

## **E-XAM COMPUTER BASED TESTING**

Project report submitted in partial fulfillment of the requirement for the  
degree of Bachelor of Technology

in

**Computer Science and Engineering**

By

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**Certificate**

**Candidate's Declaration**

I hereby declare that the work presented in this report entitled “ **E-XAM COMPUTER BASED TESTING.....**” in partial fulfillment of the requirements for the award of the degree of **Bachelor of Technology in Computer Science and Engineering** submitted in the department of Computer Science & Engineering and Information Technology, Jaypee University of Information Technology Waknaghat is an authentic record of my own work carried out over a period from January 2021 to May 2021 under the supervision of **(Rakesh kanji and Geetanjali)** (Computer science & engineering and information technology).

The matter embodied in the report has not been submitted for the award of any other degree or diploma.

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Department name- Computer Science & Engineering and Information Technology

**Dated: 15-05-2021**

## *eExamination*

### *Computer Based Testing -MY SQL & PHP*

#### *A PROJECT REPORT*

(JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY , SOLAN)



**HIMACHAL PRADESH**

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***Rishabh\_\_\_\_\_***

***Mayank Guleria\_\_\_\_\_***

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# 1. Problem Definition and scope of project

## 1.1 Purpose

Today the internet is becoming a reality and the use of the internet is very popular and there is a huge increase in internet worldwide for educational purposes. An easy-to-use test program, a complete and flexible test, a web site for testing and testing. It allows administrators to set up separate exams and ask bank questions to registered students and members. The eExamination System provides a comprehensive performance test for students. The eExamination system contains a Question Bank that is well integrated with a set of features. Using the various features of the Test System the administrator can name the test, select the test, and provide test questions.

The question bank will be the backbone of the automated process and will play an important role in the random production of unique sets of question papers. When the number of questions reaches a random random number.

Use advanced test settings, including a combination of stored variable questions, skips, and random and timely responses with the online test feature. It helps to create a questionnaire based on a set of parameters. The eExamination system provides an online online test for Objective type questions. In order to free up time online, the answers are tested and the test is performed and the test can be made available immediately. Storage of responses, results, and results in a database. In addition to the existing questions in the Question Bank, the Regulator has the power to add further questions per subject.

The system should have been built on security features to handle various security threats such as SQL injection, cross-linking, spam.

This project report outlines the requirements for active and inactive software for the release of 1.0 eExamination system. This document is intended for use by project team members who will implement and ensure the smooth running of the program. Unless otherwise stated, all the requirements outlined here are very important and are committed to the release of 1.0.

## 1.2 Objective

Online Examination System – eExamination is complete end to end solution to cover all aspects of online examination system.

The basic objective of developing this project is:

- Provides complete web site solution, including member registration, giving tests, storing of results. Complete web based administration.
- The online examination system can automatically add the marks allocated in each question to determine the total mark for the test.
- Using this feature the questions can be selected from the question Bank, and also the appearance of questions in the Random Order.
- Add multiple product to shopping card, automatic calculate the shipping price, calculate tax and calculate total amount.
- Additional to the already available questions in the Question Bank, the Administrator has the ability to add more questions as per the subject.
- The Administrator also has the ability to modify the User-defined Questions and not the already Available Questions in the Question Bank.
- Complete web based system no installation required to run the application in client system.
- Student result must save and can be retrieving later on.
- Question must provide answer type like multiple right answer selection and one right answer selection. Test screen must provide options accordingly.
- System must able to evaluate the examination and display the result instantly, student must view the correct answer after complete the test.
- System has powerful logical access management in place, each user must be identified by login id and strict password policy is applied to secure the system
- Generate various reports for administration like, Total students/members registered for examination, no of available examination, test given by the student.

## 1.3 Project Scope

The eExamination system will allow you to take and offer online tests and store key information and make various test reports. The main users of the project are the Student or Member and Program Manager.

From the end user's point of view, the eExamination System Project consists of two functional elements: Advanced Member modules for registration, trial testing, profile management. With the management section of Manage members, exams, question bank and view reports

### 1.3.1 Member and Student Module

Improved student display of enrollment, profile setting, login, test selection, and giving test, viewing results, viewing answers Following module pages are available to members.

**CM-1: Home** - It is the default page for the site. All links are available in this page.

**CM-2: Login** - The student needs to sign in to view his or her account details and purchase the product. If a student forgets his password he can return the old password to the Forget password link. A new student can subscribe to this site by clicking on the registration link.

**CM-3: Register** - The New Student is required to register to take the exam. Type all student information like email, name, address, contact details and send it. System verification for email id, should be different. In the login process the student needs to type an email and password. The student must type in a valid email id because if they forget the old password it will be sent to this email address.

**CM-4: My Account** - Displays student data details currently logged in, pre-saved test results can be viewed here with other links such as Edit profile, login, and Change password.

**CM-5: Edit Profile** - Student can edit his profile like personal details, address, contact no, display name however student can not edit email address once register.

**CM-6: Change Password** - Student can change his password from this link. Student must type his old password to change the password with new password.

**CM-7: Logout** - By clicking this link user logged out from this site all user session reset to default value.

**CM-8: Examination** - Student can view the available examination by selecting any examination from list, system display details of test like, examination name,

description, total available question, number questions for test, total time, passing marks.

**CM-9: Test** - Displays a test page, a program from time to time select questions from the question bank and show them one by one to the student. The student navigates the questions and selects the correct answer from the available options, after completing the test program to display the results immediately and save the test details to the system for future use.

### **1.3.2 Administration Module**

The administrative module is used to capture and edit test information, interview banks, record members and view reports; The web-based management module will include the following:

**AM-1: Login** - Administrator sign-in page. All admin users are identified by username, password. The administrative user can create new tests and save query banks.

**AM-2: Members** - It show list of members registered in the site.

**AM-3: Examination** - Add edit the examination details.

**AM-4: Question Bank** - Maintain the question bank for selected examination, Administrator can add, edit the question and answers.

**AM-5: Results** - Display list of test results.

**AM-6: Logout** - By clicking this link admin user logged out from this site all user session reset to default value.

Both of these workspaces will be delivered as the first version of the eExamination for online examination system is released. Performance is described in detail over time in this document.

## **1.4 Technologies**

### **1.4.1 Operating Environment**

OE-1: The eExamination web application will operate with the following Web Browsers: Microsoft Internet Explorer version 5.0, 6.0, 7.0, Google Chrome

- OE-2: The eExamination web application shall operate on a server running the latest versions of IIS (Internet Information Server).
- OE-3: The eExamination web application shall permit user access from Internet connection
- OE-4: Operating System: Windows 2000. XP
- OE-5: Software requirements: MySQL, PHP.
- OE-6: Languages used are PHP and scripting is done using JavaScript.
- OE-7: Hardware Requirements: 256(minimum)/512(recommended) MB RAM
- OE-8: Hard disc- nGB depending upon the requirement to store data minimum of 25GB.

## 1.4.2 Deployment Environment

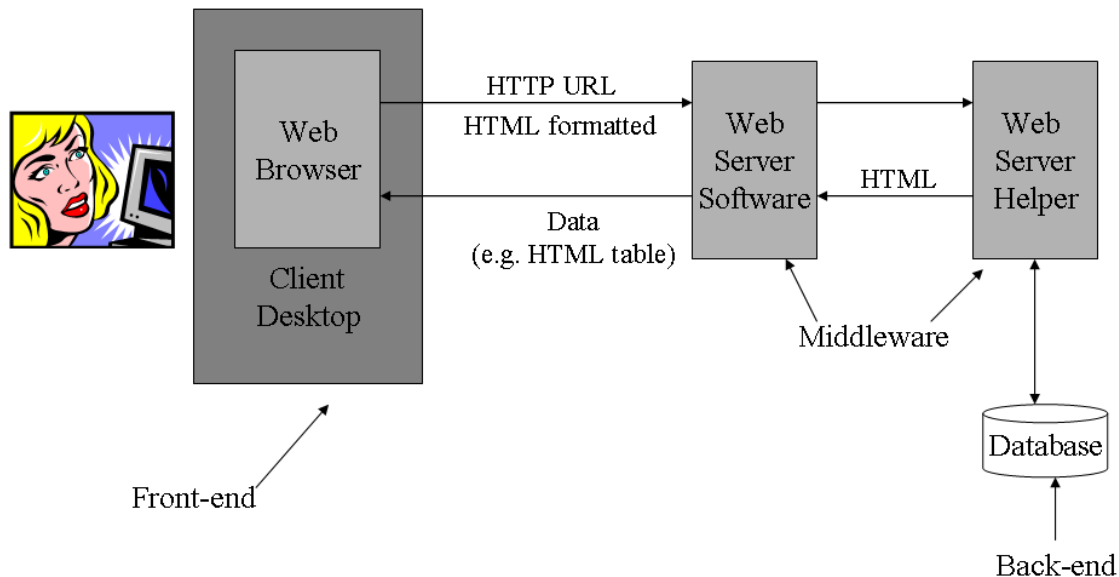
### DE-1: Database Server

OS - Win 2003 Enterprise Server  
MySQL 5.0  
HDD - Min 10 GB, Recommended 25 GB  
RAM - Min 2 GB, Recommended 4 GB  
Processor - Pentium Dual Xenon Processor

