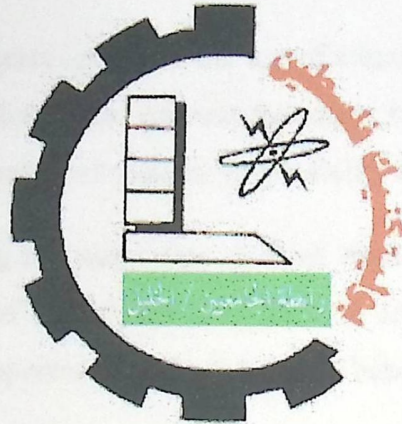بسم الله الرحمن الرحيم

Palestine Polytechnic University
Collage of Administrative Sciences and Informatics
Department of Information Technology

"Adaptive Online Exam System"
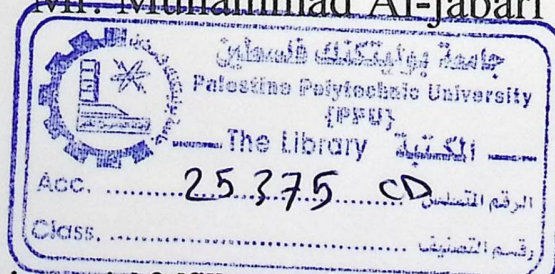
Project team

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Supervisor

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Project submitted in partial fulfillment of the requirements for the degree of
B.Sc. in Information Technology

2012

Abstract

Technology has a great impact in the use of educational process. Testing is an important aspect of the educational process that aims to the evaluation and getting feedback of the improvements and changes in the ability of the students' minds.

Furthermore, facing the same type of fixed exams that treats all students the same ignoring the level of knowledge they have is always affecting the students' evaluation and also is a supportive factor of their bad behavior of cheating.

To use technology to help students in the testing process the adaptive exam evolution was adapted as to give every student a relative exam according to his/her level of knowledge.

The main idea of the functionality of the adaptive exam system is the estimation of the examinees ability after the answer of every question and proceeds with giving an appropriate level of question until the termination condition of the exam is achieved.

الملخص

تتأثر العملية التعليمية بشكل كبير باستخدام التكنولوجيا العصرية في جوانبها المختلفة . الامتحان هو جانب مهم من جوانب هذه العملية و الذي يهدف إلى التقييم و الحصول على التغذية الراجعة كمؤشر للتغيرات و التطورات المؤثرة في قدرات الطلبة .

إن مواجهة ذات النمط الثابت من الامتحانات الذي يعامل جميع الطلبة متجاهلا التفاوت في قدراتهم العقلية و المعرفية يؤثر سلبا على تحصيل الطلبة العلمي ، أيضا فهو يكون العامل الأساسي الذي يدفع الطلاب إلى السلوك السلبي أثناء الامتحان و هو الغش.

لمساعدة الطلبة في عملية الامتحان تم استخدام التكنولوجيا في تطوير" الامتحان المتكيف " و الذي يتعامل مع الطالب و يطرح أسئلة الامتحان عليه بحيث تتوافق نسبيا و مستواه المعرفي و العلمي .

نقطة الأساس في آلية عمل هذا النظام تكون من خلال التقييم المستمر لمستوى الطالب المعرفي و العلمي بعد إجابته عن كل سؤال على حدة ، و من ثم إعطائه السؤال التالي و الذي يتناسب و مستواه العلمي ، و هكذا حتى يتحقق الشرط بانتهاء الامتحان

II

Dedication

To the candle which lighted and guided us through darkness and frustrating moments;

To our parents …

To all our brothers and sisters …

To all of our friends …

To our teachers who supported us…

To all those who care about us…

To all of these persons we would like to dedicate this project…

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Chapter One

Introduction

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- ❖ **System development stages**

1.1 Overview

Information Technology has a great effect on the evolution in many fields, especially in education .Using computer technology to gain competitive advantage in the modern educational process has a great importance such that in every step of the educational process (teaching , presenting , testing, evaluating, and feeding back).

This chapter presents the problem statement, which explains the problem of the routine fixed exams . Second , the system objectives, which are about the main goal of the system. Third, the project scope, which shows the exact domain of the system . Fourth, the project importance, which explain the benefits that we get from the adaptive testing system. Finally, we put table of tasks that contains each task we did in accordance to an expected time.

1.2 Background

Adaptive testing or Computer Adaptive Testing (CAT) is a way of conforming the exam to each individual examinee according to his \ her level of knowledge. (Patricia A, 1999)

It satisfies many aspects related to the testing process . In fact CAT merges the existing computer technology with modern measurements to increase the testing process efficiency . The exam could be created with diversity of response formats, such as, single response multiple choice, multiple response, fill-in-the-blank, drag and drop, etc. (Patricia A, 1999)

By using CAT each individual exam is unique . Even though more than one candidate will be in the same level , every one of them will have a different exam in terms of questions, number of questions, and different order of questions.

Every time the examinee answers a question, the computer estimates the examinee's ability again , based upon the most recent, revised ability estimate, the computer selects the next item to be presented, such that the examinee will find it challenging. Not too hard, Not too easy.

1.2.1 Advantages of adaptive testing

- Compared to paper-and-pencil tests, CAT technology requires fewer test items to arrive at a more accurate estimate of test takers' level of knowledge.

- CAT scoring takes into account not just the number of item answered correctly, but which items were answered correctly. A test taker who correctly answers a more difficult set of questions will score higher than a test taker who correctly answers an easier set of questions.

- The time required to take a CAT is shorter, since test items outside the test taker's proficiency level are excluded.

- The test taker is continuously faced with a realistic challenge--items are not too difficult or too easy.

- Because each test taker is potentially administered a different set of test items, test security is enhanced.

- CAT technology allows test takers to receive immediate feedback on their performance.

- For tests administered on a large scale, scheduling and supervision concerns are greatly reduced because individual administration is possible.

- CAT technologies have been found to improve test-taking motivation.

- Students' performance over time can be tracked by using the computer to store performance data.

- Computers are more accurate at reporting scores than human beings

- The use of different tests for each student should minimize any practice effects such as cheating.

1.2.2 Fixed exam (computer/paper-based) vs. computer adaptive exam

An important difference between adaptive and fixed-length standard exams is that you can't go back and review your answers on an adaptive exam. The adaptive exam bases each question on your answer to the previous question, so going back to change or

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review an answer is impossible. After you answer a question and move on, the adaptive exam locks in your previous answer.

Another difference is that adaptive exams don't break down your final score by subject, whereas standard exams provide a score for each category on the exam.

In addition, adaptive exams are over quicker than standard exams because the testing program selects questions based on your previous responses. Thus, an adaptive program requires fewer questions to determine your ability level than a standard program requires

1.2.3 Potentials of computer adaptive tests

- Tests are given "on demand" and scores are available immediately.(Lawrence M. Rudner, 1998).
- Neither answer sheets nor trained test administrators are needed. Test administrator differences are eliminated as a factor in measurement error. .(Lawrence M. Rudner, 1998).
- Tests are individually paced so that a examinee does not have to wait for others to finish before going on to the next section. Self-paced administration also offers extra time for examinees who need it, potentially reducing one source of test anxiety. .(Lawrence M. Rudner,1998).
- Test security may be increased because hard copy test booklets are never compromised. .(Lawrence M. Rudner,1998).
- Computerized testing offers a number of options for timing and formatting. Therefore it has the potential to accommodate a wider range of item types. .(Lawrence M. Rudner,1998).
- Significantly less time is needed to administer Adaptive exams than fixed-item tests since fewer items are needed to achieve acceptable accuracy. Adaptive exams can reduce testing time while maintaining the same level of reliability. (Lawrence M. Rudner, 1998).
- Adaptive exams can provide accurate scores over a wide range of abilities while traditional tests are usually most accurate for average examinees (Lawrence M. Rudner, 1998).

1.2.4 Limitations

- Hardware limitations may restrict the types of items that can be administered by computer. Items involving detailed art work and graphs or extensive reading passages, for example, may be hard to present. (Lawrence M. Rudner, ,1998).

- Adaptive exams require careful item calibration. The item parameters used in a paper and pencil testing may not hold with a computer adaptive test. (Lawrence M. Rudner, 1998).

- Adaptive exams are only manageable if a facility has enough computers for a large number of examinees and the examinees are at least partially computer-literate. This can be a big limitation. (Lawrence M. Rudner, 1998).

- The test administration procedures are different. This may cause problems for some examinees. (Lawrence M. Rudner, 1998).

- With each examinee receiving a different set of questions, there can be perceived inequities. (Lawrence M. Rudner,1998).

- Examinees are not usually permitted to go back and change answers. (Lawrence M. Rudner, 1998).

- If changing responses is permitted, a clever examinee could intentionally miss initial questions. The CAT program would then assume low ability and select a series of easy questions. The examinee could then go back and change the answers, getting them all right. The result could be 100% correct answers which would result in the examinee's estimated ability being the highest ability level. (Lawrence M. Rudner, 1998).

1.2.5 Who uses CAT:

There are some bodies that uses CAT: (Patricia A, 1999)

Armed Services Vocational Aptitude Battery (ASVAB)

The Armed Services Vocational Aptitude Battery (AVSAB) was initially developed as a paper-and-pencil test in the 1960s by the U.S. Department of Defense. The instrument is still widely used, testing approximately 700,000 students in 12,000 high schools annually.

The ASVAB is a multidimensional instrument, assessing vocational abilities such as Mathematics Knowledge, Electronics Information, and Mechanical Comprehension, that helps to determine potential placement for examinees in military occupations. There are currently three forms of the AVSAB, one of which is computer-adaptive (the CATASVAB) that was developed in 1982. Research has shown the CAT-ASVAB requires a shorter amount of testing time than the other forms.

Graduate Management Admission Test (GMAT-CAT)

The adaptive version of the Graduate Management Admission Test (GMAT-CAT) is administered by the Educational Testing Service (ETS) to those wishing to gain admission to graduate masters (typically MBA) programs. Approximately two-thirds of graduate business schools throughout the world require a GMAT score from applicants. The abilities that are purported to be measured by the test cover three areas: Analytical Writing, Quantitative Ability, and Verbal Ability. Currently, the computer-adaptive version of the GMAT, which was implemented in 1997, is the only form of the test given in North America.

Microsoft© Certified Professional Exams

To provide certification to information technology professionals, Microsoft© develops and administers both adaptive and fixed-format tests that assess certain skill areas in the technology industry. There are approximately 2 million Microsoft© Certified individuals throughout the world.

American Institute of Certified Public Accountants Exam (AICPA)

Each year, the Uniform Certified Public Accountants Examination is administered to 110,000 people who are attempting to become Certified Public Accountants. The test is composed of multiple-choice test lets and simulations that cover four areas: Auditing and Attestation, Financial Accounting and Reporting,

Regulation, and Business Environment and Concepts. The multiple-choice testlets in the first three areas were converted to an adaptive format in 2004, but all the simulated case studies are static. The fourth area, Business Environment and Concepts, is currently considered to be undergoing a practice analysis and is composed of three, multiple-choice, static test lets

1.3 Problem statement

Fixed exams (either paper based or computer based) gives questions to the examinees regardless of their level of knowledge; also it gives the same number and order of questions for all the examinees. This gives an opportunity to the examinees to cheat and acting with a bad behavior through the exam. In addition to the efforts of the supervisors during the exam and the time it takes the lecturer to correct the answers.

The general problem that makes the idea of this system is that the exams in the Palestine polytechnic university are fixed paper-based exams.

1.4 Objectives

The main goal is to create an adaptive environment of the exams that can help the students in Palestine polytechnic university by adapting the exam according to his\her level of knowledge, also to reduce efforts done by supervisors and lecturers of the university in the correction process along with giving accurate results.

1.5 Project domain

The system will serve any educational organization and any other kinds of tests.

1.6 Project importance

The importance of the project appears through the advantages of the adaptive exams which are mentioned below: (CARLA,2010)

- Immediate Feedback. The test can be scored immediately, providing feedback for the examinees.
- Multimedia Presentation. Tests can include text, graphics, photographs, and even full-motion video clips, although multimedia CAT development is still in its infancy.
- Challenge. Test takers are challenged by test items at an appropriate level ؛ they are not discouraged or annoyed by items that are far above or below their ability level ؛the test taker is continuously faced with a realistic challenge-- items are not too difficult or too easy.
- The time required to take a CAT is shorter, since test items outside the test taker's proficiency level are excluded.

- CAT scoring takes into account not just the number of item answered correctly but which items were answered correctly. A test taker who correctly answers a more difficult set of questions will score higher than a test taker who correctly answers an easier set of questions.

- Because each test taker is potentially administered a different set of test items, test security is enhanced

- For tests administered on a large scale, scheduling and supervision concerns are greatly reduced because individual administration is possible.

1.7 System development stages

Every project needs a set of tasks carried out in stages .we will display the stages using textual description, table based and chart based (Gantt chart).

1. Collecting information and planning :

Collect information about the Topic. Depending mostly about the basic information from a tutorial by Lawrence M. Rudner "An On-line, Interactive, Computer Adaptive Testing Tutorial" , and other sites that we have used as references for information we used to improve this document. (Computer Adaptive Testing Tutorial, 11/98)

Also we benefit from our experience of being students who undertake exams in the traditional paper based manner and how much it limits the boundaries of the examinee's level and produces the bad behavior of cheating.

2-System requirement:

Determine the functional and non-functional requirements for the system in abstract manner, and find alternative solutions and choose the best to be our project. We will also recall some of the risks that faced the systems developers.

3- requirement specification:

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After we determined the system requirements, we will analyze the functional requirements and draw models that display the functional requirements by details, charts and diagrams.

4- System design:

In this stage ,we will design the system elements and database that will be used

5-System implementation :

After the design process we will start programming the system.

6-System testing:

In this stage ,testing must be accompany to system implementation to check the units of the code or to check the entities system to realize the error source accurately .

7-Documentation :

Documentation will be continued from the beginning to end of the system development .

tasks	Description	weeks
1st task	Collecting information and planning	4
2nd task	System requirement	4
3rd task	requirement specification	6
4th task	System design	6
5th task	System implementation	8
6th task	System testing	6
7th task	Documentation	34

Table 1.1: time division of tasks

Weeks \ Task	2	4	6	8	10	12	14		2	4	6	8	10	12	14	15	16
1st task	■	■															
2nd task			■	■													
3rd task					■	■	■										
4th task									■	■	■						
5th task											■	■	■	■			
6th task															■	■	■
7th task	■	■	■	■	■	■	■		■	■	■	■	■	■	■	■	■
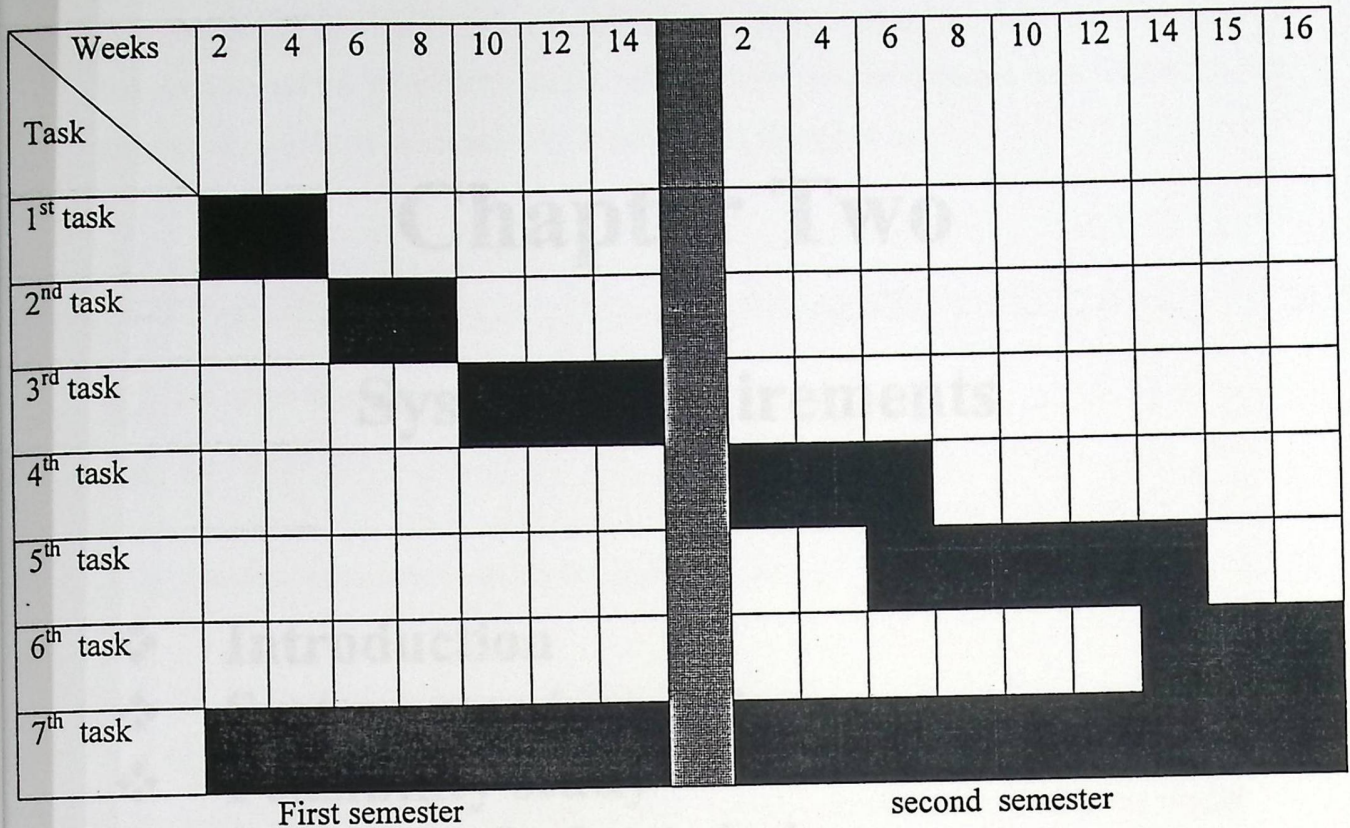
First semester   second semester

(second semester 2011)   (first semester 2012)

figure 1.1 Gantt chart

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Chapter Two

System requirements

❖ **Introduction**
❖ **System requirements**
❖ **Feasibility study**
❖ **Selecting the best choice**
❖ **Constraints and limitations**
❖ **Risks and solutions**

2.1 Introduction

The functional and non-functional requirements of the system, the risks that may face the system, and the proposed solution of these risks will be depicted here within this chapter as well the feasibility study of the system alternatives.

