
                                    exit;
            }
            if (fwrite($handle, $content) == FALSE){
                  echo "Cannot write to file ($filename)";
               exit;
            }
            fclose($handle);
            }
            if(is_writable($filename) && $error==0){
            if (!$bhandle = fopen($batch, 'w+b')) {
                                    echo "Cannot open file
($batch)<br>";
                                    exit;
                        }
                        if (fwrite($bhandle, $bcontent) == FALSE)
{
                                    echo "Cannot write to file
($batch)<br>";
                                    exit;
```

```
                }
                fclose($bhandle);
        }
        if(is_writable($batch) && $error==0){
                system($bname.">BatchFileResults.txt");
        }
        if(is_writable($rname) && $error==0){
                $handle = fopen($rname, "rb");
                $ans = '';
                while (!feof($handle)) {
                        $ans .= fread($handle, 8192);
                }
                fclose($handle);
        }
        if( strstr($ans,']') && strstr($ans,'[') ){
                $string=$ans; $a=array();

                $tok = strtok($string, "[]");
                while ($tok) {
                        if(trim($tok)!=","){
                                $b = preg_split("/,/",
$tok);
                                array_push($a,$b);
                   }
                   $tok = strtok("[]");
                }
        }
        $diff[$i]=abs($a[1][0]);
          //choose minimum difference
                if($diff[$i]<$MinDiff || $i==1){
                $MinDiff=$diff[$i];
                $EnSub=$subfam[$i];
        }
}
fclose($file);
unlink("$enfilename");
for($i=1;$i<=$rowsSub;$i++){
        if($subfam[$i]==$EnSub){
                echo "<TR><TD align=\"center\"
bgcolor=\"GRAY\"><font color=\"BLACK\"><b> $subfam[$i]
</b></font></TD>";
                printf( "<TD align=\"right\"
bgcolor=\"GRAY\"><font color=\"BLACK\"><b> %.3f
</b></font></TD></TR>",$diff[$i]);
        }else{
                echo "<TR><TD align=\"center\">
$subfam[$i] </TD>";
                printf( "<TD align=\"right\"> %.3f
</TD></TR>",$diff[$i]);
        }
}
        echo("</TABLE><br><br><b>The query enzyme
belongs to subfamily $EnSub.</b><br><br>");
        switch($EnSub){
        case 1:echo("Subfamily 1 includes oxidoreductases
that act on the CH-OH group of donors. "); break;
        case 2:echo("Subfamily 2 includes oxidoreductases
that act on the aldehyde or oxo group of donors. ");break;
        case 3:echo("Subfamily 3 includes oxidoreductases
that act on the CH-CH group of donors. ");break;
        case 4:echo("Subfamily 4 includes oxidoreductases
that act on the CH-NH2 group of donors."); break;
        case 5:echo("Subfamily 5 includes oxidoreductases
that act on CH-NH group of donors. ");break;
        case 6:echo("Subfamily 6 includes oxidoreductases
that act on NADH or NADPH. ");break;
        case 7:echo("Subfamily 7 includes oxidoreductases
that act on other nitrogenous compounds as donors. ");break;
        case 8:echo("Subfamily 8 includes oxidoreductases
that act on a sulfur group of donors. ");break;
        case 9:echo("Subfamily 9 includes oxidoreductases
that act on a heme group of donors. ");break;
        case 10:echo("Subfamily 10 includes oxidoreductases
that act on diphenols and related substances as donors.");break;
        case 11:echo("Subfamily 11 includes oxidoreductases
that act on peroxide as an acceptor (peroxidases). ");break;
        case 12:echo("Subfamily 12 includes oxidoreductases
that act on single donors with incorporation of molecular oxygen
(oxygenases). ");break;
        case 13:echo("Subfamily 13 includes oxidoreductases
that act on paired donors with incorporation of molecular oxygen.
");break;
        case 14:echo("Subfamily 14 includes oxidoreductases
that act on superoxide radicals as acceptors. ");break;
        case 15:echo("Subfamily 15 includes oxidoreductases
that act on CH or CH2 groups. ");break;
        case 16:echo("Subfamily 16 includes oxidoreductases
that act on iron-sulfur proteins as donors. ");break;
        }
        if($MinDiff>10000)
                echo "<br><br>Note: The difference is
quite large. Most likely the enzyme belongs to other subfamily or
outside of the family oxidoreductases.";
        ?><br><br><br><a href="predict.php"
class="sidelinks2" ><b>Predict another enzyme<b></a>
<?}                ?>
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Password</a><br><br>

Lectures<br><br>
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                                                        <a
href="edit_lecture.php" class="sidelinks">Edit Lecture</a><br>
                                                <a href="view_lecture.php"
class="sidelinks">View Lecture</a><br>
                                                 <a href="delete_lecture.php"
class="sidelinks">Delete Lecture</a><br><br><br>
                                                Questions<br><br>
                                                <a
href="add_question.php" class="sidelinks">Add
Question</a><br>
                                                <a
href="edit_question.php" class="sidelinks">Edit
Question</a><br>
                                                 <a href="view_question.php"
class="sidelinks">View Question</a><br>
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        Copyright 2006.</TD>
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```

XI. Acknowledgement

The completion of this SP would not be possible if it were not from the help and support of the following people.

First I am very grateful to my mom and dad who have been very supportive. To my siblings, Tintin, Cancan and Dennis, thanks for being very understanding and allowing me to use the pc all the time.

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