### DE-2: Application Server

OS - Win 2003 Enterprise Server  
IIS - Internet Information Server  
HDD - Min 5 GB, Recommended 10 GB  
RAM - Min 2 GB, Recommended 4 GB  
Processor - Pentium Dual Xenon Processor

DE-3: The eExamination web application will operate with the following Web Browsers: Microsoft Internet Explorer version 5.0, 6.0, 7.0., Google Chrome



[eExamination System Architecture]

### 1.4.3 Development Tools and Technologies

#### DT-1: PHP

PHP: Hypertext Preprocessor is a widely used language, often for the purpose of initiating web development to produce dynamic web pages. For this purpose, PHP code is embedded in HTML source text and translated by a web server that has a PHP processor, which generates a web page document. As a common programming language, the PHP code is processed by the command line translation system that performs the desired functions of the application and produces the output of the program in its standard output channel. It can also serve as a graphical application. PHP is available as a processor for many modern web servers and as an independent interpreter for many operating systems and computer platforms. Features of PHP are

- □ Standard CGI, FastCGI and Apache module support - Like the standard CGI program, PHP can be installed on any UNIX machine running on any UNIX web server. With the support of FastCGI's new standard, PHP can take advantage of the speed improvements achieved in this way. Like the Apache module, PHP becomes a very powerful and fast-paced approach to the CGI program.
- Access Logging - With PHP login capabilities, users can keep their call and login counts. It does not use centralized system access files in any way, and provides real-time access monitoring. Log Viewer script provides a quick summary of access to each user's set of pages. In addition, the package can be configured to generate a footer on each page showing accessibility details. See the bottom of this page for an example of this.



- Access Control - The web-based configuration screen handles the access control configuration. You may have created rules for all or other personalized web pages that set different limits on who can view these pages and how they will be viewed. Pages can be password protected, completely blocked, login disabled and more based on client domain, browser, email address or reference document.
- PostgreSQL Support - Postgres is an advanced free RDBMS. PHP supports embedding PostgreSQL "SQL queries" directly in .html files.
- RFC-1867 File Upload Support - □ File uploading is a new feature in Netscape 2.0. Allows users to upload files to a web server. PHP provides the actual release of Mime to do the job and also provides an additional framework for doing something useful with the uploaded file once it has been received.
- HTTP-based authentication control - PHP can be used to create customized HTTP-based authentication mechanisms for the Apache web server.
- Variables, Arrays, Associative Arrays - PHP supports typed dynamics, similar member layouts and Perl-like layouts. All of these can be transferred from one web page to another using the GET or POST method.
- Conditionals, While Loops - PHP supports full C-style writing language. You can have if / then / elseif / else / endif and loops and switch / case statements to guide the logical flow of how the html page should be displayed.
- Extended Regular Expressions - Regular expressions are widely used for pattern matching, pattern replacement and standard thread deception. PHP supports all common speech rendering functions.

- Raw HTTP Header Control - □ The ability to have web pages that send custom HTTP customized articles according to context is essential for building a high quality web site. Common use to refer to the Location header: URL to redirect a client to another specific URL. It can also be used to disable temporary storage or deception in the last header of review pages.
- On-the-fly GIF image creation - PHP has support for Thomas Boutell's GD image library which makes it possible to generate GIF images on the fly.
- ISP "Safe Mode" support - PHP supports an unique "Safe Mode" which makes it safe to have multiple users run PHP scripts on the same server.
- Many more new features are being added in newer releases of PHP. Visit the main web site at <http://www.php.net>
- It's Free! - One last important factor. The package is completely free. Licensed under the GNU / GPL license that allows you to use the software for any purpose, sale or otherwise.

## DT-2: MySQL

MySQL is a relational database management system (rdbms) that runs as a server supplying multi-user get right of entry to to a number of databases. The mysql development project has made its source code to be had under the phrases of the gnu fashionable public license, as well as underneath a variety of proprietary agreements. MySQL is owned and backed by using a unmarried for-earnings firm, the swedish company mysql ab, now owned by using oracle enterprise. Free-software projects that require a complete-featured database control machine often use mysql. Such tasks consist of (for example) wordpress, phpbb, drupal and other software program constructed on the lamp software stack. MySQL is also used in lots of high-profile, massive-scale world huge web merchandise consisting of wikipedia, google and fb.

Features of MySQL are

- A broad subset of ANSI SQL 99, as well as extensions
- Cross-platform support
- Stored procedures
- Triggers
- Cursors
- Updatable Views
- True Varchar support
- INFORMATION\_SCHEMA
- Strict mode
- X/Open XA distributed transaction processing (DTP) support; two phase commit as part of this, using Oracle's InnoDB engine
- Independent storage engines (MyISAM for read speed, InnoDB for transactions and referential integrity, MySQL Archive for storing historical data in little space)

- Transactions with the InnoDB, BDB and Cluster storage engines; savepoints with InnoDB
- SSL support
- Query caching
- Sub-SELECTs (i.e. nested SELECTs)
- Replication support (i.e. Master-Master Replication & Master-Slave Replication) with one master per slave, many slaves per master, no automatic support for multiple masters per slave.
- Full-text indexing and searching using MyISAM engine
- Embedded database library
- Partial Unicode support (UTF-8 and UCS-2 encoded strings are limited to the BMP)
- Partial ACID compliance (full compliance only when using the non-default storage engines InnoDB, BDB and Cluster)
- Shared-nothing clustering through MySQL Cluster
- Hot backup (via mysqlhotcopy) under certain conditions

## **2. Overall Description**

### ***2.1 User Characteristics***

#### **2.1.1 Member**

Able to register, login, edit personal information, results, select the examination, give test, view results and view answers.

#### **2.1.2 Administrator**

Administrator will have all the access rights. Administrator can create new examination, edit examination details, maintain the question bank, view the member and test results.

### ***2.2. Assumptions***

1) System User and Administrator communicate with each other via emails.

## 3. System Features

### 3.1. System features

#### 3.1.1 .Description:

A web based eexamination software so that can use to provide and take exam over the net. Proposed eexamination application gadget is give up to give up answer for online exam manner includes member registration, choice of exam, give examination, view consequences, configuring examinations, preserve question financial institution, and technology of stories for the management.

#### 3.1 .2.Constraints

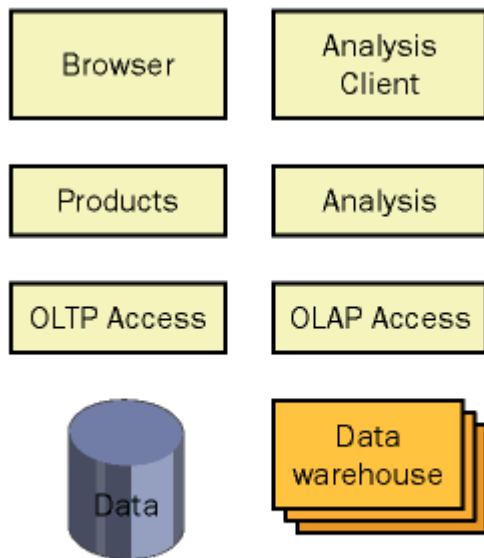
Linking and integration with academic and institution system. Upload questions into system in different formats. Connecting to third-party OLAP applications for generating reports. Etc.

#### 3.1.4 Action/result

Action	Result
Member registers himself	After validation, naive users becomes registered Users.
User/Admin Logins via Login page	According to the access rights redirected to the accordance page.
Manage Question Bank (Admin)	Redirected to question page for add, edit question and answer.
Start new examination (Member)	Redirected to Start Examination page.
View Answers (Member)	Redirected to view answer page from result page
View Test Results (Admin)	Redirect to result page

## 4. Requirement Analysis

The requirement evaluation outlines the technique the improvement crew will take to satisfy the dreams of the venture and provides the idea for proceeding to the making plans section. After identifying the enterprise trouble and defining the imaginative and prescient and scope, the team creates the answer concept that explains in trendy phrases how the team intends to fulfill the necessities of the assignment.