2.2 system requirements

2.2.1 Functional requirements

The functional requirements of the system are categorized based upon the classification of the users putting into action the system which the namely are: administrator (instructor), and main user (student).

2.2.1.1 Administrator (instructor) functions

1. Creating and modifying the exam

The Administrator enters all questions and inquiries about course, modify the entries whether deleting or updating including specifications such as weights, difficulty and the assortment to be affiliated with.

2. View reports

The administrator views various reports about questions, their weights and difficulties, amount of the questions, time duration for the exams and fully test takers' doing information who were sitting for an examination.

2.2.1.2 Main user (students) functions

The main users (students) can only undertake an examination, do what they have to do to be more than prosperous by answering the questions after all.

Table (2.1) below summarizes user types, and the privileges of each type.

privilege ⟋ users	Administrator (instructor)	Main user (student)
Creating and modifying the exam	√	X
View reports	√	X
Undertake the exam	√	√

2.2.2 Non-functional requirements

1. Usability

The system should be enhanced with user friendly interface to have it efficient ,equally easy to use.

2. Integrity

The system should be integrated with a data base that could have any necessary information about the examinees .

3. Performance

The system should be fast, which means the information retrieval time will be readily, because the access to system most of the time is from the university which provides a fast connection.

4. Security

The system should be incumbent upon protection against any possible threats and attacks, this can be fulfilled using md5 encryption, using complex passwords, authentication, authorization, give every user a specific privilege. The system also will benefit from the existing security infrastructure of PPU network and web services.

5- Scalability:

The system should provide high relatively number of users to take the exam & also should be extendable so it can grow according to the situations and the needs.

6. Periodic saving :

The system should provide a periodic saving of its current state , to avoid the loss of an exam when there is a physical problem such that electricity power off. On the other hand the system should provide resuming to allow the examinee to continue from the point it was interrupted .

7. Variety of question formats :

The system should provide various question formats such as : multiple choice, matching, true/false, drag and drop and fill in the blank questions.

8. Adaptation to the examinee level:

The system should be adaptive which means that it has to estimate the examinees level of knowledge then gives the question from the appropriate category of hardness.

9. Random :

The system should give the questions to the examinees as random as possible

2.3 Feasibility study

2.3.1 Alternatives

There are different alternatives to implement the tasks of adaptive online exam system. These alternatives could be summarized as follow.

1. Computer-based fixed exam

Computer-based fixed exam can be defined as: "a self contained program that performs a defined set of tasks under the user control". (Comparing Desktop Applications with Web Applications).

- ☐Advantages:

- Do not require a network or internet connection.

- High security.

- Low cost.

- It is fast.

- ☐Disadvantages:

- Need to be individually installed on each computer.

- Machine dependent, every change has only reflects at the machine level.

- In some cases need high storage capacity.

2. Adaptive exam (web based)

Advantages:

- Easily accessible from any computer or location that has internet access.

- Requires single installation, all the data is shared in a centralized place.

- Internet dependent program, any change reflects at everywhere.

- Platform independent.

- Do not require any special configuration or installation, a simple web browser is enough.

☐Disadvantages:

- Less secure than computer-based fixed exam.

- More expensive (over time) than computer-based fixed exam

- Relies on internet speed to transfer data which makes it slower.

2.3.2 Cost analysis

This section will goes into the financial study of the system, for all alternatives stated in Section 2.3.1.

1. Development and operational resources (computer-based fixed exam)

- ☐Development costs

The human resources, hardware resources, and software resources that are required during the development stage of the computer-based fixed exam alternative are detailed below in Table (2.2), Table (2.3), and Table (2.4) respectively.

Table (2.2): Monthly development human resource budget for computer-based fixed exam

Human resource	Quantity	Monthly cost per developer	Overall cost per month
System developer	2	500$	1000$

Table (2.3): Physical development budget for computer-based fixed exam (Al_Manara Company)

Item	Quantity	Specification	Cost
Compatible PC	1	HP, CORE 2 DUO 2GHz processor. RAM 2 GB, Hard disk drive 250GB, SuperMulti DVD Burner.	500$
Flash memory	2	8GB	60$
UPS	1	It can remain for at least one hour	200
Overall cost			760$

Table (2.4) Software development budget for computer-based fixed exam (http://www.amazon.com)

Item	cost
Microsoft windows 7 ultimate	600$
MySQL server	50$
Microsoft Office 2007	290$
Overall cost	940$

Operational costs

The operational costs for a computer-based fixed exam comprises yearly maintenance are circa 200 $. With missing special hardware and software required for the system operation; the users of the system are instructors at the university and they can install the application on the labs' computers.

2. Development and operational resources (Adaptive exam)

☐Development costs

The development resources of the web application are just as the computer-based fixed exam's, which beforehand detailed above.

☐Operational costs

The human resources and hardware resources that are needed during the operational step of the Adaptive exam alternative are detailed below in Table (2.5), Table (2.6) respectively. The software requirement for this stage is the same as that detailed in Table (2.4).

Table (2.5) Operational human resource budget for Adaptive exam

Human resource	Quantity	Monthly cost per developer	Overall cost for 1 month
System administrator	1	500$	500$
Overall cost			500$

Operational costs

The operational costs for a computer-based fixed exam comprises yearly maintenance are circa 200 $. With missing special hardware and software required for the system operation; the users of the system are instructors at the university and they can install the application on the labs' computers.

2. Development and operational resources (Adaptive exam)

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The human resources and hardware resources that are needed during the operational step of the Adaptive exam alternative are detailed below in Table (2.5), Table (2.6) respectively. The software requirement for this stage is the same as that detailed in Table (2.4).

Table (2.5) Operational human resource budget for Adaptive exam

Human resource	Quantity	Monthly cost per developer	Overall cost for 1 month
System administrator	1	500$	500$
Overall cost			500$

Table (2.6): Operational physical budget for Adaptive exam

Item	Quantity	Specification	cost
server	1	Processor: 2x Quad Core Intel Xeon E5504 (2.00GHz, 1333FSB) Memory: 8GB PC2-5300DDR2 Hard Drive: 4x 1466B SAS 15K with integrated RAID5 Optical Drive: 16x DVD+/- RW SATA Networking: Dual Gigabit Ethernet NIC Power: Dual power supply	0$
Overall cost			
0$			

The cost is set to zero because the system will be installed on a server of the computer center of PPU.

2.4 Selecting the best choice

After analyzing and looking into the possibility of applying web application and desktop application along with reckoning the advantages and disadvantages of both alternatives (which detailed in Section 2.3.1) as well as the costs of both system which also detailed previously in Section 2.3.2. Another studied alternative is to apply a mixed desktop / web application as an endeavor to take advantage of both applications and triumph over accompanied drawbacks. This mixed model is blemished with synchronization between web part and desktop part; which leads to a scarcely updating entitled to databases of the two parts simultaneously. Nevertheless, there are some solutions for this problem; one possible solution could be accomplished using a specific synchronization protocol; however, this solution will not be adopted in this project due to the it's toughness and the lack of lore the project team encounter. In other words, without such synchronization, the system will suffer

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data inconsistency for all the time intervals when users are offline and disconnected from the web part of the system.

According to the university's geophysical cumbers like manifold branched campuses; the web application seems to be the most appropriate for the system just so to facilitate access to the system from any computer or location that has internet access.

2.5 Constraints and limitations

The main constrains that must be taken into account throughout the development of the system process encompass:

1. Working within the delineated budget.
2. The system should be turned over within the specified period.
3. The system is customized to the PPU University.

4. Disagreement in times and places among team members.

5. Analyzing the system is not efficient, because of propping new requirement

6. Instructors may find it difficult to deal with the system and create adaptive exams

2.6 Risks and solutions

Several likely risks, which may take place during the different phases of this project, are coming up listed below:

1. The emergence of new requirements during, or after the development of the system is accomplished.
   - This problem can be solved by specifying the system requirements distinctly.

2. The system may be apt to the physical and programmatically problems.
   - To resolve this problem, different backup copies should be obtained periodically.

3. The system may get damaged by hacking or by any other threats.
   - To resolve this problem the system design should be more than secured.

4. Power outages

- To resolve this problem use UPS, or motor for providing electricity.

5. Server shutdown

- To resolve this problem the system should works automatically in another server instead.

Chapter Three

System specification

❖ Introduction
❖ Description of functional requirements
❖ Use case diagram
❖ Sequence diagrams
❖ Flow chart
❖ Test plan

4. Power outages

   - To resolve this problem use UPS, or motor for providing electricity.

5. Server shutdown

   - To resolve this problem the system should works automatically in another server instead.

Chapter Three

System specification

- ❖ **Introduction**
- ❖ **Description of functional requirements**
- ❖ **Use case diagram**
- ❖ **Sequence diagrams**
- ❖ **Flow chart**
- ❖ **Test plan**

2. View reports

Description	Ability to view various reports about questions, their weights and difficulties, amount of the questions, time duration for the exams and fully test takers' doing information who were sitting for an examination.
Inputs	
Outputs	Different reports and statistics about the test takers and their doing also the test itself
Requirements	Valid ID and password for the system administrator

3- Undertake the exam

Description	The exam will be given as one question at a time, starting with the adaptive quiz to start with the appropriate level of difficulty question to the examinee , also estimate the level of the examinee after every answer of a question
Input	The answers of each question corresponding to its format
Output	Immediate feedback for the student showing his/her result, and transferring the results of all students to the web
Requirements	correct and valid username and password of a main user or an administrator in case of individual exam

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3.1 Introduction

This chapter will get deeply into the system main functionalities, which details how the whole system proceed in its work . such as how the instructor put the categorized questions for the test taker according to how difficulty they are, the system activities in generating randomly questions through the exam after a short adaptive quiz so it can define the capability of the test takers to apply for the test and finally go through the correction procedures to the transformation of the results to the aimed database. Different models will illustrate all of the precedent functionalities.

3.2 Description of functional requirements

1. Creating and modifying the exam

Description	Enables the administrator (instructor) to create the exam of the specific course, modify the entries whether deleting or updating, categorizing the questions according to the level of difficulty for each question
Input	Questions and their appropriate answers, difficulty level of each question (categorizing), weight of each question according to its difficulty, also choosing the format of the question (multiple choice, fill in the blank, match …)
Output	Creating exam was done successfully
Requirements	Correct username and password for a system administrator

2. View reports

Description	Ability to view various reports about questions, their difficulties, amount of the questions, time duration for the fully test takers' doing information examination.
Inputs	
Outputs	Different reports and statistics about the also the test itself
Requirements	Valid ID and password for the

3- Undertake the exam

Description	The exam will be given adaptive quiz to the examine answer of a question
Input	The answer

Figure 3.1 Adaptive Online Exam Use Case Diagram 1

3.3 Use Case diagram

As can be seen in Figure (3.1), the system has a database and two users; namely: administrator and main user.
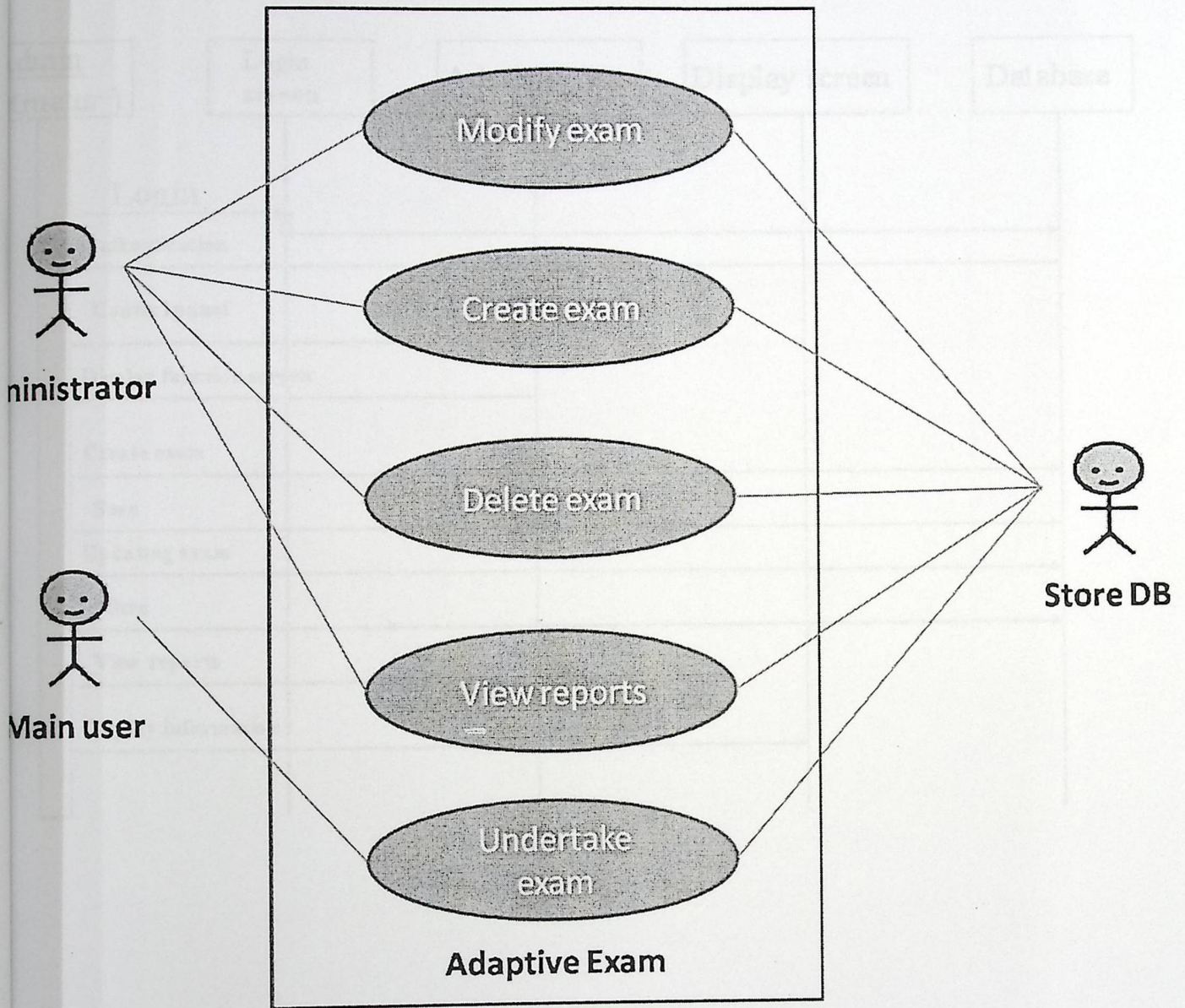
Figure 3.1 Adaptive Online Exam Use Case Diagram 1

3.4 Sequence diagrams

Down in the figures, all sequence diagram for each user of system as can be depicted and seen .

1. Sequence diagram for administrator:

Admin (instructor)	Login screen	Admin screen	Display screen	Database
Login				
Authentication				
Control panel				
Display function screen				
Create exam				
Save				
Updating exam				
Save				
View reports				
Display information				
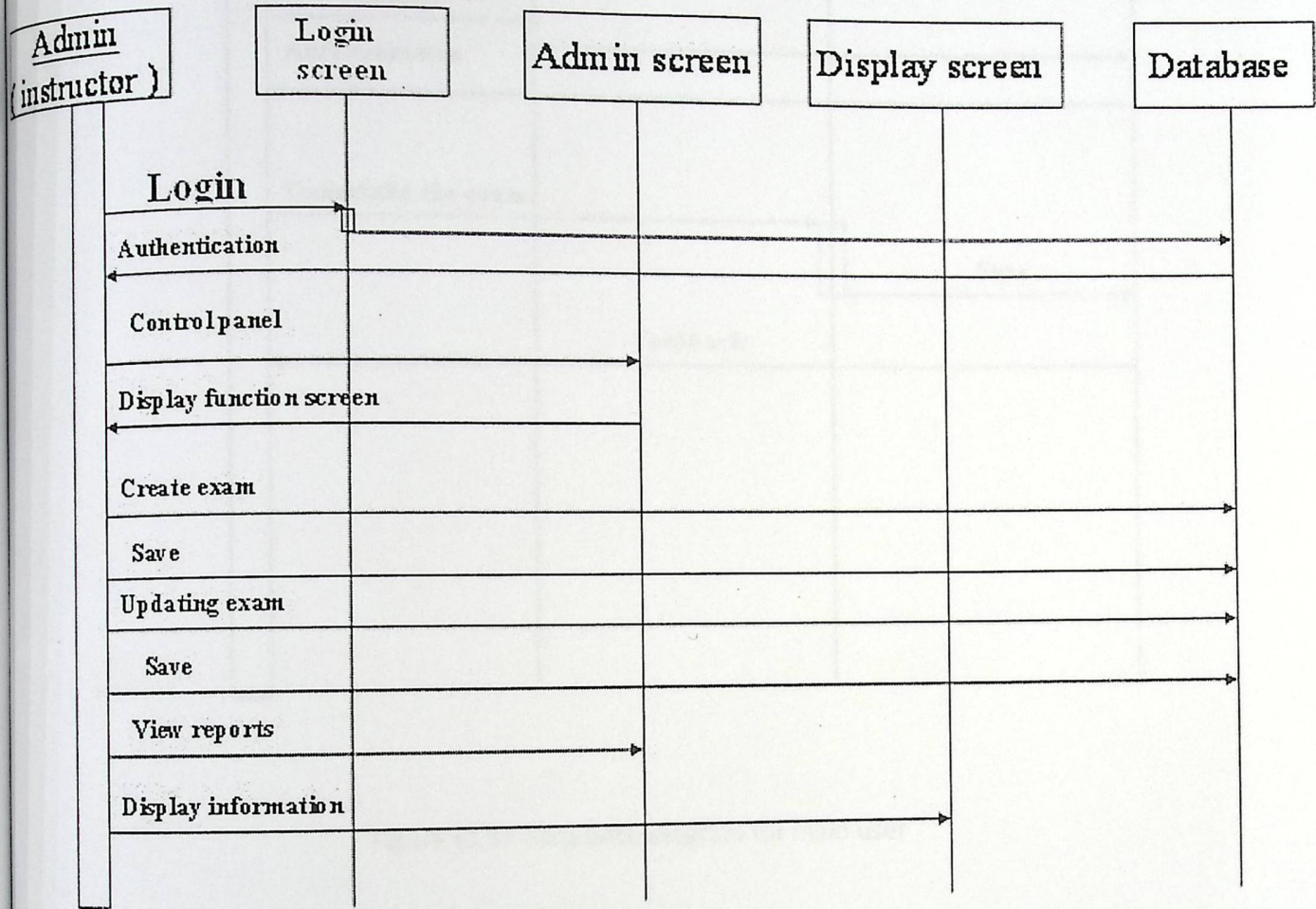
Figure (3.2): Sequence diagram for administrator

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2. Sequence diagram for main user:
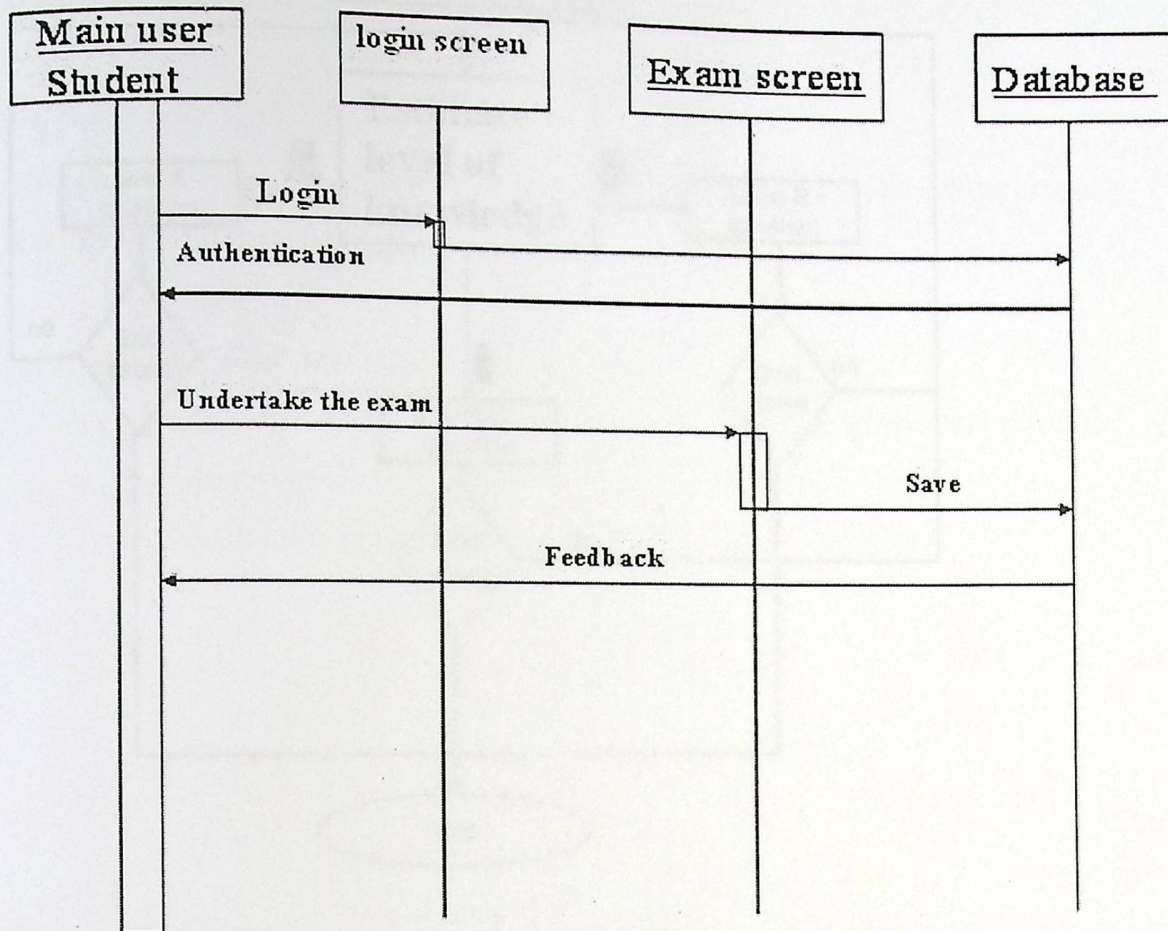
Figure (3.3): Sequence diagram for main user

3.5 Logic Flowchart
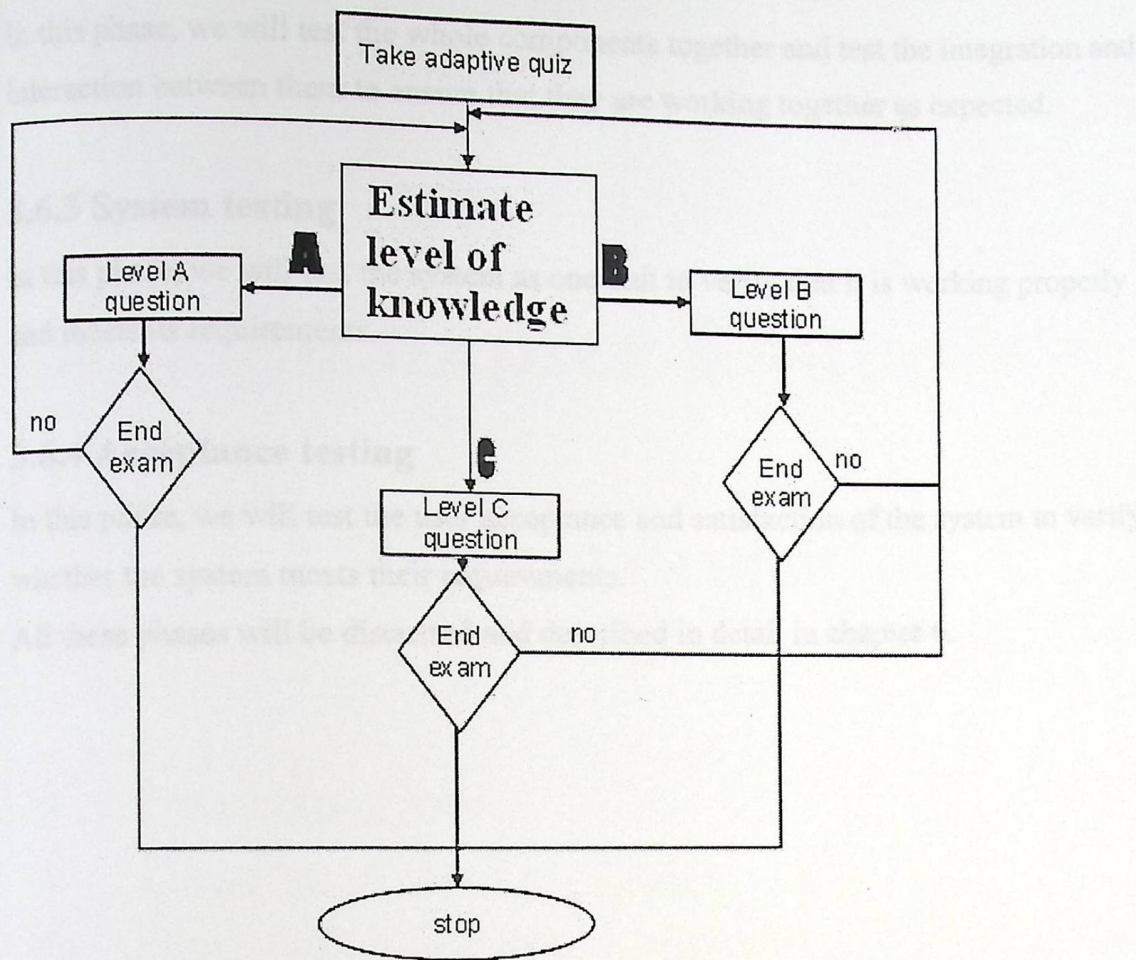
figure 3.4: Logic Flow chart

3.6 Test plan

This section describes the test plan of the system which will be used to ensure that the system meets its functional and technical requirements and working as properly as expected, and can be implemented with the same characteristics.

The project team describes briefly the methodology that is adapted to test the system as follow:

3.6.1 Unit testing

In this phase, we will test each unit in the system separately to ensure that it is operating correctly and meet the specifications.

3.6.2 Integration testing

In this phase, we will test the whole components together and test the integration and interaction between them to ensure that they are working together as expected.

3.6.3 System testing

In this phase, we will test the system as one unit to verify that it is working properly and meets its requirements.

3.6.4 Acceptance testing

In this phase, we will test the user acceptance and satisfaction of the system to verify whether the system meets their requirements.

All these phases will be discussed and described in detail in chapter 6.

Chapter Four

System design

- ❖ **Introduction**
- ❖ **Database description**
- ❖ **Database design**
- ❖ **Database dictionary**
- ❖ **User interface design and validations**

4.1 introductions

This chapter discusses the logical design of the system, and the design of database and its dictionary.

4.2 The adaptive concept

The adaptive exam should provide an exam environment in which all the adaptive parameters meet, in order to achieve this the flow chart below its description is proposed.

The criteria of estimating the ability of the examinee before the first question is to be either to give a median level question or to give an adaptive quiz , we choose the median question because we don't want the examinee to feel that this is another area rather than the exam it self , also there is a possibility of misunderstanding the quiz considering it as the exam it self , both ways will provide a primary estimation of the ability and not the exact ability of the examinee .

After providing the median level question to the examinee which is randomly chosen from the median category of the questions, the question is randomly chosen nevertheless its format or number, (the formats are multiple-choice, true/ false , and match questions), the system waits for the examinees answer which is very important aspect to estimate the examinees ability and to direct the choice of the next questions .

The questions are given one by one and there is an estimation process after every single question, "unlike linear testing, in adaptive testing three different stages of ability estimation can be distinguished:-

(1) ability estimation to start the item-selection procedure.

(2) ability estimation during the test to adapt the selection of the items to the examinee's ability.

(3) ability estimation at the end of the test to report a score for the examinee. Each of these stages involves its own requirements and problems.

4.2.1 Ability estimation criteria

this estimation process takes into consideration the answer of the previous question, and according to that response the process proceeds to the process of selecting the new question item, taking the ability estimation from the previous process the selection process can decide the category of the questions level from which the next item will be generated, and so the next item comes out as random as possible from that category.

As it is illustrated figure 4.1 the logic flow of the ability estimation , The answer of the previous question determines the level of the next question each time the examinee answers a question ,

1. if the answer of the previous question is true then in accordance of the previous question level the new ability of the examinee is set, if the previous question level is difficult then the ability will remain on level A, if its median level question then the ability will be set to the level difficult, and if its easy then the ability will be set to median level.

2. if the answer of the previous question is false then in accordance of the previous question level the new ability of the examinee is set, if the previous question level is difficult the ability of the examinee will be set to median, if its median the ability of the examinee will be set to easy, and if it is easy the ability of the examinee will remain easy.
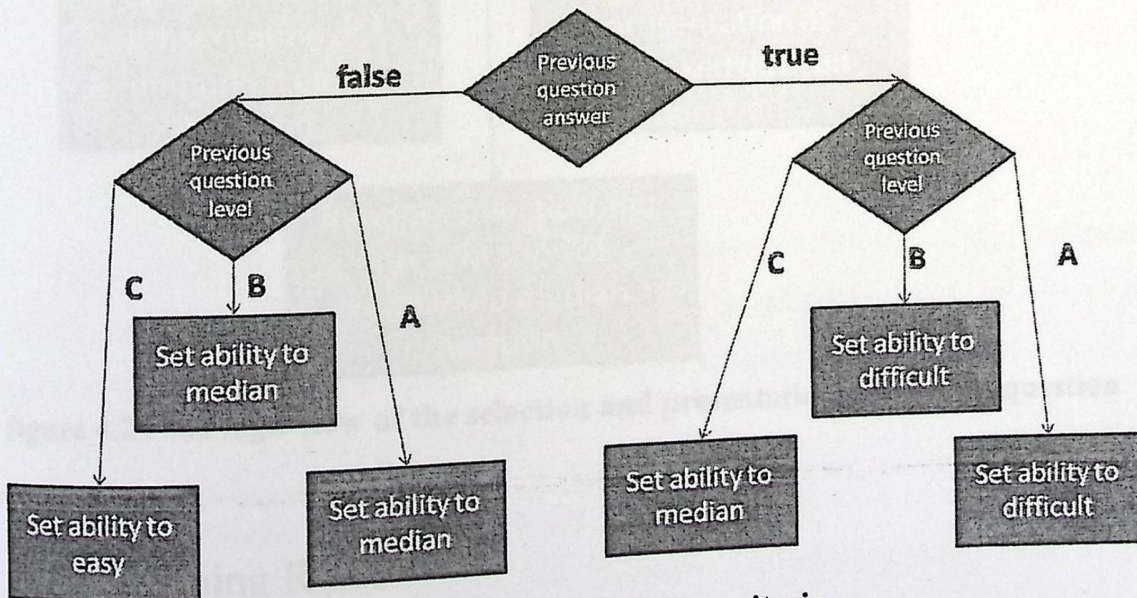
figure 4.1 : the logic flow of the ability estimation criteria

4.2.2 The selection and presentation of the next question

as illustrated in figure the logic flow of the selection and presentation criteria of the next question is the process that comes after the new ability of the examinee is set, the ability will lead to the right questions pool, with the right category and right difficulty, at every category of the questions the selection process is performed on the items, the next item should be unmarked item which assures that no question will be repeated in the same exam, also to take into consideration that the selection process has to be as random as possible to make sure that as much as we can we eliminate the repetition of the questions on two or more concurrent exams.
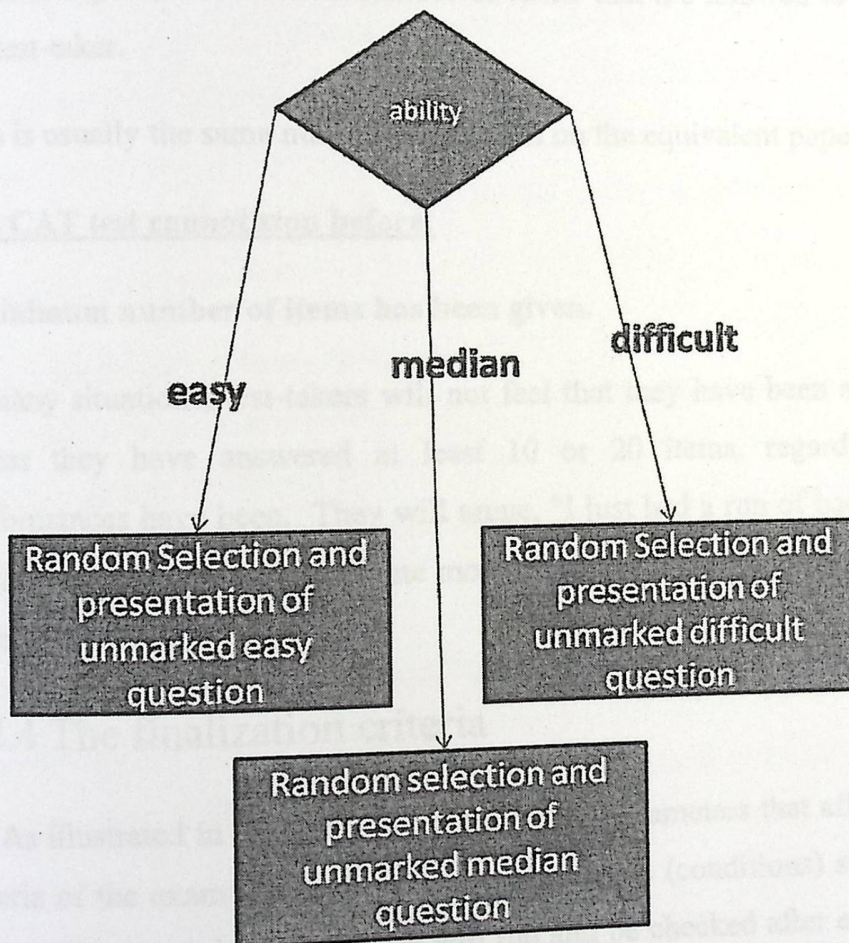
figure 4.2 : the logic flow of the selection and presentation of the next question

4.2.3 Stopping Rules

The decision as to when to stop a CAT test is the most crucial element. If the test is too short, then the ability estimate may be inaccurate. If the test is too long,

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then time and resources are wasted, and the items exposed unnecessarily. The test-taker also may tire, and drop in performance level, leading to invalid test results.

1. The item bank is exhausted.

This occurs, generally with small item banks, when every item has been administered to the test takers.

2. The maximum test length is reached.

There is a pre-set maximum number of items that are allowed to be administered to the test-taker.

This is usually the same number of items as on the equivalent paper-and-pencil test.

The CAT test cannot stop before:

a minimum number of items has been given.

In many situations, test-takers will not feel that they have been accurately measured unless they have answered at least 10 or 20 items, regardless of what their performances have been. They will argue, "I just had a run of bad luck at the start of the test, if only you had asked me more questions, my results would have been quite different!"

4.2.4 The finalization criteria

As illustrated in figure there are four main parameters that affects the finalization criteria of the exam each one on these parameters (conditions) should be true or the exam will not terminate, and they will run and be checked after every single question is answered, the four main parameters are :

1- the questions had finished in the data base : this case is so unique and it happens only for exams with poor database of questions and few items in each category, if it is not finished it will proceed with the other conditions if not , then the exam will terminate.

2- A maximum number of questions is reached: a maximum number of questions to taken for each individual examinee is previously set, this to eliminate all the running exams with examinees who is just trying to answer without a serious attitude towards the exam, if the maximum number is not reached it will proceed with the other conditions if its reached then the exam will terminate.