[Solution concept of eExamination]

For a project to be successful, it is essential that we correctly identify the goals of the project. Project goals can be categorized as follows:

- Business goals
- Design goals

### 4.1 Business goals

Business desires constitute what the organisation desires to reap with the answer. Enterprise desires shape the premise for determining the success standards of the solution. The reason of defining business dreams is to absolutely articulate the goals for the mission and to ensure that your solution helps the ones commercial enterprise necessities. The team desires to decide the nice technique for figuring out the dreams and agreeing on them.

Throughout the existence of the challenge, the group makes tradeoffs among sources, agenda, and features. It's far vital that enterprise dreams are prioritized in a way that will permit the crew to have a clean know-how approximately which of them the consumer believes are most essential, in case a number of the desires can not be completed.

For this eExamination project, business goals might include the following:

- expand the institute's s geographic reach past the modern bodily area.
- shorten the time to behavior examination and result process by way of the use of extra green online web sites.
- Integrate all students worldwide by using a online site process, and shorten the overall examination process.
- More transparent process of taking the examination.
- No additional and specific system requirement to operate the online examination site.
- It must be secure.
- Easy to use and no addition knowledge require to operate the system.
- Reliable and accurate and their should not be any manual intervention in examination process.
- No requirement of examiner and examination center.

#### ***4.2 Design goals***

Layout dreams are similar to enterprise goals in lots of ways. The difference is that design goals cognizance extra on the attributes of the answer and much less on what the solution will accomplish for the business. Design desires cope with now not best what the crew wants to accomplish but also what the group isn't always attempting to accomplish with the solution. As with business desires, you need to prioritize design dreams in order that the group knows which desires ought to be carried out, in case the undertaking can not acquire all of them.

Consider the case of this e-commerce Web site. Some of the design goals for the online shopping cart might include:



- Improve the user experience by reducing page-download wait times to 5 seconds or less.
- Limit dependency on connectivity with the server.
- Reduce the time and level of effort required for a user to complete the online registration.
- The service and all supporting applications must be localized for users worldwide.
- The service must have an availability of 99.99 percent.
- The service cannot lose data.
- The service must permit access only by authorized users.

### ***4.3 Feasibility Study***

#### **4.3.1 Economic Feasibility**

Financial evaluation is most frequently used for evaluation of the effectiveness of the machine. More usually known as cost/gain evaluation the method is to decide the benefit and saving which are anticipated from a device and examine them with costs, decisions are made to design and implement the gadget. This part of feasibility has a look at giving the top management the monetary justification for the new device. That is a vital input to the control, because very frequently the top control does

No longer want to get confounded with the aid of the numerous technicalities that bound to be related to a challenge of this kind. A simple financial analysis that gives the actual contrast of costs and advantages is a good deal more significant in such cases. In the system, the corporation is maximum satisfied by means of financial feasibility. Because, if the company implements this gadget, it will no longer require any additional hardware resources as well as it can be saving a lot of time.

#### **4.3.2 Technical Feasibility**

**Technical feasibility centers on the existing guide device of the take a look at management process and to what quantity it could assist the machine. Consistent with feasibility analysis manner the technical feasibility of the system is analyzed and the technical requirements such as software facilities,**

procedure, inputs are diagnosed. It is also one of the important stages of the device improvement sports. The system gives more stages of consumer friendliness mixed with greater processing pace. Consequently, the fee of preservation may be decreased. Due to the fact that, processing speed is very high and the work is reduced within the protection factor of view management persuade that the undertaking is operationally viable.

### **4.3.3 Behavioural Feasibility**

Human beings are inherently immune to exchange and pc has been recognized to facilitate changes. An estimate ought to be made from how strong the person is in all likelihood to transport in the direction of the improvement of automated system. These are diverse tiers of users with a purpose to ensure right authentication and authorization and security of sensitive data of the corporation.

#### 4.4 Business Requirements

The following preliminary lists are based on initial interviews and study of existing manual system,

The commercial enterprise aim for the application is to aid an increase the safety, velocity, accuracy and entire automation of present guide or semi computerized exam process. Business requirements are discussed inside the scope phase, with the following additional element:

- Improve the examination search facility and student should get all the information in a second.
- System should able to save the results and test details.
- Admin user must able to monitor all the activities.
- The Administrator should be able to enter or update examination details and question bank from web interface only
- System Administrator must able to control the access rights by each user as per requirement.
- The application should support the capability to use multi user environment.
- The Admin user should able to generate all type of reports as and when required by the management.
- Can be used anywhere any time as it is a web based application (user location doesn't matter).
- No restriction that examiner has to be present when the candidate takes the test.
- A Student Sign-in page must allow registered student to sign in with their e-mail addresses and passwords. New student must be able to register from this page.
- A Sign-in Information page must allow student to input or change their e-mail addresses, passwords, and other personal information.
- The following question types are essential:

- **Multiple**

This question type allows the user to select ONE correct answer  
- Options can be randomised

- **Choice**

- More than one option can be correct but the user can only select ONE option
- Score can be set per option
- No limitation on number of options
- If there are a number of Options, these can be presented in a column(s).

o **Multiple Response**

**This question type allows the user to select more than ONE correct answer**

- Options can be randomised.
  - Score can be set per option.
  - No limitation on number of options.
  - If there are a number of Options, these can be presented in a column(s).
  - The number of responses students enter can be limited.
- Students can access tests they have completed.
  - Question paper must be randomized order of question must be randomized no two student must not get same question in same order.

The machine users need to enhance their modern-day potential to research pupil. In particular, they want to focus on identifying their excellent student. To enable them to perform this purpose, they want to extract meaningful facts that easily solutions the subsequent questions:

- What are the early warning signs of problems?
- Who is my best student?
- What are my student's issues as groups?
- What type of examination are my student wanted?

## ***4.5 User Requirements***

User requirements are categorized by user type.

### **4.5.1 Student**

- Able to register in the site
- Able to edit personal information, contact details.
- Able to select the examination and give examination online.

- Able to view result online after completing the examination.
- Able to view right and wrong answers after completing the examination.
- Able to view previous examination and test details in My Account page.

#### **4.5.2 Administration**

- Administrator must able to add new examination details.
- Must able to maintain the question bank.
- Generate Reports as per requirement.

#### **4.6 Operational requirements**

The following requirements provide a high-level view of how the system will run:

- processor utilization ought to now not exceed 80 percentage in the course of concurrent uses.
- backups will occur incrementally at some point of the day.
- a full weekly backup is needed to computer virus drives.
- make certain that information is simple to get right of entry to both, and significant for the device users and the corporation.
- limit the technical expertise that gadget users and scholar want to get entry to the records, generate advert hoc queries, seek and consider examination and check records.
- any trade to facts need to be contemplated at once, and the changes need to be propagated to the hunt engine in order that device users that perform searches see this new records.

- the software must paintings with the present communications and networking infrastructure.
- the utility have to installation with at the least extra operational approaches, manual or in any other case.

#### ***4.7 System Requirements***

These are additional constraints from a system perspective:

- the administrator must be able to screen the whole thing from the it department.
- the information have to be accessible through all people within the enterprise in intranet and in internet for the students and administrator as in step with the rights specify.
- all records especially question bank must be updated.

#### ***4.8 System Constraints***

Constraints suggest the parameters to which the very last commercial enterprise solution must adhere. They're elements of the enterprise environment that can not or will now not be modified. Often, those constraints come to be layout dreams for the utility. If constraints aren't diagnosed properly, the venture crew might design a product that can't be deployed in the commercial enterprise.

Examples of possible constraints that you should document include:

- Budget limitations
- Characteristics of earlier supporting systems
- Network system architecture
- Security requirements
- Operating systems
- Planned upgrades to technologies
- Network bandwidth limitations

- Maintenance and support agreements and structures
- Knowledge level of development or support staff
- Learning limitations of users

#### ***4.9 Behavioral Description***

The person of eexamination system registers himself with the aid of sincerely accessing the system's home web page and fills the easy form. When the scholar sign up, he or she will be able to able deliver examination, view results and locate proper and wrong solution. Student can view the my account page to see the previous test information.

Administrator is the user of the system with administrative rights. Administrator manages exam. Preserve the question bank and display the member and tests he also view and generate numerous reviews.

## 5. Nonfunctional Requirements

### 5.1 Performance Requirements

An application's performance is defined with the aid of metrics consisting of transaction throughput and aid usage. A user may outline an software's overall performance in phrases of its response time. No greater than five-percent degradation in common question response is authorized even as all concurrent users are the usage of the machine. Processor usage need to now not exceed 80 percentage throughout all concurrent users are the usage of the device.

We have to define overall performance requirements before the group proceeds to the developing section. To define an awesome overall performance requirement, we must pick out challenge constraints, decide services that the software will carry out, and specify the weight at the software.