3- Maximum mark is reached : a maximum mark of the exam is to be set before any examinee undertakes the exam, this will help the efficiency of the exam to be achieved, the maximum mark of the exam could be reached in any time, the student who will take the difficult questions will reach the maximum mark in a few time because the weight of each difficult question is much more than the other lower categories, if this maximum mark is reached then the exam will terminate , if not then it will proceed with the last condition.

4- The full time of the exam is finished : there is a full time of the exam which is the maximum time an examinee can take while undertaking the exam this is obvious that if the time is finished the exam will terminate, if not then the exam will proceed on.

After the check of these four conditions if one of them is satisfied the whole finalization criteria is satisfied , if no one then the exam will proceed, it will proceed going to the ability estimation passing through to the selection of the question and coming again to the finalization criteria until the finalization criteria is satisfied

If the finalization criteria is satisfied, exam proceeds with showing a report of the result and the time consumed to undertake the exam, the average ability of the whole exam, number of questions taken and then will terminate .
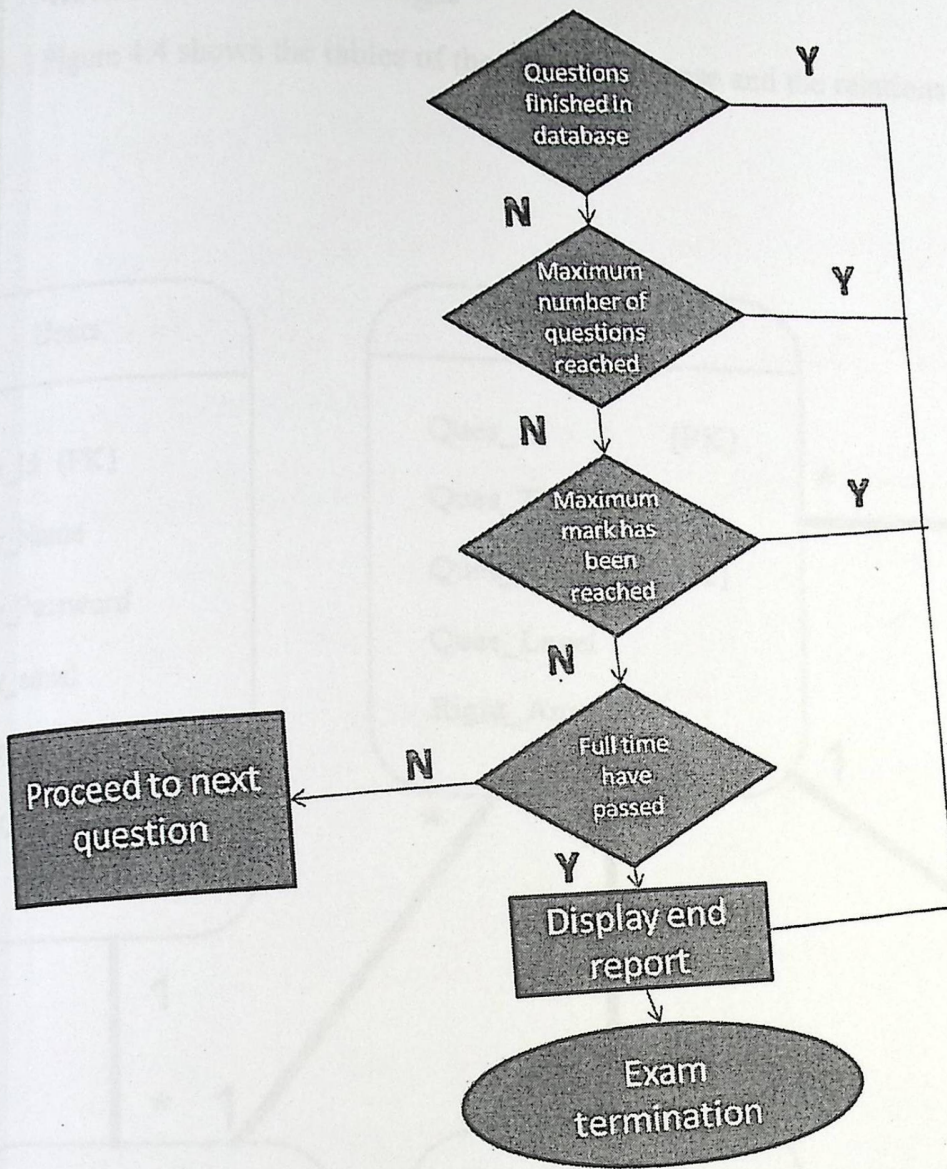
figure 4.3 : the logic flow of the finalization criteria

4.3 Database description

The system database contains the whole information that the system needs to accomplish its functions and operations. The database consists of six tables which are:

O Users

O Course

O Questions

O Session

O Answers

O Marks

4.3.1 Database Design

Figure 4.4 shows the tables of the system database and the relations between them.

Users

User_Id {PK}

User_Name

User_Password

User_email

User_type

User_Level

Questions

Ques_Id   {PK}

Ques_Text

Ques_course_id {FK}

Ques_Level

Right_Answer

Course

Course_Id {PK}

Course_Name

Answers

Ques_Id   {FK}

Answer_Id {PK}

Answer_text

Answer_is_right

Session

Session_Id {PK}

Std_Id

Answer_id {FK}

Ques_id   {FK}

Is_pass

Marks

Mark_Id {PK}

Std_Id

Session_id {FK}

Mark

Bonus

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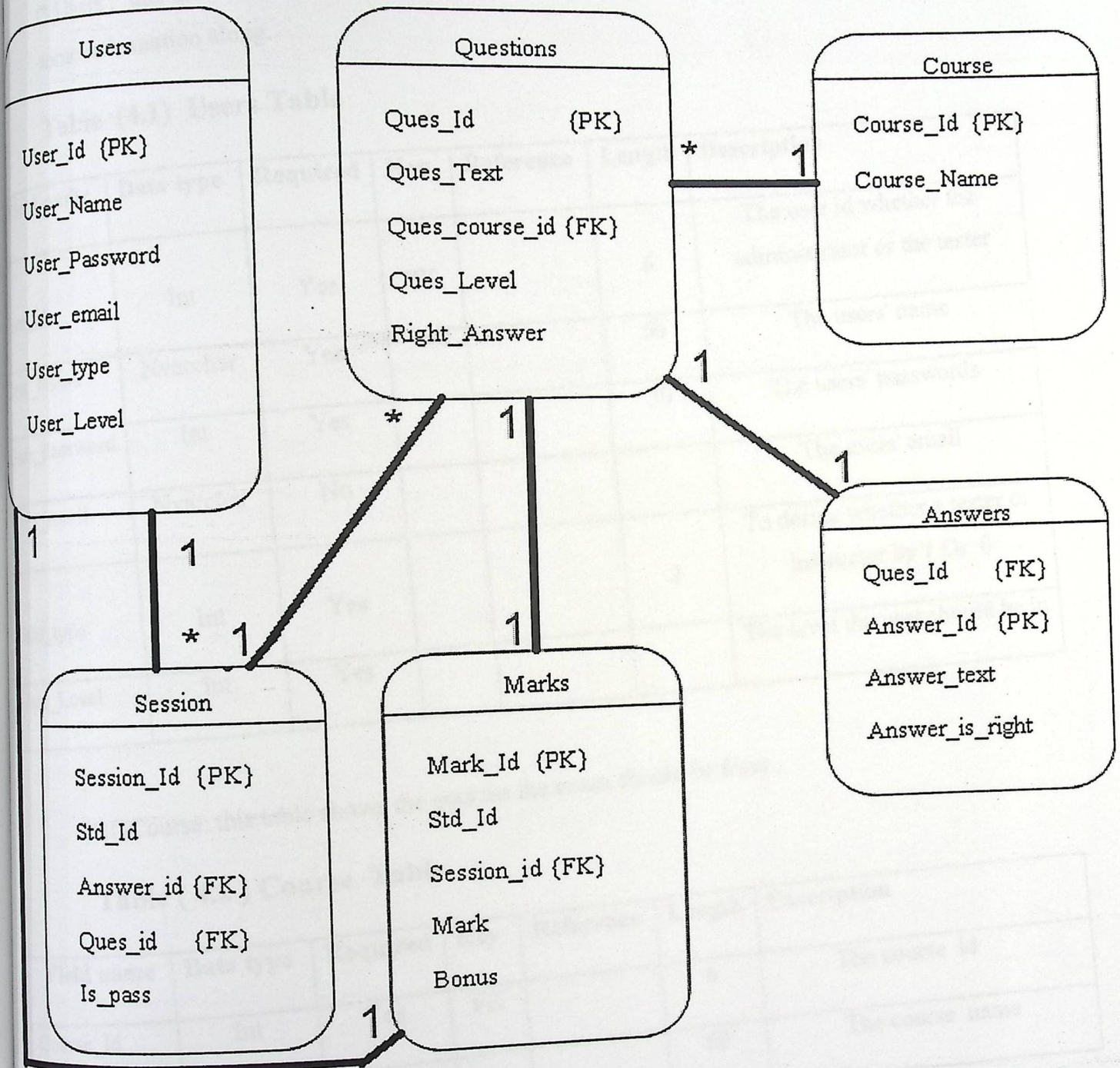
4.3.2 Database dictionary

This is a description of each table and it's fields:

☐ Users : this table shows the users that should be enter to the system, included some information along.

Table (4.1) Users Table

Field name	Data type	Required	Key	Reference	Length	Description
User_Id	Int	Yes	PK		6	The user id whether the administrator or the tester
User_Name	Nvarchar	Yes			50	The users' name
User_Password	Int	Yes			30	The users' passwords
User_email	Nvarchar	No				The users' email
User_type	Int	Yes			2	To define whether a tester or instructor by 1 Or 0
User_Level	Int	Yes				The level the user should be in

☐☐Course: this table shows the courses the exam should be from .

Table (4.2) Course Table

Field name	Data type	Required	Key	Reference	Length	Description
Course_Id	Int	Yes	PK		6	The course id
Course_Name	Nvarchar	Yes			50	The course name

□□Questions : this table shows the questions to be answered within the exam .

Table (4.3) Questions Table

Field name	Data type	Required	Key	Reference	Length	Description
Ques_Id	Int	Yes	PK		6	The Question id
Ques_Text	Nvarchar	Yes			150	The the question text
Ques_course_id	Int	Yes	FK	Course	6	To which course the question belongs to
Ques_Level	int	Yes			2	The question level

□ Session : this table shows the session and the level that the user is giving a test in

Table (4.4) Session Table

Field name	Data type	Required	Key	Reference	Length	Description
Session_Id	Int	Yes	PK		6	The session id ,level of the questions to be taking
Std_Id	Int	Yes			6	Student id
Answer_id	Int	Yes	FK	Answers	30	The answer id
Ques_id	Int	Yes	FK	Questions		The question id
Is_pass	Bool	Yes			2	To define whether a tester is going to next level or not

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☐ Answers : this table shows the answers to the questions with some specifications

Table (4.5) Answers Table

Field name	Data type	Required	Key	Reference	Length	Description
Ques_Id	Int	Yes	FK	Questions	6	The question id which related to this answer
Answer_Id	Int	Yes	PK		6	The answer id
Answer_text	Nvarchar	Yes			100	The answer text
Answer_is_right	Bool	Yes				Check if the student's answers is right or not

☐ Marks : this table shows the marks of the questions and the sessions and define if he user pass the session or not to define his level

Table (4.6) Mark Table

Field name	Data type	Required	Key	Reference	Length	Description
Mark_Id	Int	Yes	PK		6	The mark id
Std_Id	Int	Yes			6	The Student id
Session_id	Int	Yes	FK	Session	6	The session id
Mark	Int	Yes				The resulted mark
Bonus	Int	Yes			2	The obtained bonus if there's so

4.4 User interface design and navigation

This section describes the main user interface screens of the system especially input/output interface.

1. Login screen

Log In

Please enter your username and password.

Account Information

Username: _____

Password: _____

[Log In]

Figure (4.5) Login screen

Table (4.7) Description of Login screen

Serial No	Field	Action	Database Table
1	username	Text field to input username	
2	password	Text field to input password	
3	login	Button. When clicked, the system authenticates the user and redirects him/her to the page based on his privileges.	Users

2. Student Screen

Welcome To Name of the Course Exam

Question NO (Question number)

The question's script ....etc

Elapsed Time for Bonus
00:30 sec

- Option A
- Option B
- Option C
- Option D
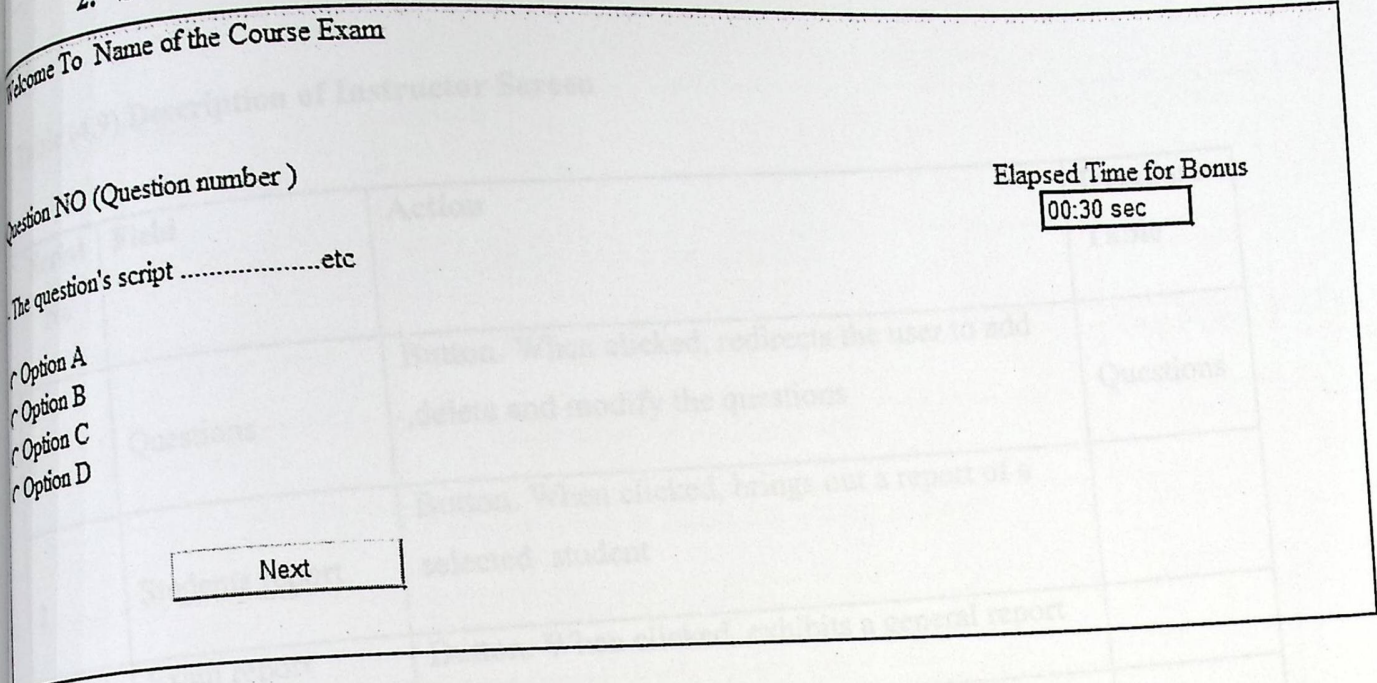
Next

Figure (4.6) Student screen

Table (4.8) Description of Student screen

Serial No	Field	Action	Database Table
1	Options A,B,C,D	To be chosen for the right answer by the student	Answers
2	Next	directs the student to the next to the next question based on his level.	Session
3	Bonus time	Add points to the question mark if it's answered before the elapsed time	

3. Instructor Screen

Welcome

Questions

Students report

Exam report

Log out
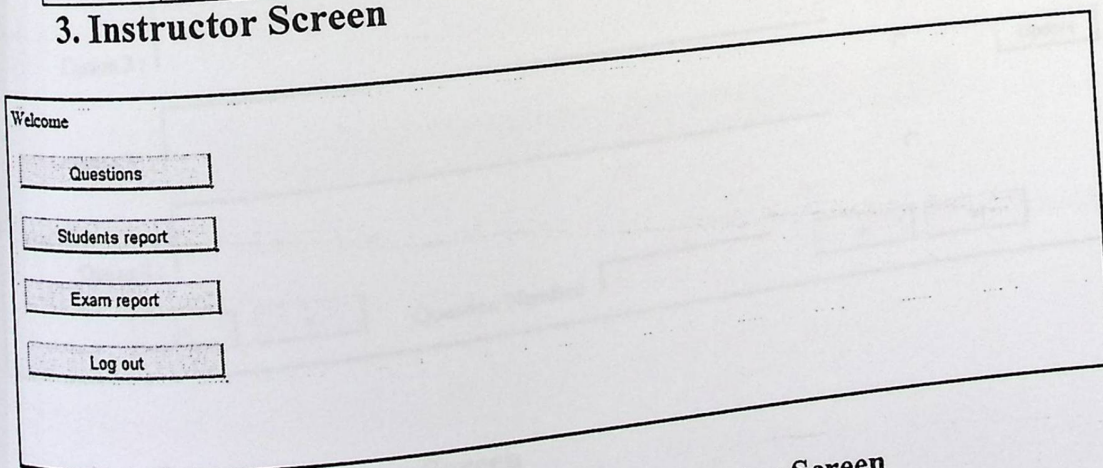
Figure (4.7) Instructor Screen

Table (4.9) Description of Instructor Screen

Serial No	Field	Action	Database Table
1	Questions	Button. When clicked, redirects the user to add ,delete and modify the questions	Questions
2	Students report	Button. When clicked, brings out a report of a selected student	
3	Exam report	Button. When clicked, exhibits a general report	
4	Log out	Logging out the page	

4. Questions Screen

Figure (4.8) Questions Screen

Table (4.10) Description of Questions Screen

Serial No	Field	Action	Database Table
1	Question Text	Text field to input the question	Questions
2	Question Level	Drop down list to select the question level	Questions
3	Option	Text fields to input the Answers	Answers
4	Correct Answer	Radio buttons to select the correct answer	Answers
5	Add	Button. When clicked, add new question	
6	Delete	Button. When clicked, delete the current question	
7	Update	Button. When clicked, update the current question	
8	Question Number	Text field to input the number of wanted question	

5. Student Report Screen

Figure (4.9) . Student Report Screen

Table (4.11) Description of. Student Report Screen

Serial No	Field	Action	Database Table
1	Student Report	Data grid that display the student report	
2	Student Number	Text field to input the student number	Users
3	Display report	Button. When clicked, generate a report related to a meant student	

6. Exam Report Screen
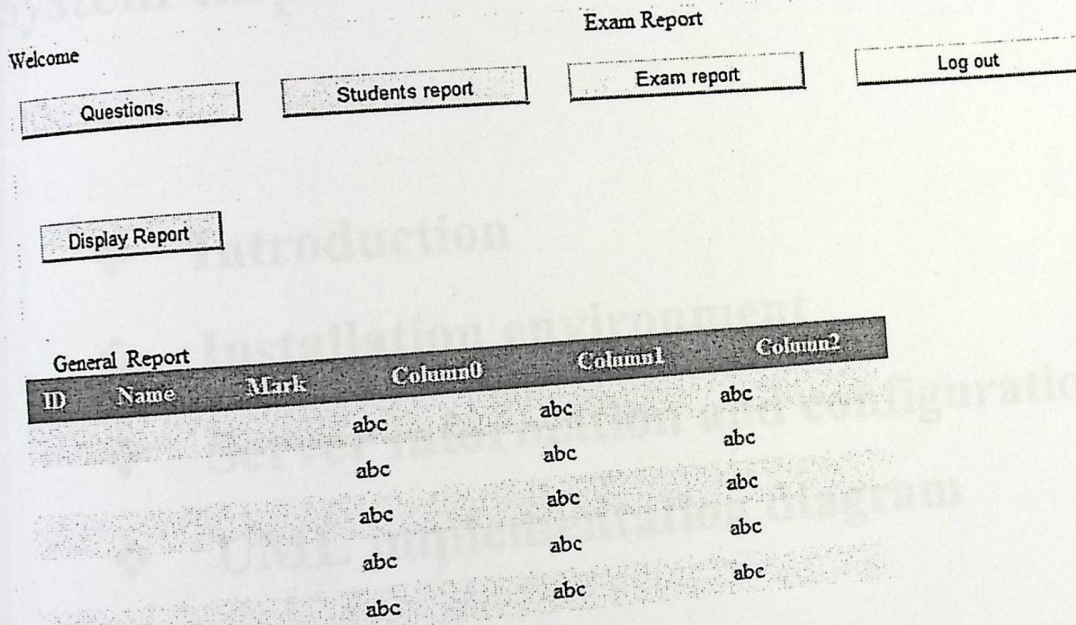
Figure (4.10) Exam Report Screen

Table (4.12) Description of Exam Report Screen

Serial No	Field	Action	Database Table
1	General Report	Data grid that display a general report	
2	Display report	Button. When clicked, generate a general report for the whole the students	

Chapter Five

System implementation and installation

- ❖ Introduction
- ❖ Installation environment
- ❖ Server information and configuration
- ❖ UML implementation diagram

5.1 Introduction

This chapter introduces the implementation phase of the system which includes installation environment, server information and configuration, and UML implementation diagram.

5.2 Installation

A set of hardware and software requirements are must be equipped to set up and implement the system. The following is a description of those requirements.

5.2.1 Hardware requirements

The project team uses a server to implement and run the system to integrate it with PPU website. The following is a brief description of the server used in the system.

1. Server

Specifications:

- Processor: 2x Quad Core Intel Xeon E5504 (2.00GHz, 1333FSB)
- Memory: 8GB PC2-5300DDR2Khkljl
- Hard Drive: 4x 1466B SAS 15K with integrated RAID5
- Optical Drive: 16x DVD+/- RW SATA
- Networking: Dual Gigabit Ethernet NIC
- Power: Dual power supply.

5.2.2 Software requirements

The project team uses PHP technology to get connected with the system database and get data back along performing the basic system operations. We use Adobe Dreamweaver CS5 to build the web application, design the system interfaces, display the information through, and send and retrieve data from Mysql database through using PHP files. The following is a brief hence about the intended softwares.

1. Adobe Dreamweaver CS5

It's an open source framework developed on Adobe technology for building interactive web applications that deploy consistently on all major desktops, browsers, and operating systems. It uses Sun's Java Environment for developing Rich Internet Applications (RIA's). It provides many useful ways to send and retrieve data to and from server-side components. (Adobe Creative Suite family) (Adobe Dreamweaver CS5.5)

The Dreamweaver includes a rich component library with more than a hundred extensible user interface components including list boxes, buttons, data grids, several text controls, layout containers, application states, and form validation for creating rich Internet applications, it is compiled into a file having SWF format called ShockWave Flash files, the applications can be written using Adobe Dreamweaver builder or by using the available compilers from Adobe. Dreamweaver CS5 includes the complete framework, including compilers, debuggers and a component library. (USING LIBRARIES IN DREAMWEAVER) Adobe Dreamweaver is embedded with two languages: Action Script and MXML. The following is a brief description of these languages.

• MXML

It's an XML-based user interface markup language and its component is used by Adobe Flex application that offer way to build and layout the interface of applications and can also be used to implement internet application behaviors and business logic. It can include chunks of Action Script code, either when data binding where the curly braces ({}) syntax is used, or with creating the body of an event handler function. MXML may be used in combination with action script to develop Rich Internet Application (RIA's) in Adobe Flex. (Adobe Help Resource Center) , (USING LIBRARIES IN DREAMWEAVER)

• Action script

It's a scripting language based on ECMAScript that is used for the development of websites and software and it is also used in some database applications. Action Script is the programming language that can be used along with MXML to create sophisticated Adobe Dreamweaver applications. It supports a wide range of features including interfaces, packages, runtime exception handling, runtime data types, and regular expressions. (Adobe Help Resource Center)

Action Script is a standard-based, object-oriented language; therefore it can be viewed as a collection of APIs generally in the form of classes. Its coding is done inside the tag <mx: Script> and the execution of file is (.as).
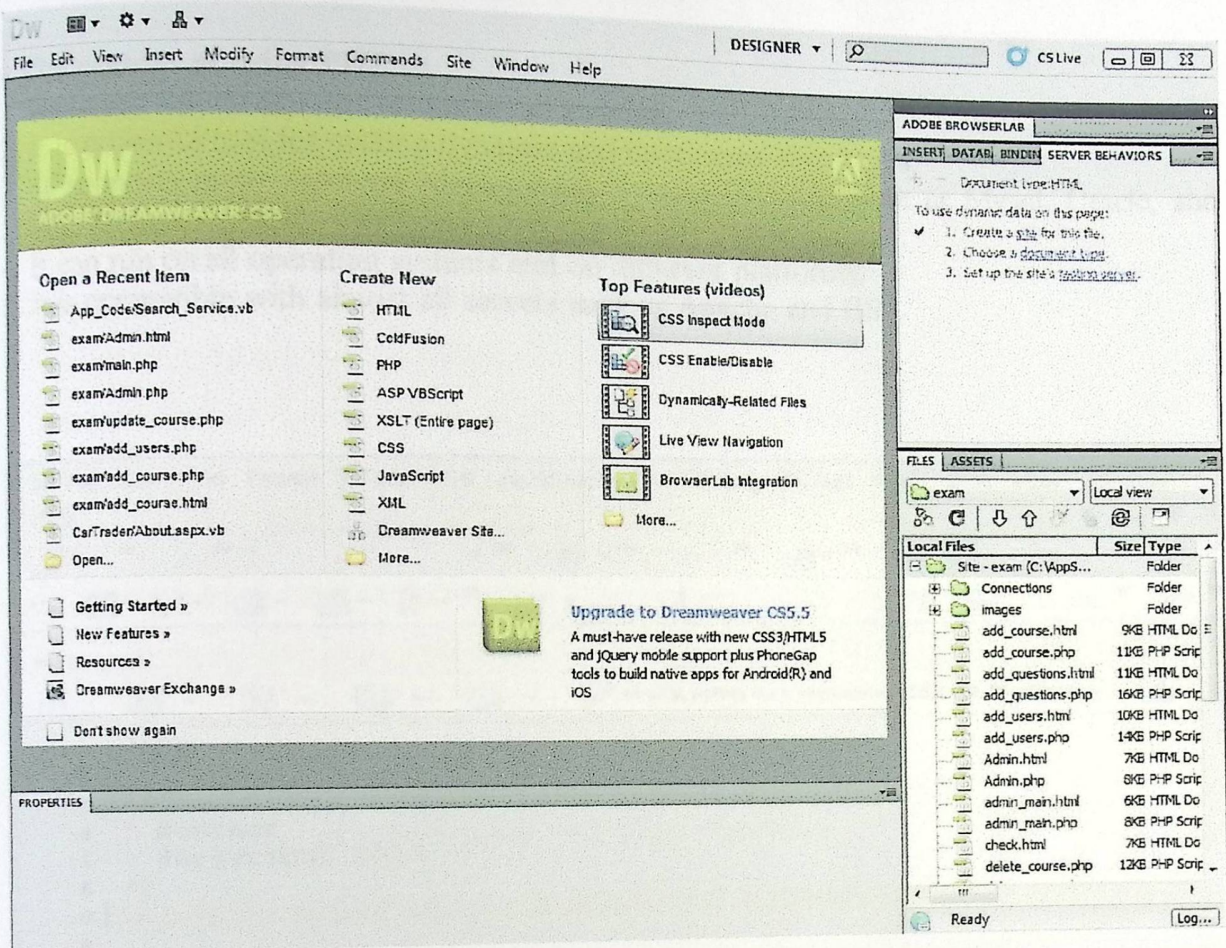

Figure (5.1): Adobe Dreamweaver default page.

2. PHP

PHP, which stands for Hypertext Preprocessor is a general-purpose server-side scripting language and is free software for creating dynamic Web pages, it can be used on all major operating systems, including Linux, Microsoft Windows, many Unix variants ,and others. (Zak Greant)(PHP Functions Essential Reference), (What is PHP?)

When a visitor opens the page, the server processes the PHP commands and then sends the results to the browser. With PHP, we can do things like login pages, create forums, and check details from a form, picture galleries, and surveys. PHP supports Apache and Mysql and has many open source libraries. (What is PHP?

● **The reasons of using PHP:**[6]
1. It is open source and free to download and use.
2. It is powerful tool for making dynamic and interactive WebPages.
3. It supports many database Management System (DBMS) such as Mysql, Oracle, and Solid.
4. It can run on all operating systems and on different platforms.
5. It is compatible with almost all servers such as Apache and IIS.

Figure (5.2): PHP designer default page

3. MySQL

It's a relational database management system (RDBMS) based on Structured Query Language (SQL).It's the one of the most popular open source SQL DBMS and it's developed, distributed and supported by Sun Microsystems. It runs as a server providing multi-user access to a number of databases. (P. Eng and Rob McCormack)(MySQL)

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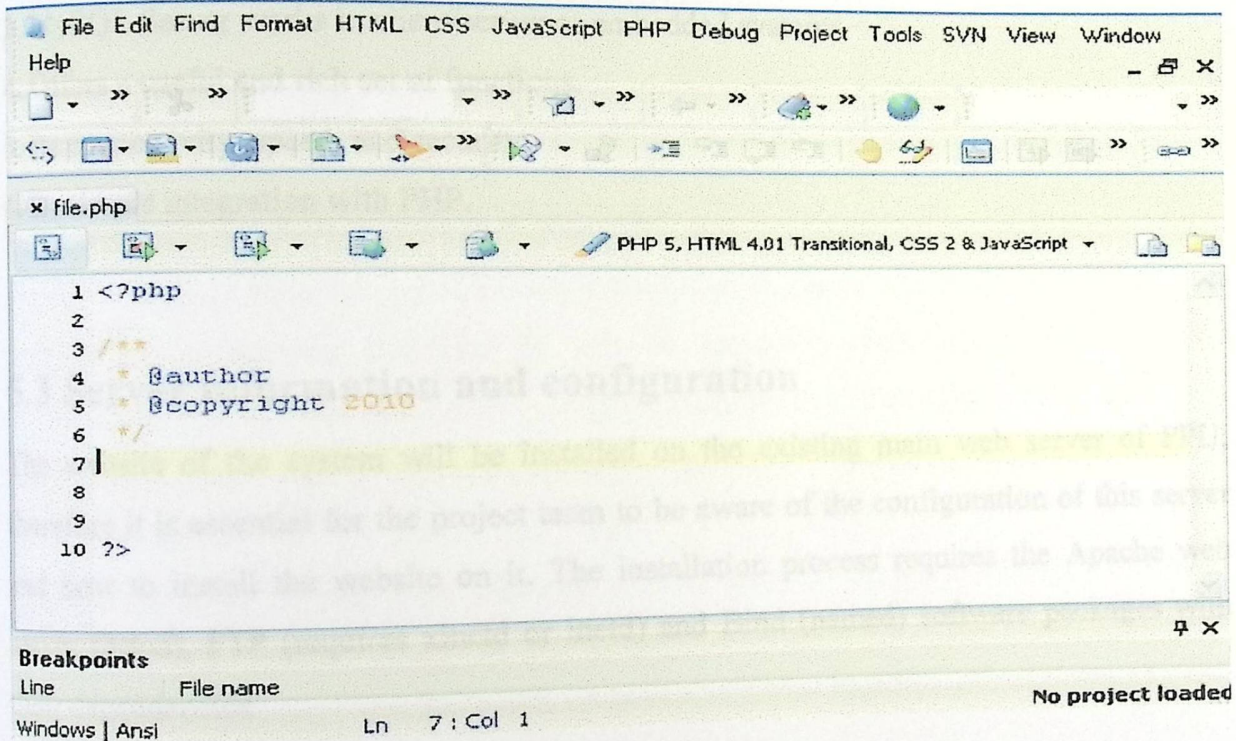5. It is compatible with almost all servers such as Apache and IIS.

File Edit Find Format HTML CSS JavaScript PHP Debug Project Tools SVN View Window Help

× file.php

PHP 5, HTML 4.01 Transitional, CSS 2 & JavaScript

```
1 <?php
2
3 /**
4  * @author
5  * @copyright 2010
6  */
7 |
8
9
10 ?>
```

Breakpoints
Line   File name   No project loaded

Windows | Ansi   Ln   7 : Col 1
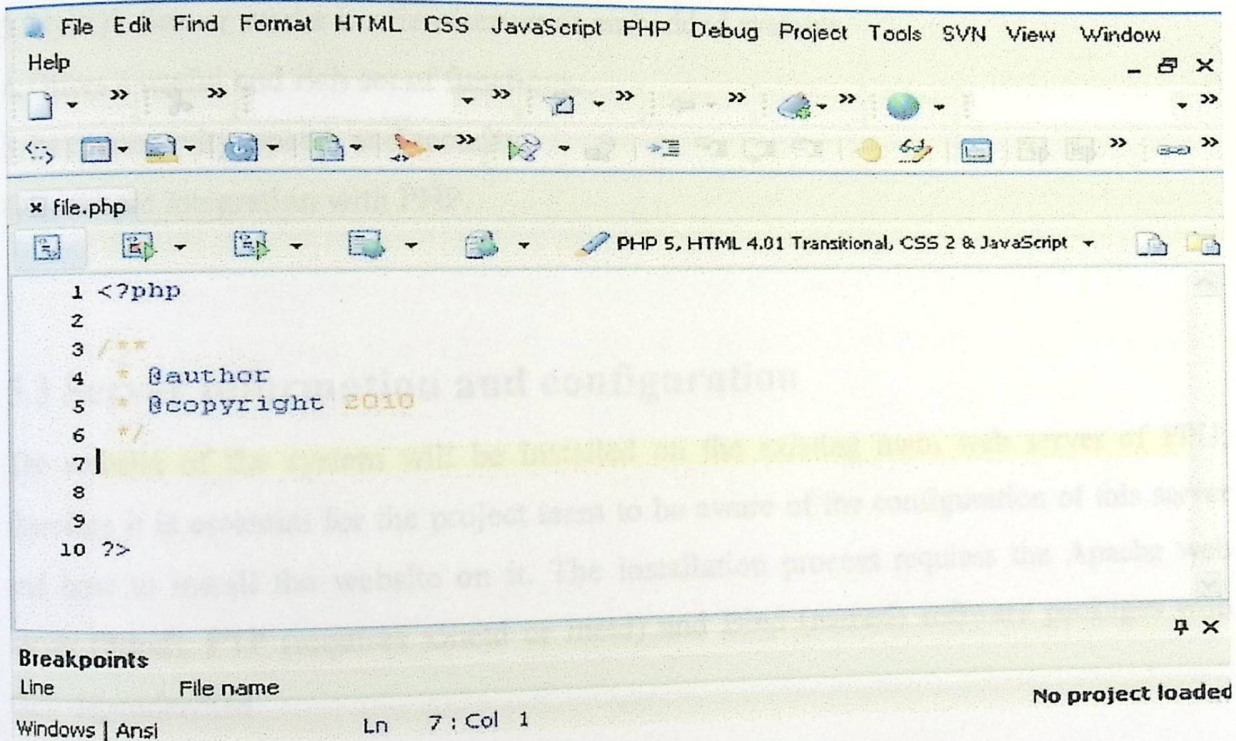
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MySQL is used in a wide range of applications, including e-commerce, data warehousing, Web databases, logging applications and distributed applications. Some of the most popular open source PHP web applications, such as Wordpress and Joomla, use MySQL to store their data, and several high traffic website such as Google and face book use Mysql for data storage and logging of user data. (P. Eng and Rob McCormack)(MySQL), (MySQL), MySQL runs on many different platforms, including Linux, UNIX, and Windows, and many programming languages contain libraries for access MySQL including C, C++, Java, Perl, and PHP. (P. Eng and Rob McCormack)(MySQL),

- **The reasons of using MySQL Database Server:**6

1. It is free and open source software.

2. The MySQL Database Server is reliable, very fast, and easy to use.

3. MySQL Server works in client/server or embedded systems.

4. Offers a useful and rich set of functions.

5. Its connectivity, speed, and security.

6. Its simple integration with PHP.

5.3 Server information and configuration

The website of the system will be installed on the existing main web server of PPU; therefore it is essential for the project team to be aware of the configuration of this server and how to install the website on it. The installation process requires the Apache web server (httpd), FTP (requires xinetd or inetd) and Bind (named) software packages with their dependencies.