**PR-1: Identifying constraints** - Constraints inside the venture include finances, agenda, infrastructure, and the selection of development gear or technology. As an example, we'd need to set up this eexamination application via a particular date. We may additionally want to apply a specific improvement device because the crew has information in that tool only. We won't be able to layout and expand applications which are processor extensive because the client computer systems do not have good enough hardware. We need to layout an utility so that it meets its performance dreams inside the boundaries of the constraints. As opposed to changing a few factors of a project to improve overall performance, you may adjust elements of the task that aren't restricted to determine how we can improve performance. As an example, can the crew study for you to create additives via the use of a extraordinary tool? Can statistics get admission to be progressed via converting the information get admission to era?

**PR-2: Determining features** - The functions of this software correspond to apply cases and usage scenarios. We will discover the utilization eventualities that affect the overall performance of the software and, for each such situation, specify what the user does and what the utility does in reaction, along with how databases and other machine offerings are accessed. In addition, you want to decide how regularly every characteristic might be used. This information allow you to create tests for measuring overall performance that resemble actual utilization of the software as intently as feasible.

**PR-3: Specifying the load** - We will specify the load of this eexamination application because the wide variety of students so as to use the software. Further, we can examine how the load would possibly vary through the years. For example, the wide variety of requests for this eexamination website online will be better in the course of



positive times of year. We will use the load to outline the overall performance metrics of this software.

## 5.2 Availability Requirements

Availability is a degree of ways often the software is available to address carrier requests in comparison to the planned run time. Availability additionally takes into account restore time due to the fact an utility this is being repaired isn't to be had to be used.

Designing for availability consists of awaiting, detecting, and resolving hardware or software failures earlier than they result in provider mistakes, faults, or facts corruption, thereby minimizing downtime. To make sure availability, offer more than one routes to application offerings and records. Use only tested validated tactics (both automatic and people-primarily based) that aid the application throughout its lifestyles cycle.

In addition to unplanned downtime, deliberate downtime have to be decreased. Deliberate downtime can encompass protection changes, running machine upgrades, backups, or any other interest that quickly removes the utility from carrier.

Availability of an application also depends on its reliability. For a surprisingly available and dependable utility, we need a reliable basis: right software design, rigorous testing, and certification. Some of the techniques used for designing for availability encompass:

**AR-1: Reduce planned downtime** - To keep away from planned downtime, use rolling improvements. For instance, to update a thing on a server, circulate the server's resource businesses to some other server, take the server offline, update the aspect, and then carry the server online. Meanwhile, the opposite servers deal with the workload, and this utility experiences no downtime. You may use this strategy in an application that scales out.

**AR-2: Reduce unplanned downtime with clustering** - Clustering is a technology for developing high-availability applications. A cluster includes more than one computer systems that are bodily networked and logically related the usage of cluster software. By way of the usage of clustering, a a couple of server web website can resist failures with out a interruption in provider. While the energetic server fails, the workload is robotically moved to a passive server, cutting-edge patron methods are converted, and the failed utility service is restarted automatically. If a resource fails, customers related to that server cluster may revel in a moderate postpone, however the carrier may be finished. Cluster software program can offer failover help for applications, record and

print offerings, databases, and messaging systems which have been designed as cluster-aware and assigned to a cluster.

**AR-3: Use network load balancing** - Network load balancing (nlb) is used to distribute visitors flippantly across to be had servers. Nlb also allows growth the supply of an application: if a server fails, you could use nlb to redefine the cluster and direct traffic to the alternative servers. Nlb is in particular beneficial for eexamination applications that hyperlink external customers with transactions to statistics servers. As customer visitors increases, you may scale out the internet server farm with the aid of including as much as 32 servers in a unmarried cluster. Nlb automatically detects server screw ups and redirects purchaser visitors to the remaining servers, all of the time preserving continuous, unbroken customer service.

**AR-4: Use redundant array of independent disks (RAID) for data stores.** -Raid makes use of more than one hard disks to save facts in multiple locations. If a disk fails, the application is transferred to a reflected facts image and the software keeps jogging. The failed disk may be replaced with out stopping the software.

**AR-5: Isolate mission-critical applications** - An application is continuously appearing obligations and requesting sources consisting of network communications, records get right of entry to, or manner threads. Each of those useful resource requests can affect the performance and availability of programs sharing the identical resources. If an utility stocks those services on the same servers, the workload and throughput characteristics for those servers might trade unfavorably. It's far encouraged that challenge-critical packages use dedicated infrastructures and personal networks.

**AR-6: Use queuing** - Queuing permits your utility to speak with other programs by sending and receiving asynchronous messages. Queuing ensures message transport; it does now not rely whether or not the vital connectivity currently exists (with mobile applications, as an example). Queuing gets rid of a failure point from the utility. Queuing is also an answer for coping with top workloads which could require a variety of hardware. Similarly, via increasing the number of routes for a success message transport, an utility can boom the chances for a hit and on the spot message of completion.

Calculation of availability

Measurement Types for Calculating Availability		
Name	Calculation	Definition
Mean Time Between Failure (MTBF)	Hours / Failure Count	Average length of time the application runs before failing

Measurement Types for Calculating Availability		
Name	Calculation	Definition
Mean Time To Recovery (MTTR)	Repair Hours / Failure Count	Average length of time needed to repair and restore service after a failure

The formula for calculating availability is:

$$\text{Availability} = (\text{MTBF} / (\text{MTBF} + \text{MTTR})) \times 100$$

As an instance, the standard availability requirement for this eexamination software is that the website online is available 24 hours an afternoon, 7 days per week. If you count on one thousand non-stop hours as a checkpoint, 1-hour failures all through this time period effects in availability of:

$$((1000 / 2) / ((1000 / 2) + 1)) \times 100 = (500 / 501) \times 100 = .998 \times 100 = 99.8\%.$$

A popular way to describe availability is by means of the nines, for example, three nines for ninety nine.9 percentage availability. However, the implication of measuring through nines is often misunderstood. We need to do the arithmetic to find out that 3 nines (99.9 percentage availability) represent approximately 8.5 hours of provider outage in a single yr. The subsequent degree, four nines (ninety nine.Ninety nine percentage), represents approximately 1 hour of carrier outage in a year. Five nines (99.999 percentage) constitute approximately 5 minutes of outage consistent with year.

### 5.3 Reliability Requirement

The reliability of an software refers back to the potential of the application to provide accurate consequences. Reliability and availability are carefully associated. Whilst availability measures the ability to address all requests and to recover from a failure with the least lack of get right of entry to to the application, reliability measures how long the software can execute and produce anticipated outcomes with out failing. Customers bypass unreliable net web sites, ensuing in misplaced sales and reduced destiny sales. Similarly, the expense of repairing corrupted information increases the price of utility failure. Unreliable systems are also difficult to keep or enhance due to the fact the failure points are commonly hidden during the device. Because of the want no unmarried point failure, automatic failover could be required. Similarly, existing disaster healing and backup plans and methods need to be revised to include the eexamination application.

To layout for reliability, you need to take a look at the software's predicted usage pattern, create a reliability profile, and create a solution that meets the profile. You ought to take a look at how a selected service is supplied, compare failure eventualities, and design favored options. Further, you want to recall the software's interactions with different packages.

It is difficult to perceive reliability issues and solutions for a gadget that has no longer been evolved. But, we will begin by means of reading the currently strolling programs within the corporation. Such analysis reveals the failure frequency and distribution, root reasons, and viable improvements for present structures. We are able to use this facts to layout a reliable solution.

- A reliable solution guarantees blunders-unfastened statistics enter, facts transformations, nation control, and non-corrupting recuperation from any failure conditions. Creating a high-reliability utility relies upon on the entire software program development lifecycle, from the planning section, through development and testing, to deployment and stabilizing. The following duties will let you create a reliable utility:
- Putting reliability requirements in the specification
- Using a good architectural infrastructure
- Including management information in the application
- Using redundancy
- Using quality development tools
- Using reliability checks that are provided by the application
- Implementing error handling
- Reducing the application's functionality instead of completely failing the application

#### ***5.4 Scalability Requirement***

Scalability is defined as capability to growth resources to provide an growth within the carrier capability. In a scalable software, you can upload resources to control additional demands with out editing the software itself.

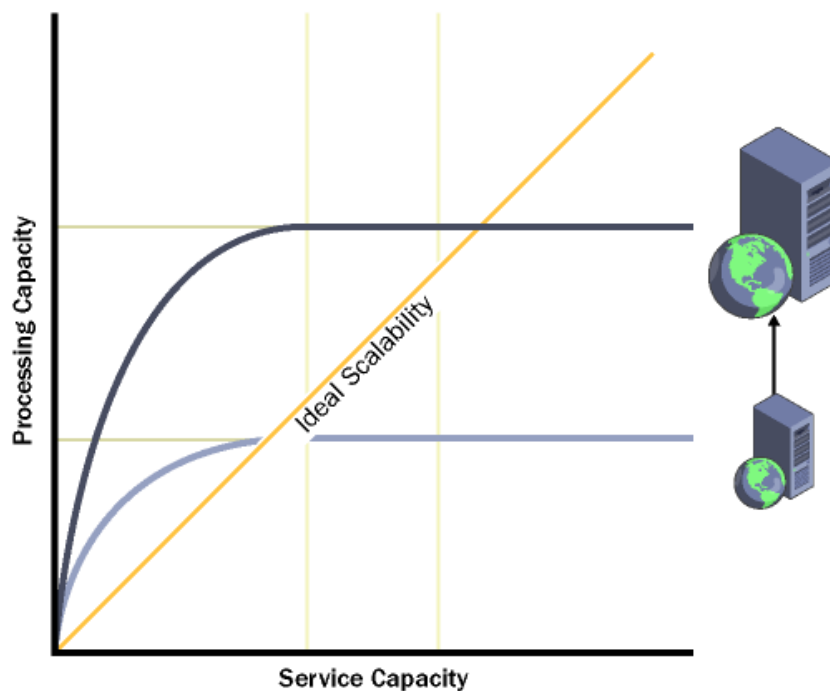
A scalable utility requires a balance between the software program and hardware used to put in force the application. You may upload assets to either software or hardware to increase the scalability of the application. Adding these assets might produce a gain; but, it can actually have a poor or null effect, with the utility showing no big growth in provider potential. As an instance, you might enforce load balancing in an application.

This may assist most effectively minimally if the utility has been written to make synchronous approach calls or to retrieve lengthy datasets in reaction to a person's request.

eExamination Application an average load of 1500 concurrent users after the system is fully operational, and expects that to grow by 25 percent each year for the next five years.

The two most common approaches to scalability are:

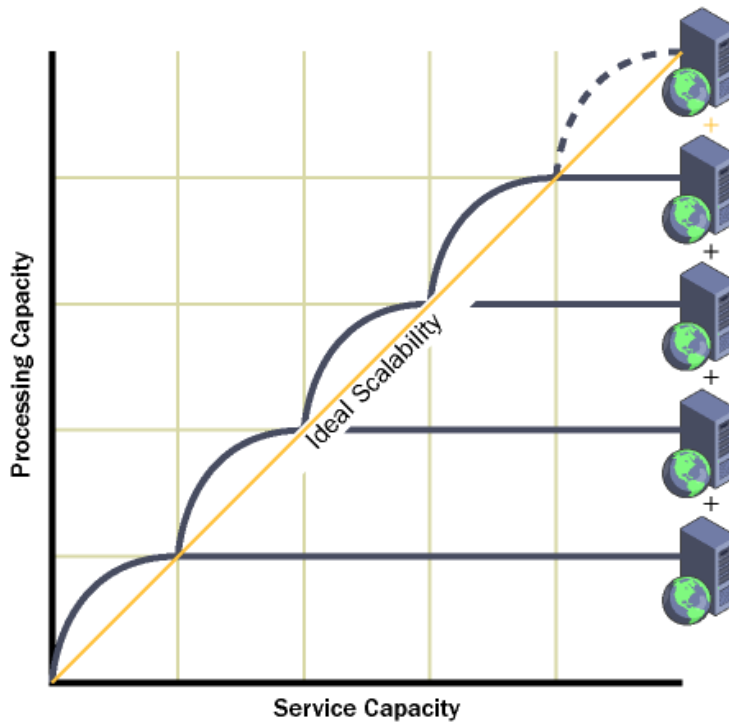
**SR-1: Scaling up** - Refers to accomplishing scalability with the aid of improving the present server's processing hardware. Scaling up includes adding extra reminiscence, extra or faster processors, or migrating the software to a greater powerful pc. The primary goal of scaling up an software is to boom the hardware sources available to the software. Usually, you could scale up an application without changing the supply code. Further, the executive attempt does now not exchange considerably. But, the gain of scaling up tapers off ultimately until the actual maximum processing capability of the gadget is reached.



[Scaling Up]

**SR-2: Scaling out** - Refers to dispensing the processing load across more than one server. Even though scaling out is done by using the use of a couple of computer

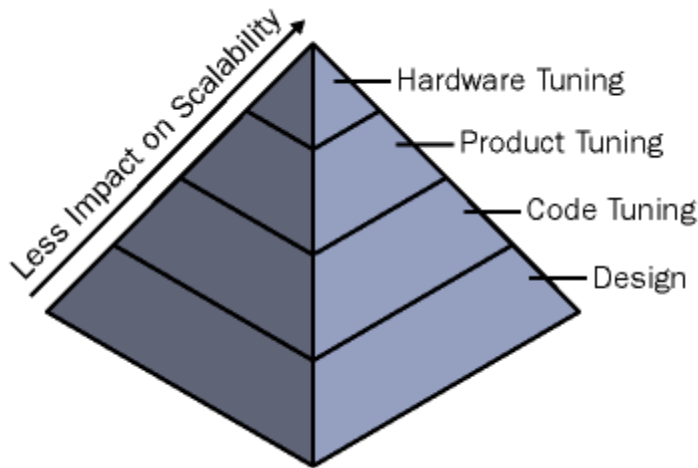
systems, the collection of computer systems keeps to behave as the unique tool configuration from the give up-person attitude. Again, the balance between software and hardware is vital. The utility should be able to execute with no need records approximately the server on which it's miles executing. This concept is called location transparency. Scaling out also will increase the fault tolerance of the software.



### [Scaling Out]

Good design is the foundation of a highly scalable application. The planning phase has the greatest impact on the scalability of an application.

Underneath determine illustrates the function of layout, code tuning, product tuning, and hardware tuning within the scalability of an software. Layout has more impact on the scalability of an application than the other 3 factors. As you move up the pyramid, the impact of different factors decreases. The pyramid illustrates that effective layout provides more scalability to an software than elevated hardware sources.



[Scalability pyramid]

To design for scalability, we need to following guidelines:

**SR-3: Design processes such that they do not wait** - A technique ought to in no way wait longer than vital. A method may be classified as synchronous or asynchronous. A synchronous system waits for every other process to complete earlier than it continues. Such tactics have to look forward to some other method to succeed or fail absolutely before appearing some other operation. Programs that enforce synchronous approaches stumble upon bottlenecks for sources. These bottlenecks affect both the overall performance and the scalability of the application. One manner to attain scalability is to implement asynchronous approaches. In programs that have asynchronous techniques, long-strolling operations may be queued for finishing touch later by way of a separate manner.

**SR-4: Design processes so that processes do not compete for resources** - Considered one of the most important causes of scalability problems is opposition for sources such as memory, processor cycles, bandwidth, or database connections. Plan your useful resource utilization to limit these issues:

- series resource utilization to use the most ample sources first and the least plentiful resources remaining.
- gather assets as overdue as viable. The shorter the quantity of time a process uses a resource, the earlier the useful resource will become available to another procedure.

**SR-5: Design processes for commutability** - Two or more operations are called commutative if they can execute in any order and still obtain the same result.

**SR-6: Design components for interchangeability** - An interchangeable aspect is designed to launch its sources, move right into a pool controlled through a useful

resource supervisor, and be re-initialized for use via a brand new customer. Layout the aspect so that no patron-particular kingdom persists from purchaser to patron. In addition, the issue must guide aggregation and no longer be sure to a particular thread. Resource pooling schemes consisting of com+ issue pooling and open database connectivity (odbc) connection pooling use interchangeable resources. For instance, you may use the thing offerings administration device to allow object pooling, set minimal and maximum pool size, and create timeout settings.

**SR-7: Partition resources and activities** - Reduce relationships among assets and sports with the aid of partitioning them. This allows you keep away from the danger of bottlenecks. Partitioning sports can also ease the burden on critical resources along with the processor and bandwidth. For example, the usage of secure sockets layer (ssl) to provide a secure connection effects in significant overhead. Consequently, you might decide to apply ssl only for pages that require a high degree of security and use committed internet servers to deal with ssl classes. You could also partition resources and activities with the aid of creating many small components instead of some large additives, and via proscribing go-tool communication. But, partitioning could make a device more complicated. Dividing assets which have dependencies can add enormous overheads to an operation.