The main steps to install and create a virtual host for the website on the server are:
1. The Apache configuration file is: /etc/httpd/conf/httpd.conf.
2. Apache may be configured to run as a host for one web site or it may be configured to serve multiple domains. Serving multiple domains may be achieved in two ways:

- Virtual hosts: One IP address but multiple domains - "Name based" virtual hosting.
- Multiple IP based virtual hosts: One IP address for each domain - "IP based" virtual hosting.

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The existing PPU server uses "name based" virtual host with the following settings

<VirtualHost>

DocumentRoot /var/www/staff.ppu.edu/aoe

ServerName: staff.ppu.edu/aoe

</VirtualHost>

3. Copy the website files on the server and activate it for the first time using following command:

Service httpd start.

4. Give the website domain name by using foreword zone:

vi /var/named/chroot/var/named/exam.ppu.edu.zone.

5. Activate the new settings by reloading the service using the following command.

Service httpd reload.

5.4 UML implementation diagram

Deployment diagram is the one of the implementation diagrams which shows the execution architecture of systems and how it will be physically deployed in the hardware environment. It shows the system hardware, the software that is installed on that hardware, and the middleware used to connect the disparate execution environments together. (Donald Bell)(UML basics)

Deployment diagram has four elements which are: nodes that represent hardware, components that represent software, dependencies which show that one component relies upon another component and links that connect two nodes together. (Mark Goetsch)(UML for the Software Developer)

The deployment diagram shown in Figure 5.3 clarifies the three implementation tires of the system which are users, system, and database.
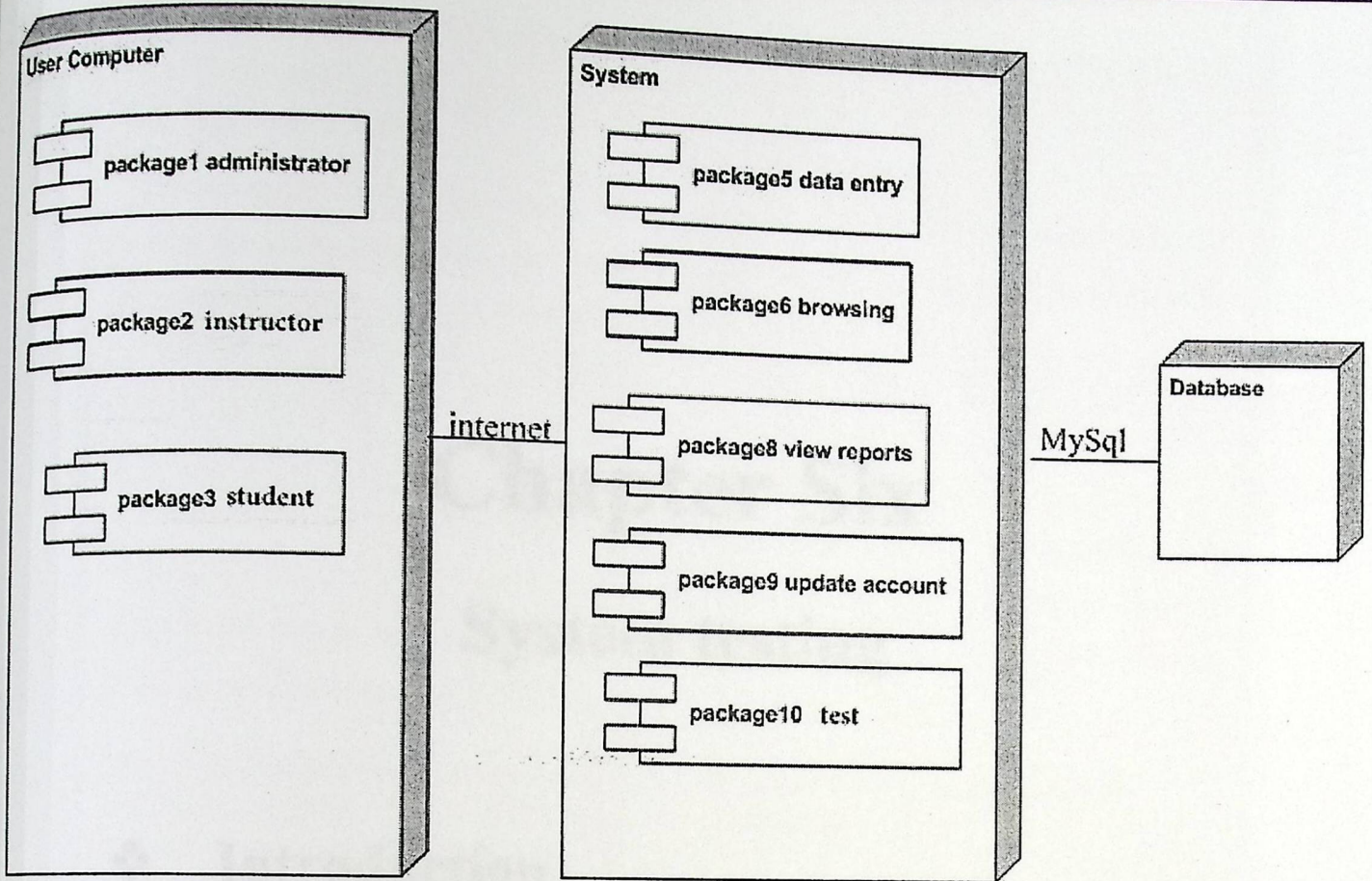
Figure (5.3) UML implementation diagram.

Chapter Six
System testing

- ❖ **Introduction**
- ❖ **Unit and form testing**
- ❖ **Integration testing**
- ❖ **System testing**
- ❖ **Acceptance testing**

6.1 Introduction

After designing and programming the system, it will be tested to make sure the system meets its functional and technical requirements and working as properly as planned, and can be implemented with the same characteristics.

6.2 Unit and form testing

This process is carried out by the developer where each module of the system is tested separately in order to discover any errors in the form's code, to be positive that the specific function of units is working as planned, and to ensure that they are operating correctly and meet the specifications.

The project team starts with testing each unit of the system separately as follow:
• Test the operation of each button in all system interfaces.
• Test the operation of each application links.

As an example, figure (6.1) shows a testing of a successful login, and figure (6.2) shows a testing of unsuccessful login (by entering incorrect username and/or password).
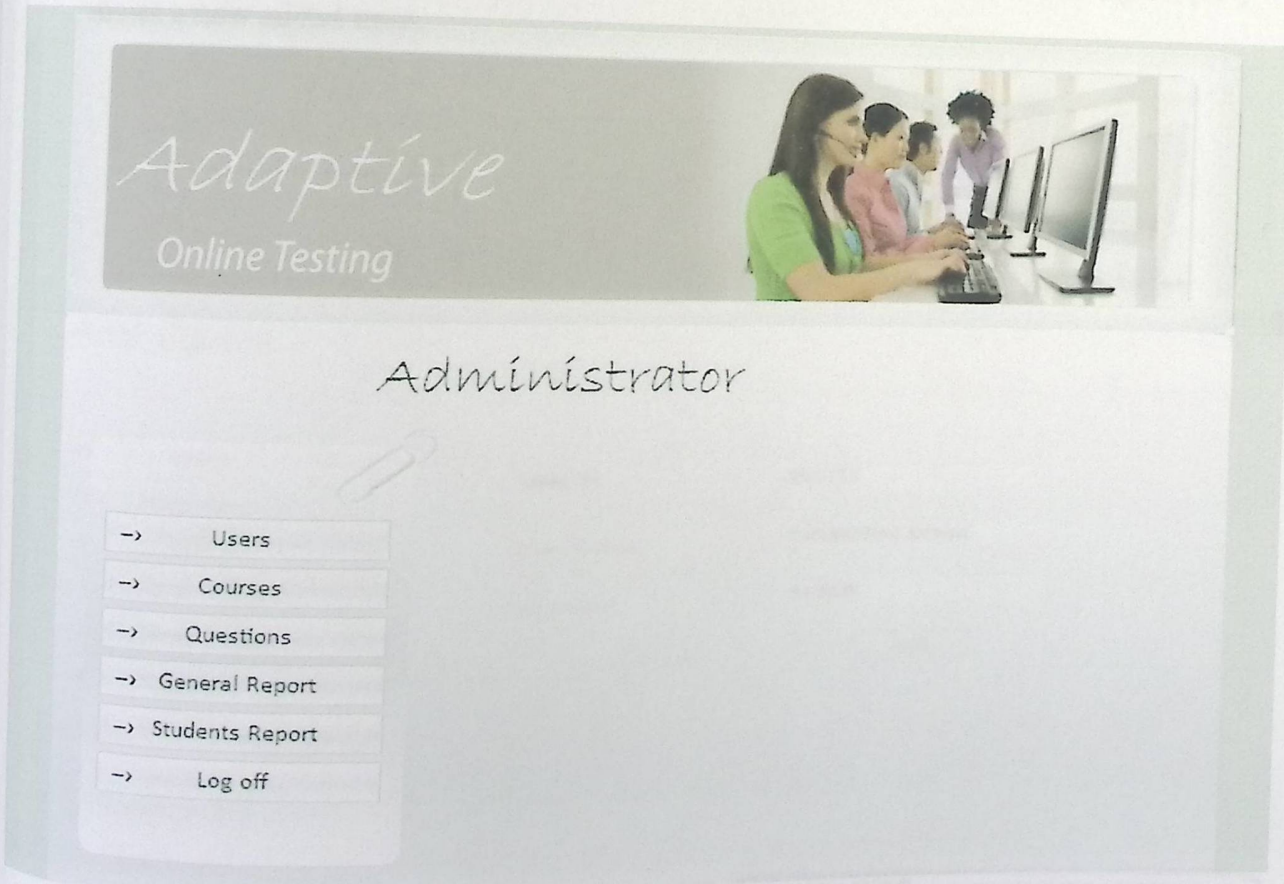

Figure (6.1) Administrator screen after login correctly

Adaptive Online Testing

Admin Login

Adminname

Password

login

Invalid Password or Username

Figure (6.2) Incorrect login screen

6.3 Integrating testing

In this testing stage the individual modules are combined and tested as a group, to ensure that the interactions of components produce satisfy results. (Anand Ramdeo) (Integration Testing).

As an example, figure (6.3) shows a testing of adding new user, and figure (6.4) shows a new added user.

Adaptive Online Testing

Add Users

→ Users
→ Courses
→ Questions
→ General Report
→ Students Report
→ Log off

Update Users

Add Users

User ID   091111

User Name   mohammad adnan

                     student
Password

                     Add

Figure (6.3) Test adding a new user

Add users

id	name	password
1	khalil11	0
81411	khalil5555	0
0	khalil	0
98811	ahmad ewedat	0
80000	student 1	0
91111	mohammad adnan	0

→ Users
→ Courses
→ Questions
→ General Report
→ Students Report
→ Log off

Figure (6.4) Showing the new added user

Table (6.1) Integrating testing

State	Input	Expected result	Actual result
Adding a new user to database	User: mohammad adnan	Correct data	Adding the user and store it in the database
Adding user in the user page	User: mohammad adnan	Correct data	Showing the new add user in the user account page

6.4 System testing

In this stage the system tested as one independent unit to ensure that the system works module by module and also as a whole, it also ensure that each function of the system works as expected and without errors. (System Testing),

The team project tests the system as one independent unit and ensures that it achieves all functional requirements without any errors.

6.5 Acceptance testing

This process is carried out by actual users who test the system in the real environment where it will eventually be used, and test whether the system meets their requirements; after that they accept it once they are satisfied with it.

The following is a brief description of the two types of acceptance testing:

• Alpha testing

This test is performed by the project team members and some specialists' experts at a test environment or a development center for testing the completed information system using simulated data. Any type of discovered errors and abnormal behavior of the system is noted and corrected by the developers in order to ensure that the system works properly. Alpha testing is often employed for off-the-shelf software. (ALPHA TESTING)

In this stage the project team tests and verifies the alpha version of the system to ensure that the system meets the functional requirements which are mentioned in chapter two such as: allowing the power user to enter data, querying on the specification of equipments, and to ensure that the system meet the non-functional requirements such as: usability, integrity, and modularity.

• Beta testing

This test is performed by some common users with different knowledge and skills at the real user environment for testing a completed information system using real data. Whereas the users explore the software if they find any defect or faults they report them to the developers. This software version is known as beta version. Beta testing comes after alpha testing. (BETA TESTING)

In this stage the system is to be tested in the computer center of the university, computer center staff will be asked to test the Beta version of project with real data at the computer center of PPU to ensure that the system meets the functional requirements and working as properly as planned without errors or faults.

Chapter Seven

System maintenance

- ❖ **Introduction**
- ❖ **System deployment and backups**
- ❖ **System upgrading**
- ❖ **System maintenance**
- ❖ **Apache server maintenance**
- ❖ **MySQL maintenance**

7.1 Introduction

The maintenance phase is the last step of the system development life cycle. In this phase the project team maintains the system to describe any kind of repairs being performed on the system, and makes changes to a system to fix or enhance its functionality.

Running the system in the real environment may face some errors and bugs, which break the system down which should be avoided and prevented it.
In this chapter we will describe the system backup and how it is performed, system upgrading, system maintenance, Apache server maintenance, and finally Mysql maintenance.

7.2 MySQL database backup

It is very important to make backups of the data to keep it from lose. Mysqldump command is used to backup MySQL database, this command connects to the MySQL server and creates an SQL dump file. (How to Back Up and Restore a MySQL Database).
The following command shows syntax of backing up the database:

```
$ mysqldump --opt -u [uname] -p[pass] [dbname] > [backupfile.sql]
```

Later, the following command can be used to restore the backup files:

```
$ mysql -u [uname] -p[pass] [db_to_restore] < [backupfile.sql]
```

7.3 System upgrading

New requirements will appear during the use of the system so upgrading is required. In this stage we will notify the new requirements and work to achieve them.

7.4 System maintenance

In the system maintenance we describe various forms of computer or server maintenance, which concerns with a modification of a system to make it compatible with the new environment or changed requirements, to correct bugs and error, to keep a computer system running properly, and to improve its performance ,(Systems Maintenance).

The outcomes and deliverables from this process are the development of a new version of the software and new versions of all design documents created or modified during the maintenance phase.

7.5 Apache server maintenance

The Apache server of PPU University was used for publishing the website of the system, and publishing the system depends on the accuracy and security provided by the server; therefore it is essential for the project team to maintain the server to keep its running properly and smoothly.

7.6 MySQL maintenance

The database which was built by Mysql database management system is essential and important part in the system because it consists of all tables with which the system can operate and run its function; therefore the project team maintains the database to ensure that it works properly without errors and have a security to provide authorization and authentication to each user to access the database based on his /her privileges.

Chapter Eight

Conclusions and recommendations

- ❖ Conclusions
- ❖ What has been achieved from project goal?
- ❖ Recommendations and further work

8.1 Conclusions

Today the use of information technology is growing rapidly in many aspects of life. In order to accommodate these technological developments ,and in order to overcome the problems of the traditional paper-based method of giving exams we have developed a computerized system that helps users to both create and undertake the exams in a more efficient and effective way using a web adaptive application.

8.2 What has been achieved from project goals?

1. we have created a computerized web application that simulates the adaptive environment of the adaptive exam according to its logical flow

2. the system allows the examinee to face challenging question every time that is suitable for his/her level of knowledge

3. the system allows the instructor to view reports easily with some statistical indications such as number of student passed, or number of students failed.

4. immediate feedback of the exam is available and stored to be retrieved whenever it is needed

8.3 Recommendations and further work

In future we recommend that the work of the adaptive exam would start from the item response theory which provides a more accurate estimation of the ability of the examinee after taking every single question, and it has a more powerful mathematical equation in every step in the flow of the adaptive exam .