## ***5.6 Interoperability***

Normally, medium and huge organizations have heterogeneous computing environments. As an example, many agencies deploy dispensed n-tier customer/server packages that require get entry to to information or transactions on current structures. Further, our application might want to engage with applications that have been developed using proprietary or 1/3-party software program. In model 1.Zero of the eexamination software for on-line examination gadget, there are no necessities for interoperability with other systems.

### **6. Project Management**

The method is essentially your method to clear up the problem. This offers with the system version used. A manner version for software engineering is selected based on the nature of challenge and application, the techniques and equipment for use, and the



controls and deliverables which are required. Therefore searching at the goals and dreams of the system, we've got chosen spiral version for it.

### **6.1 Spiral Model:**

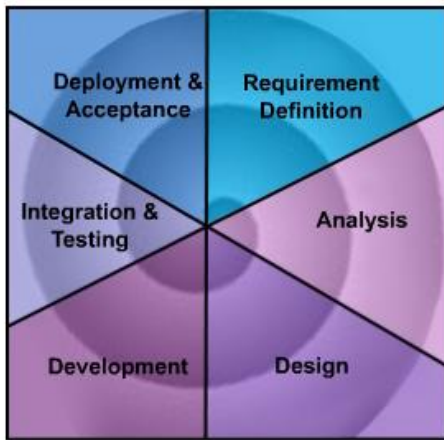
The spiral model is a software program improvement procedure combining elements of both design and prototyping-in-stages, if you want to combine advantages of pinnacle-down and backside-up standards. Additionally referred to as the spiral lifecycle version (or spiral development), it's far a gadget's improvement approach (sdm) used in facts era (it). This model of development combines the capabilities of the prototyping model and the waterfall model. The spiral version is intended for big, costly and complicated initiatives.

#### **ADVANTAGES:**

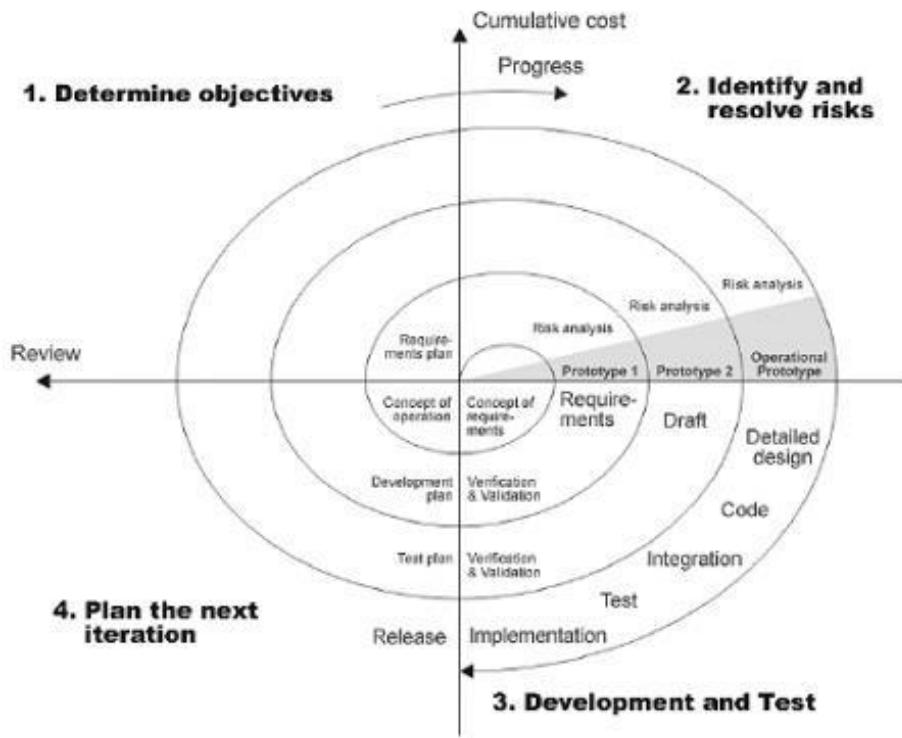
- 1. Estimates (i.E. Finances, schedule, and many others.) emerge as greater realistic as work progresses, due to the fact important problems are located in advance.
2. It is extra capable of address the (nearly inevitable) modifications that software program improvement normally includes.
3. Software program engineers (who can get restless with protracted design procedures) can get their fingers in and start operating on a undertaking in advance.

#### **➤ DISADVANTAGES:**

- 1.Highly customized limiting re-usability
- 2.Applied differently for each application
3. Risk of not meeting budget or schedule



This model includes the following steps in the course of software development:



[SPIRAL MODEL]

## 6.2 *Phases of Spiral Model:*

### 6.2.1 Planning Phase:

- The making plans phase establishes a hen's eye view of the supposed software program product and uses this to establish the simple venture shape, evaluate feasibility and dangers related to the challenge, and describe appropriate management and technical approaches. The outputs of the venture making plans section are the configuration control plan, the great assurance plan, and the assignment plan and schedule, with an in depth list of scheduled sports for the upcoming necessities stage, and excessive-stage estimates of effort for the out stages.
- The necessities amassing method takes as its input the goals diagnosed inside the high-level necessities segment of the undertaking plan. Each aim can be delicate into a fixed of one or greater requirements. These necessities define the most important features of the intended application, outline operational facts areas and reference statistics regions, and outline the initial records entities.
- Fundamental features include vital procedures to be controlled, as well as undertaking critical inputs, outputs and reviews. A person magnificence hierarchy is advanced and associated with these predominant capabilities, information areas, and statistics entities. Each of those definitions is called a demand. Requirements are recognized through particular requirement identifiers and, at minimal, contain a requirement identify and textual description.

### 6.2.2 Risk Analysis Phase:

This segment is the most essential part of "spiral model". On this section all possible (and available) alternatives, that could help in developing a price powerful challenge are analyzed and techniques are decided to apply them. This phase has been delivered specially with a view to become aware of and solve all the feasible dangers within the project improvement. If dangers imply any sort of uncertainty in requirements, prototyping can be used to continue with the to be

had statistics and find out possible solution in order to cope with the capability changes inside the requirements

### **.6.2.3 Engineering Phase:**

This phase which includes development level takes as its number one input the design elements described in the approved design file. For each design detail, a set of 1 or extra software program artifacts can be produced. Software program artifacts include however aren't confined to menus, dialogs, statistics control forms, information reporting codecs, and specialised processes and features. Appropriate test cases will be advanced for each set of functionally associated software program artifacts, and an online help system will be advanced to manual users in their interactions with the software program.

### **6.2.4 Customer Evaluation Phase:**

- At some point of the construction section the software program artifacts, on line assist, and check records are migrated from the development surroundings to a separate test environment. At this factor, all take a look at cases are run to confirm the correctness and completeness of the software program. A success execution of the test suite confirms a strong and entire migration capability. All through this degree, reference facts is finalized for production use and production users are diagnosed and related to their suitable roles. The final reference facts (or hyperlinks to reference statistics supply documents) and manufacturing consumer listing are compiled into the production initiation plan.
- In the course of the deployment section, the software program artifacts, on-line help, and preliminary production information are loaded onto the manufacturing server. At this factor, all check instances are run to verify the correctness and completeness of the software. A hit execution of the test suite is a prerequisite to acceptance of the software by means of the patron. After consumer personnel have demonstrated that the preliminary manufacturing records load is accurate and the take a look at suite has been achieved with best effects, the purchaser formally accepts the transport of the software program.

- The consumer evaluation segment - to obtain purchaser comments based on the assessment of the software illustration created during the engineering stage and implemented all through the installation level. This will help in figuring out and resolving ability troubles/errors within the software evolved. This section is very lots similar to checking out segment.

### ***6.3 Nature of Spiral Model:***

There are four stages in the "spiral model" as discussed above. These four levels are iteratively followed one after other with a purpose to do away with all the issues, which were confronted in "the waterfall model". Iterating the stages helps in expertise the issues associated with a phase and managing the ones problems whilst the equal segment is repeated next time, planning and developing techniques to be followed whilst iterating through the levels. The technique progresses in spiral sense to indicate iterative course accompanied, steadily extra entire software program is constructed as we cross on iterating via all four stages. The first new release on this version is taken into consideration to be maximum important, as in the first iteration almost all feasible risk factors, constraints, necessities are identified

## **7. Estimation and Planning**

### *Planning*

Making plans may be very essential in every factor of improvement paintings. Software program mission plan indicated scope of the venture, milestones and deliverables, challenge estimates, aid allocation, risk control, scheduling strategies and excellent manipulate and fashionable. Software mission plan may be considered as the subsequent:

#### **7.1 User Interfaces**

The usage of textbox and list field for accepting data. The enter facts are then stored within the database. These facts can also be retrieved from the database and displayed inside the shape of tables.