Appendix "A"

Technical manual

This appendix clarifies the creation of a new project/file for the following programs which are using in the project.
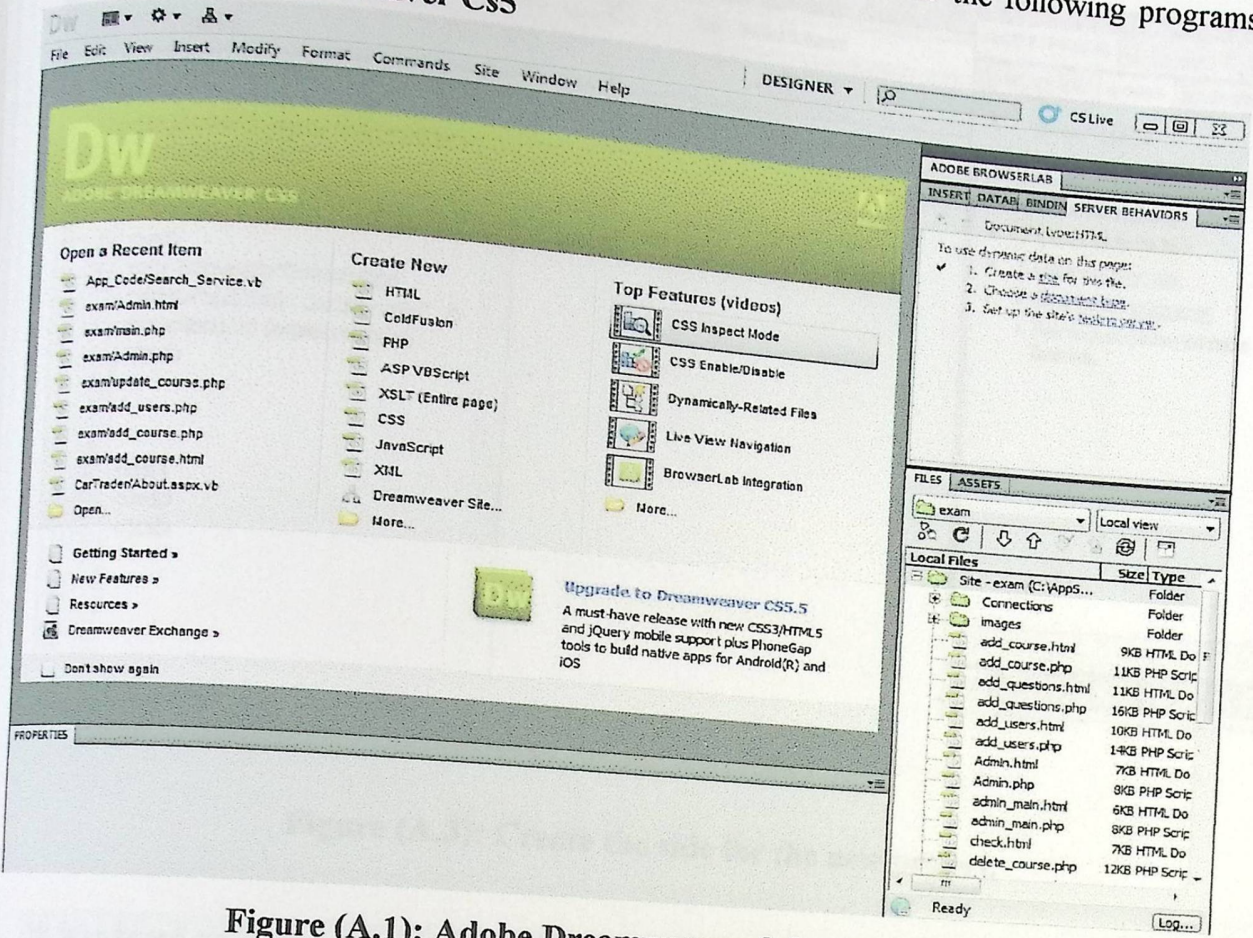
1. Adobe Dreamweaver Cs5

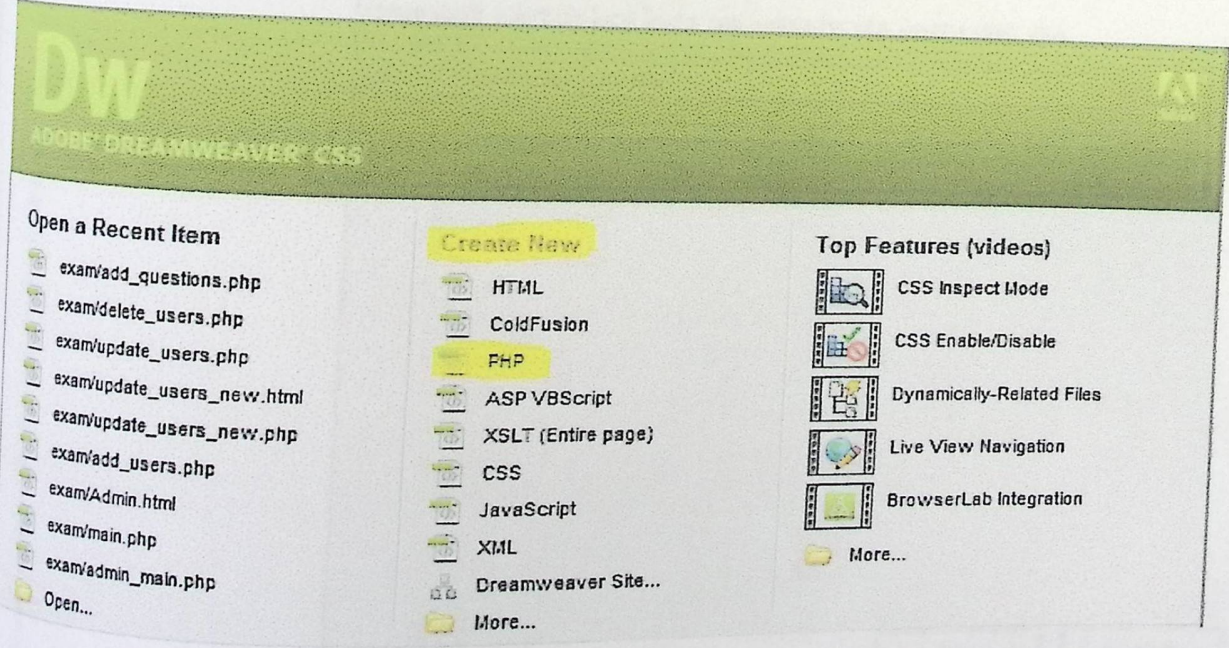**Figure (A.1): Adobe Dreamweaver default page**

• Creating new project

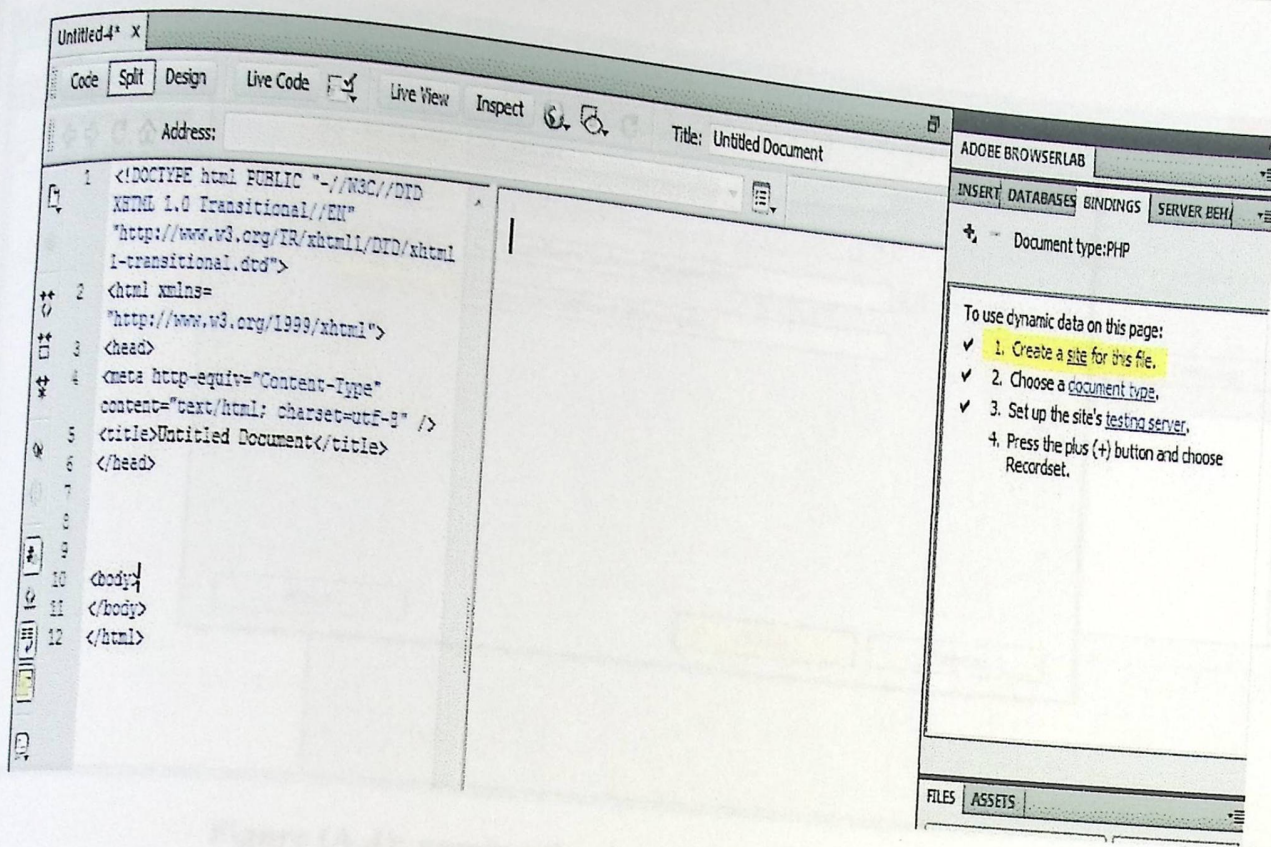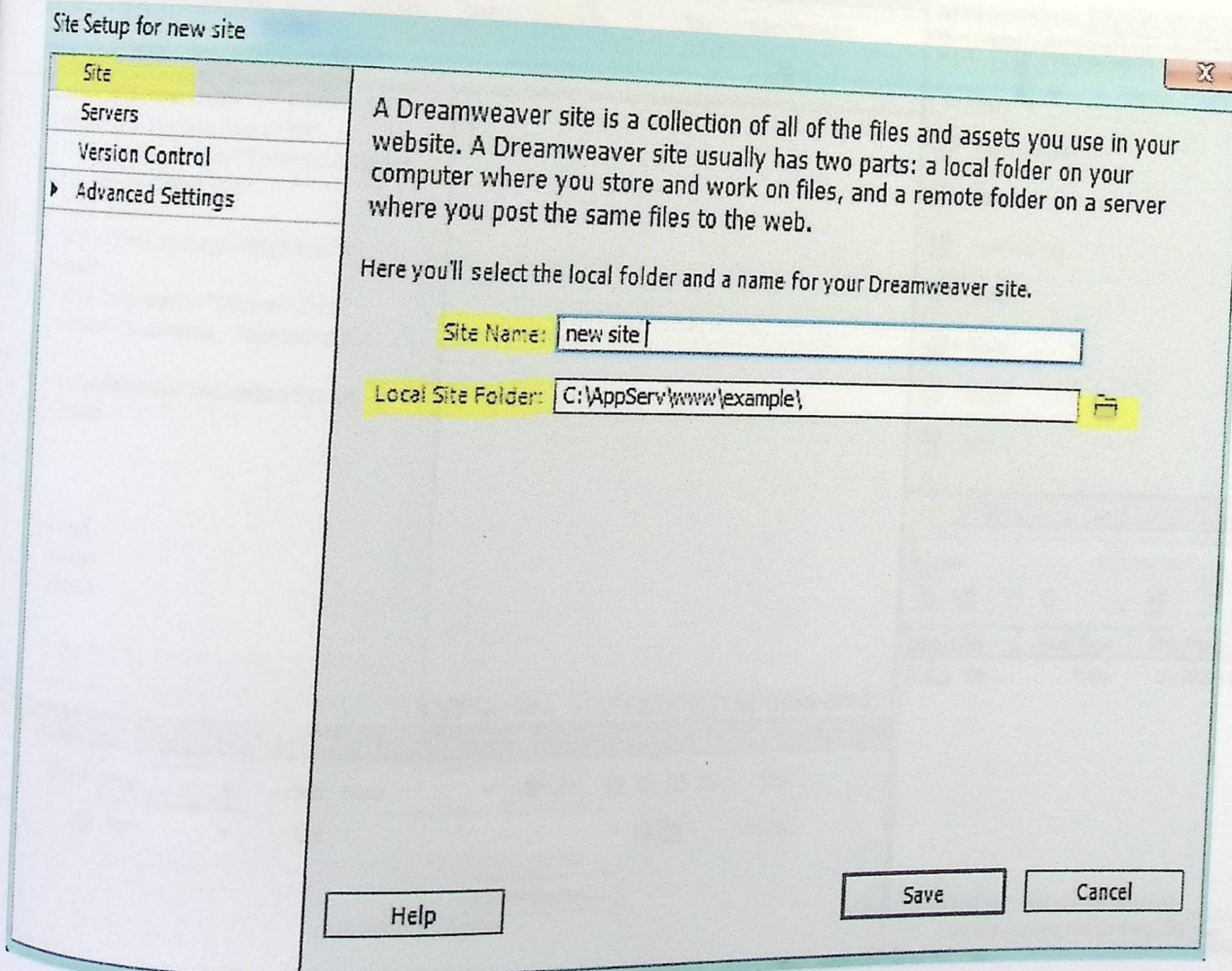**Figure (A.2): creating new PHP project.**

Figure (A.3): Create the side for the new project.
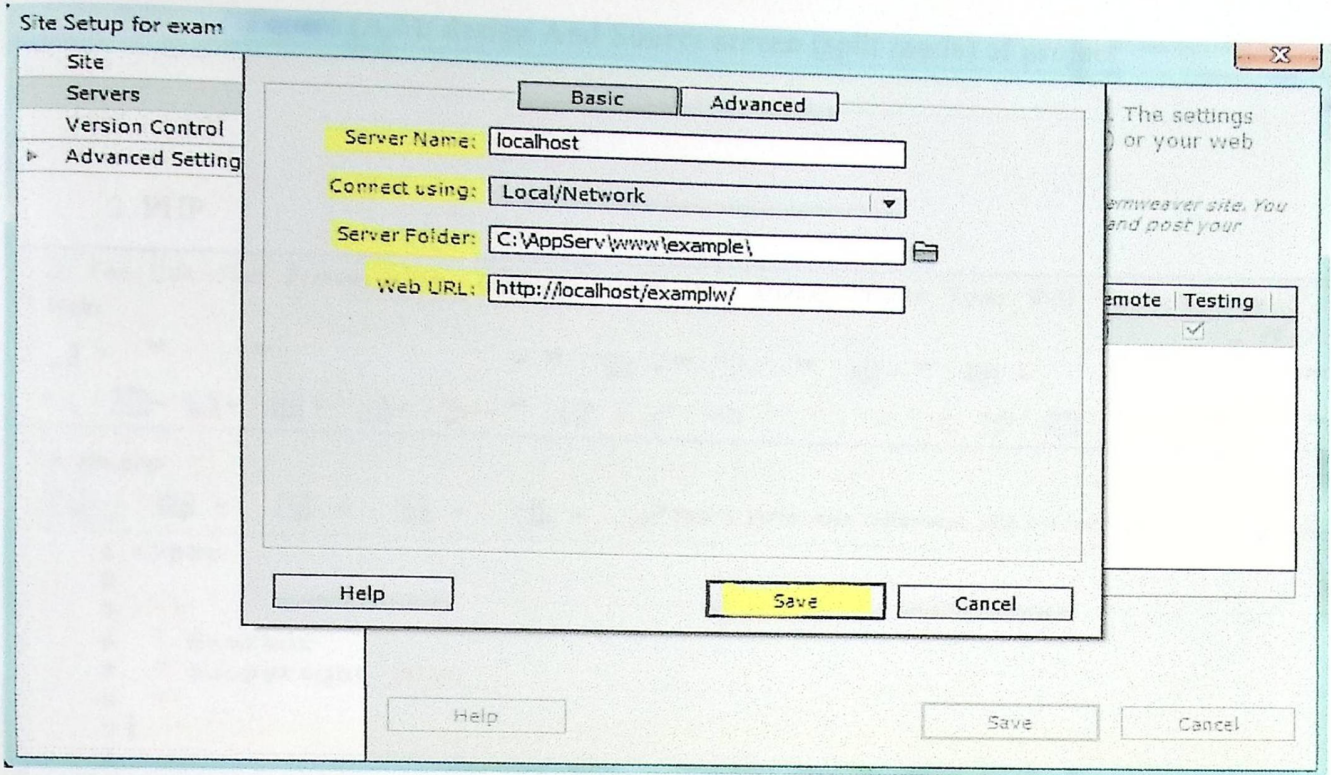
Figure (A.4): naming the site and locate folder of project
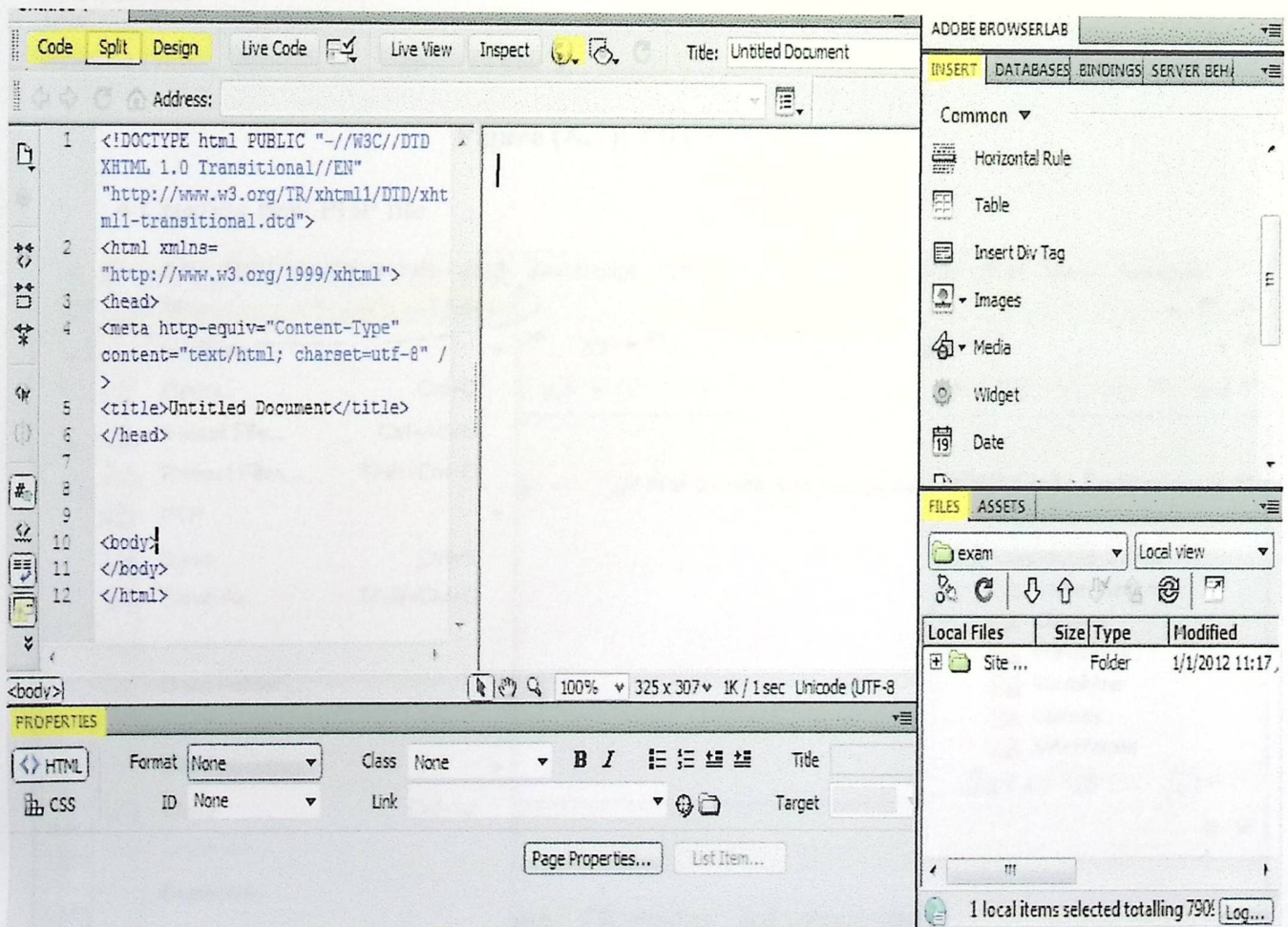
Figure (A.5): Add the Server

2. PHP

File   Edit   Find   Format   HTML   CSS   JavaScript   PHP   Debug   Project   Tools   SVN   View   Window
Help

× file.php

PHP 5, HTML 4.01 Transitional, CSS 2 & JavaScript

```
1  <?php
2
3  /**
4   * @author
5   * @copyright 2010
6   */
7  |
8
9
10 ?>
```

Breakpoints
Line   File name

Windows | Ansi   Ln   7 : Col 1   No project loaded
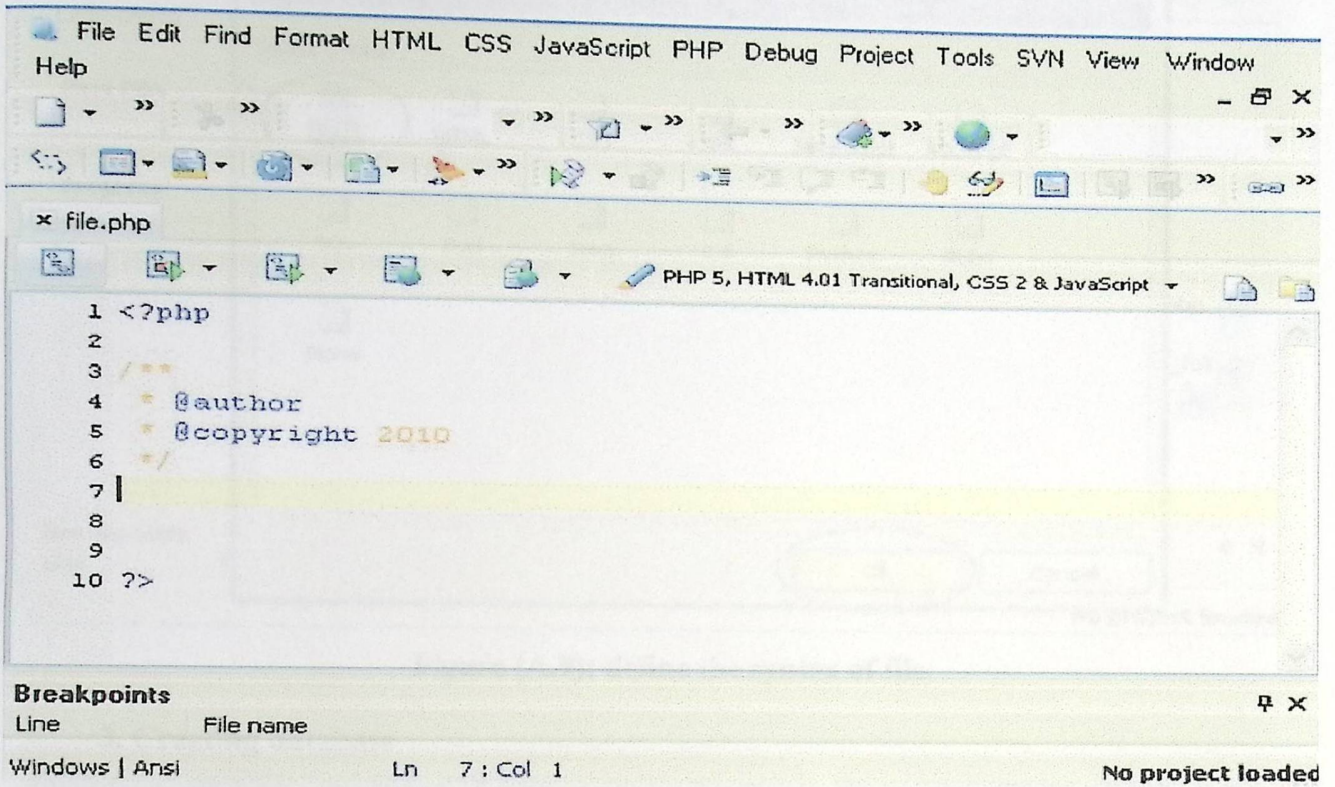
Figure (A.7): PHP default page.

• Creating new PHP file

File   Edit   Find   Format   HTML   CSS   JavaScript   PHP   Debug   Project   Tools   SVN   View   Window
Help

New	Ctrl+N
Reopen...	▶
Open...	Ctrl+O
Select File...	Ctrl+Alt+O
Project Files...	Shift+Ctrl+O
FTP	▶
Save	Ctrl+S
Save As...	Shift+Ctrl+S
Save All	F12
Data Folder...	
File Format	▶
File Encoding	▶
Close	Ctrl+W
Close All	
Duplicate...	
Revert...	
Rename...	

PHP 5, HTML 4.01 Transitional, ·   **PHP Code Explorer**   � ×

connection1.php
    Dependencies
    Classes
    Functions
    Variables
    Consts
    Interfaces
P..   P..   F..

Brea
Line

uate   Watches   Context variables

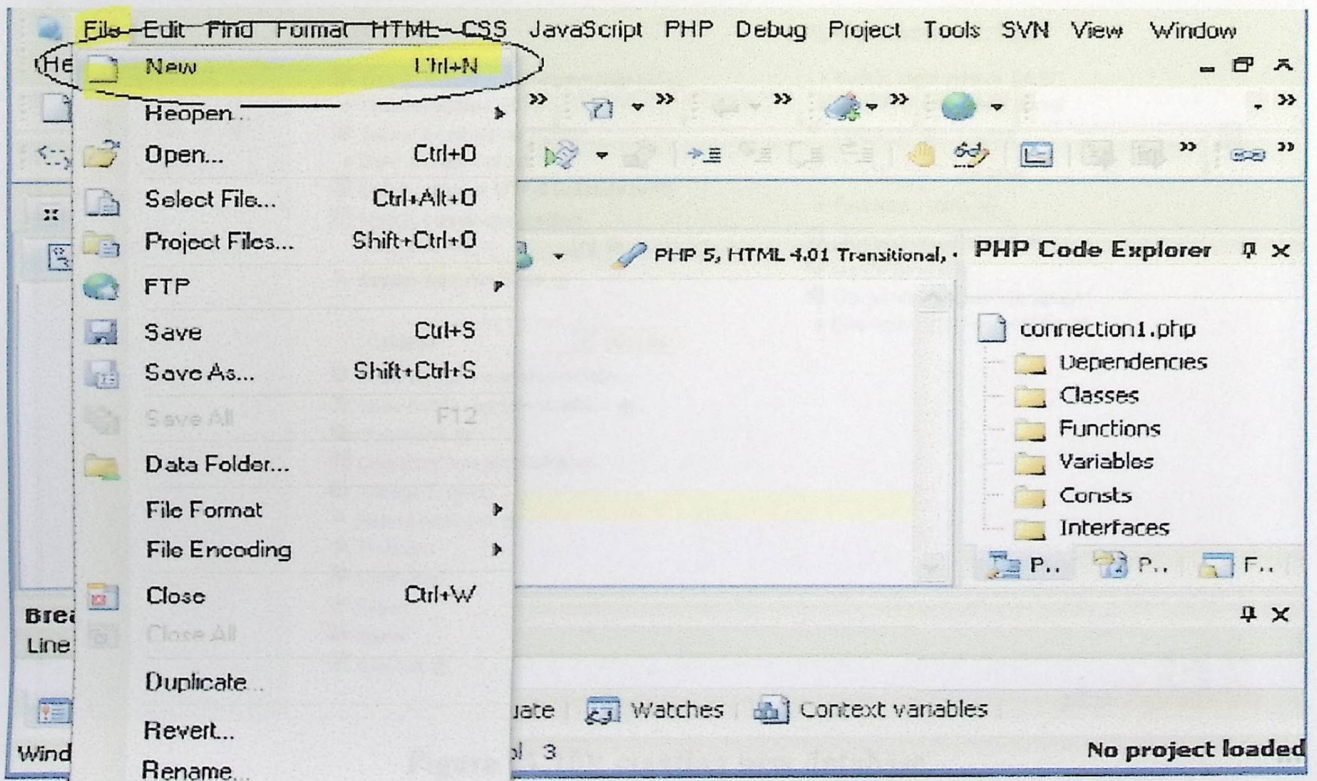Wind   ol 3   No project loaded

58

Figure (A.8): creating new PHP file
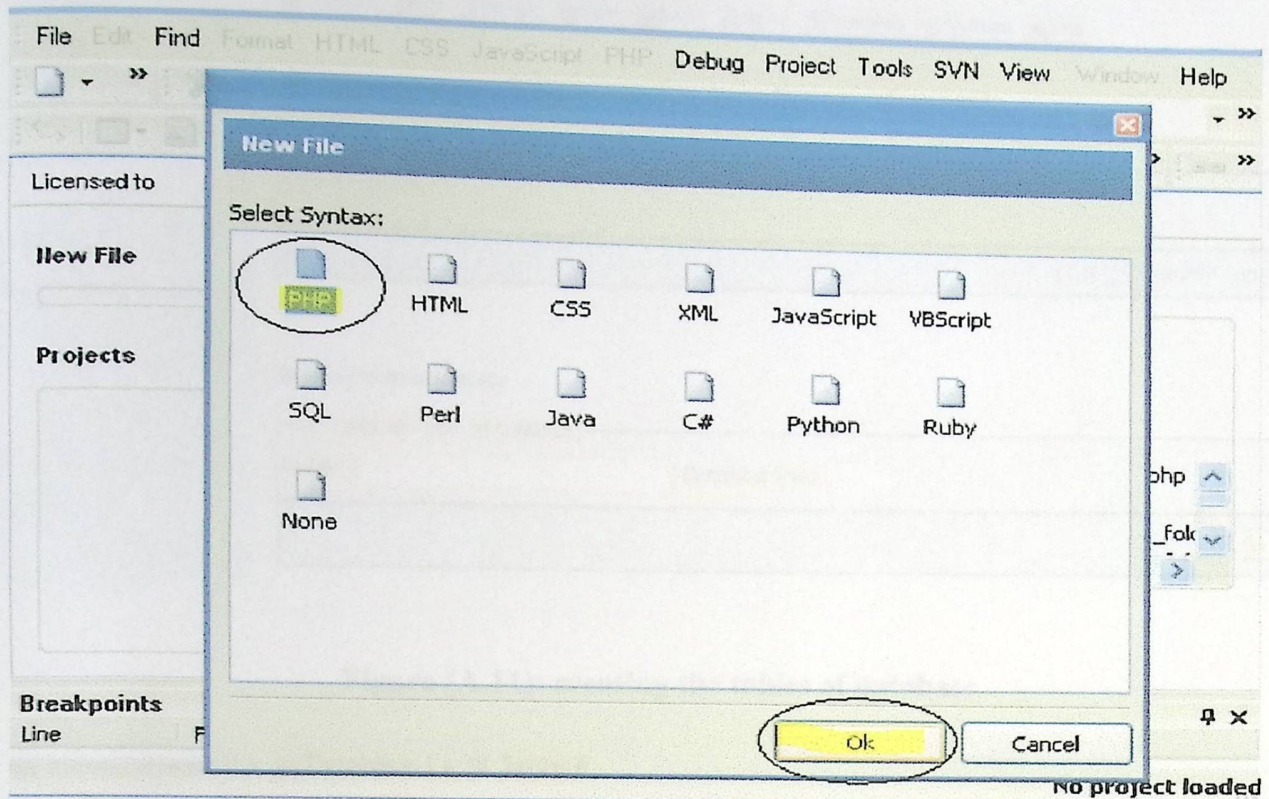
Figure (A.9): define the syntax of file.

3. Creating database
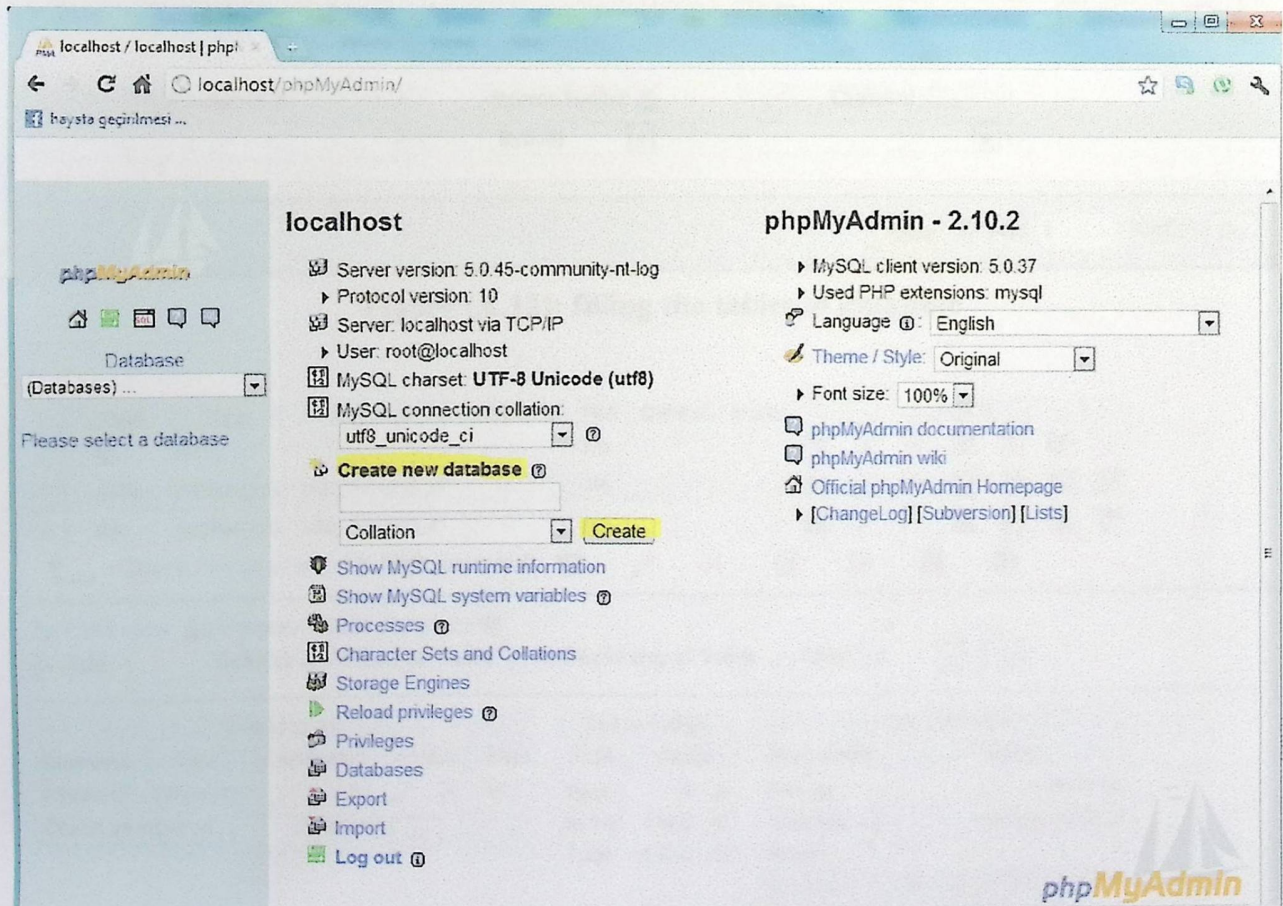
Figure (A.10): creating new database.

Structure | SQL | Search | Query | Export | Import | Operations | Privileges | Drop

(i) Database j has been created.

SQL query:
CREATE DATABASE 'j' ;

[Edit] [Create PHP Code]

No tables found in database.

Create new table on database j
Name: [   ]   Number of fields: [   ]

Go

Figure (A.11): creating the tables of database

Server: localhost ▸ Database: j ▸ Table: jj

Field	Type ⑦	Length/Values¹	Collation	Attributes	Null
	VARCHAR ▾		▾	▾	not null ▾
	VARCHAR ▾		▾	▾	not null ▾
	VARCHAR ▾		▾	▾	not null ▾

Table comments:	Storage Engine: ⑦	Collation:
	MyISAM ▾	▾

Save   Or Add [1]   field(s) Go

Figure (A.12): filling the tables of database

	Field	Type	Collation	Attributes	Null	Default	Extra	Action
☐	id	int(7)			No			📖 ✏ ✖ 📇 📄 📝 📑
☐	name	varchar(30)	utf8_general_ci		No			📖 ✏ ✖ 📇 📄 📝 📑
☐	loc	varchar(30)	utf8_general_ci		No			📖 ✏ ✖ 📇 📄 📝 📑

↑ Check All / Uncheck All With selected: 📖 ✏ ✖ 📇 📄 📝 📑

🖶 Print view 📷 Propose table structure ⑦
Add [1] field(s) ● At End of Table ○ At Beginning of Table ○ After id ▾ Go

Indexes: ⑦					Space usage		Row Statistics	
Keyname	Type	Cardinality	Action	Field	Type	Usage	Statements	Value
PRIMARY	PRIMARY	0	✏ ✖	id	Data	0 B	Format	dynamic
Create an index on [1]		columns Go			Index	1,024 B	Collation	utf8_general_ci
					Total	1,024 B	Rows	0
							Creation	Jan 02, 2012 at 12:36 AM
							Last update	Jan 02, 2012 at 12:36 AM

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