#### **7.2 Hardware Interfaces**

Raw facts inserted into this software program are permanently stored in tables; consequently processor having unfastened area will be beneficial for faster storage and retrieval of data. Here we've used 3.6 ghz p4 processor, so one can have an extra guide for our software.

#### **7.3 Software Interfaces**

This software is operated in a WINDOWS XP environment. This will help for firewall security provisions if the software is used along with internet connection.

#### **7.4 Cost of Implementation**

This venture can be applied within the corporation in one to 2 weeks. The cost of this challenge is derived from attempt, hardware cost, travel prices, training fee, telecommunication expenses and so on.

### **7.5 Effort:**

It consists of the full number of manpower per months. As this undertaking is completely automated therefore less wide variety of manpower could be used to effectively run this challenge. At the least 2-3 people can be enough to keep this venture.

#### **7.5.1. Hardware cost:**

It includes 2 INTEL P4 Standalone Computers. Cost around 60,000.

#### **7.5.2 Training Cost:**

One Software personnel will be allotted for providing training to the manpower allotted

#### **7.5.3 Project duration:**

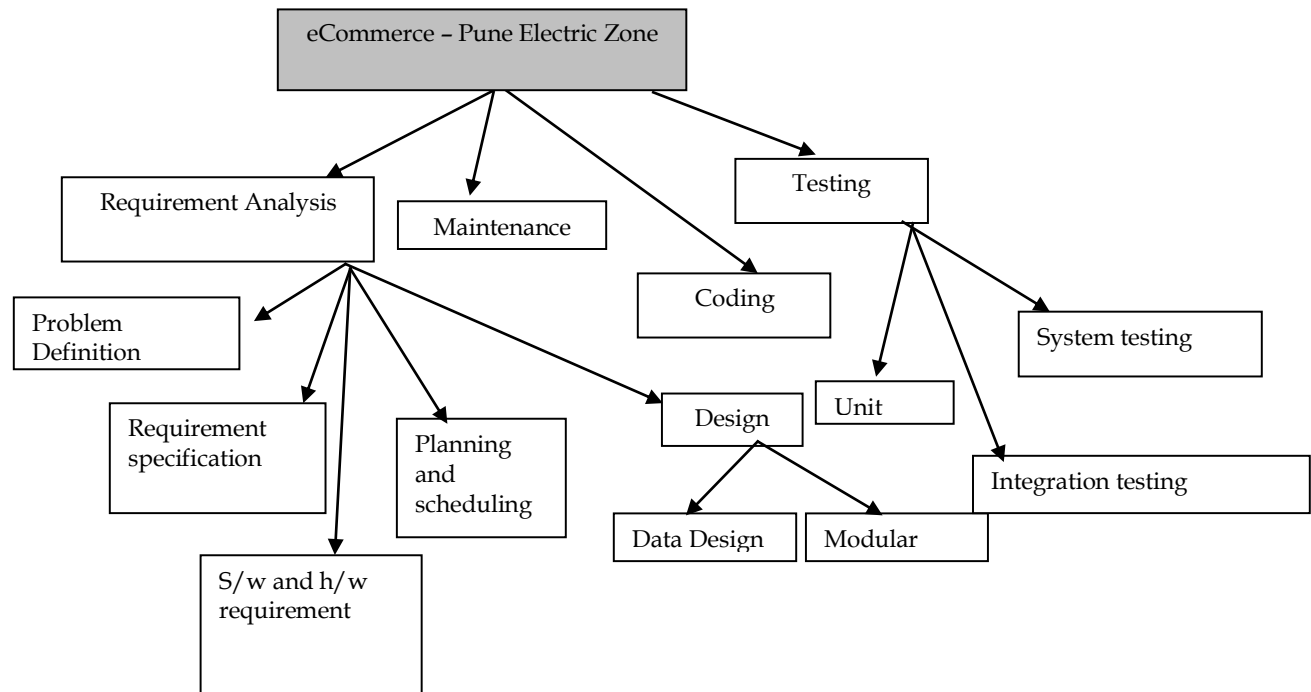
It will take complete 2 months for completion. After that it will take another 2-3 weeks for implementation and testing. Another 1-2 weeks is kept in hand for any inconvenience.

#### **7.5.4 With respect to the customer:**

Weekly or well timed conferences may be scheduled with the customers for buying time to time remarks. Those meetings may be followed with presentation reports. After you have remarks further modifications and tendencies could be achieved.

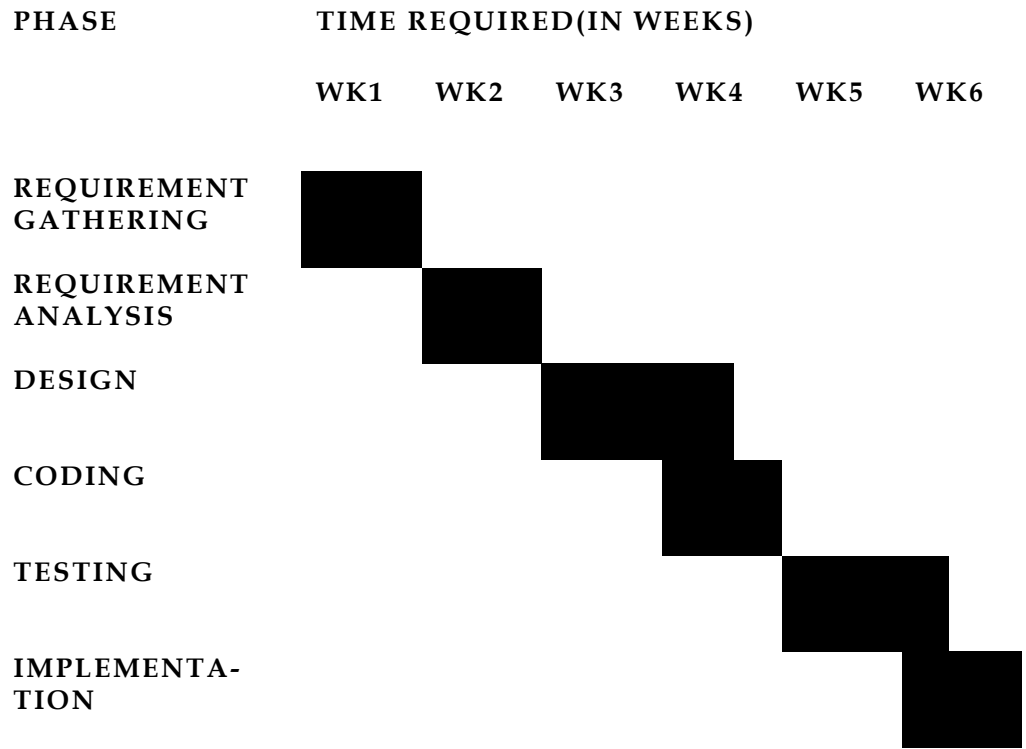
## 7.6 Scheduling

Scheduling of a undertaking may be correlated to prioritizing numerous jobs with admire to their price, time and period. Scheduling can be executed with resource constraint or time constraint in mind.

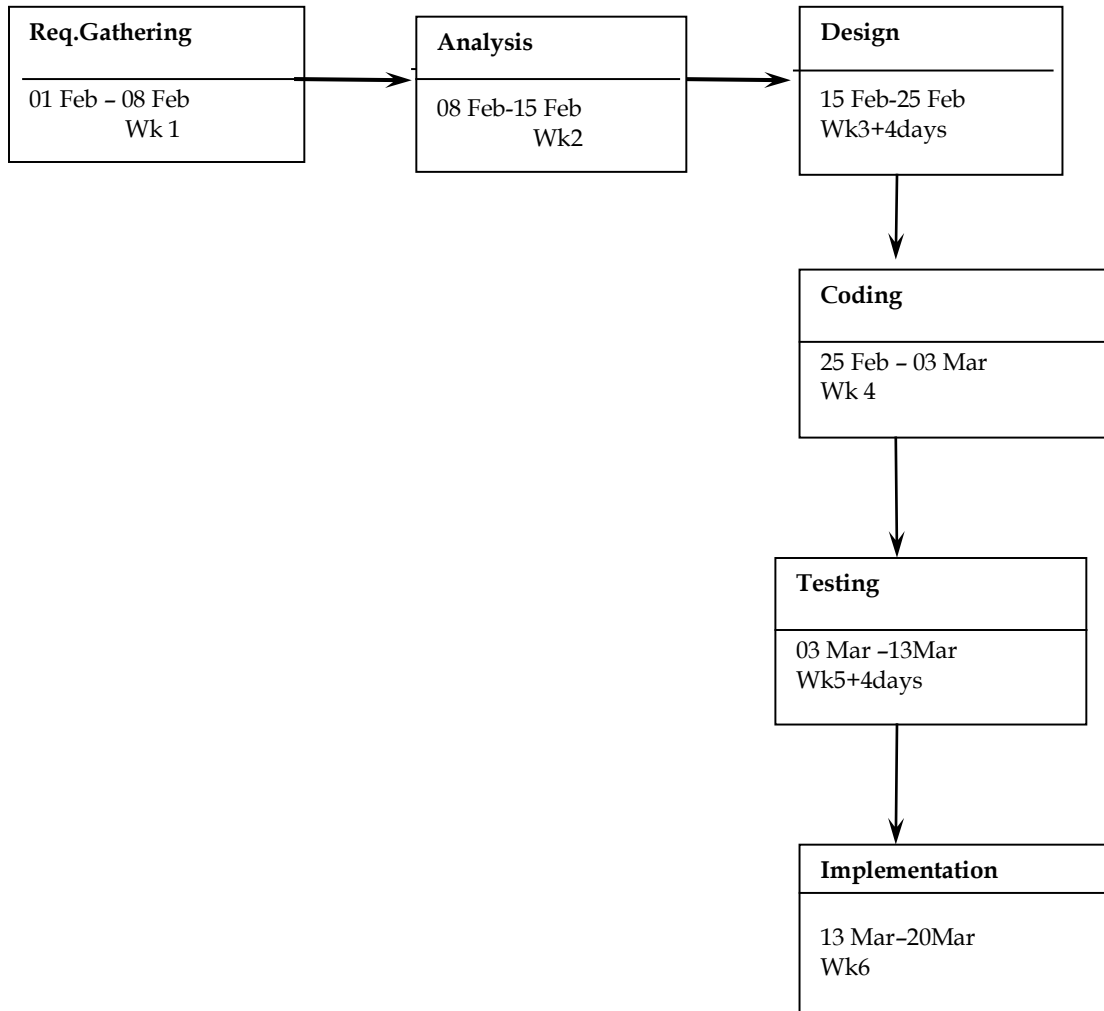




**7.7 Gantt chart:**

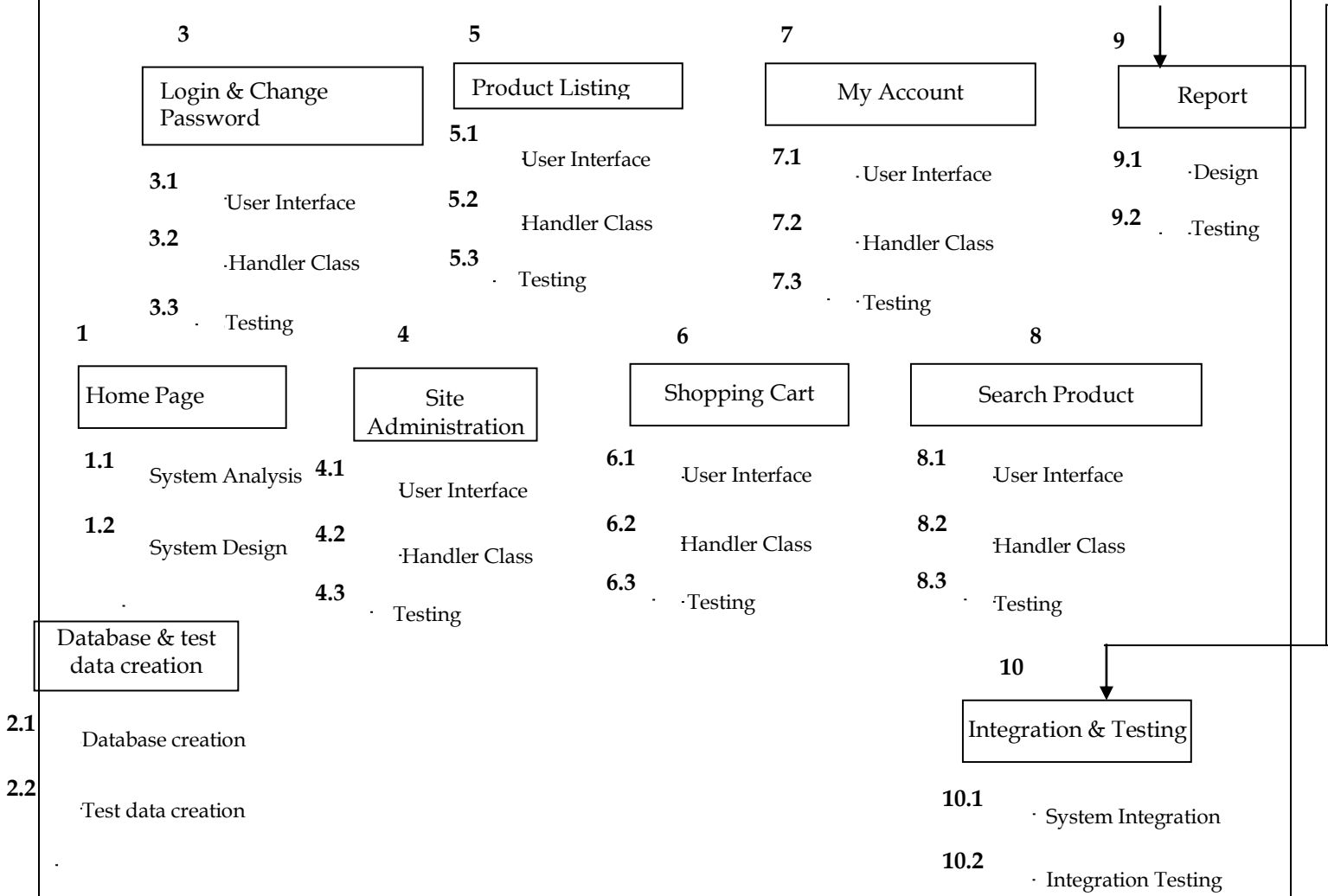


**7.8 PERT chart:**



### 7.9 WBS - Work Breakdown Structure of eCommerce

**eCommerce - Pune Electric Zone**



### Work Breakdown Structure (WBS)

## 7.8 Estimation

### 7.8.1 Basic COCOMO

(cocomo) is an algorithmic software value estimation version evolved with the aid of Barry Boehm. The version uses a simple regression formula, with parameters which might be derived from historic undertaking facts and modern-day project traits. Optimistic cost version: it is a hierarchy of estimation models that address: software composition model: used all through the early stage of software program engineering, when prototyping of consumer interfaces, consideration of software and system interaction, evaluation of overall performance, and evaluation of technology adulthood are paramount.

Cocomo consists of a hierarchy of 3 more and more specific and accurate bureaucracy. The first degree, simple cocomo is ideal for quick, early, hard order of importance estimates of software charges, however its accuracy is restrained because of its lack of things to account for difference in challenge attributes

The basic COCOMO equations take the form

$$\text{Effort Applied} = a_b(\text{KLOC})^{b_b} \text{ [ man-months ]}$$

$$\text{Development Time} = c_b(\text{Effort Applied})^{d_b} \text{ [months]}$$

$$\text{People required} = \text{Effort Applied} / \text{Development Time} \text{ [count]}$$

The coefficients  $a_b$ ,  $b_b$ ,  $c_b$  and  $d_b$  are given in the following table.

Software Project	a	b	c	d
Organic	2.4	1.05	2.5	0.38
Semi Detached	3.0	1.12	2.5	0.35
Embedded	3.6	1.2	2.5	0.32

$$\begin{aligned} E &= 3.0(\text{KLOC})^{1.12} \\ &= 3.0(5000)^{1.12} \\ &= 18 \text{ person months} \end{aligned}$$

$$\begin{aligned} D &= 2.5E^{0.35} \\ &= 2.5(22)^{0.35} \\ &= 6.8 \text{ months} \end{aligned}$$

Therefore No. of persons required =  $18/6.8=3$ persons.

## 7.8.2 Function Point Estimation

A characteristic factor is a unit of size to specific the quantity of enterprise functionality an records system presents to a user. Function factors are the devices of measure utilized by the ifpug functional size dimension technique. The ifpug fsm technique is an iso regarded software program metric to length an statistics device primarily based on the capability that is perceived by way of the person of the records system, unbiased of the era used to put in force the records gadget.

The approach of measuring the scale of an facts device and expressing it in a number of characteristic points is known as characteristic point analysis (fpa). The approach is saved up to date by using worldwide cooperating fpa person agencies like nesma and ifpug. A characteristic point analysis expresses the functional size of an information device in a number of function factors (as an instance: the scale of a device is 314 fps). There are many makes use of and blessings of function factors and the useful size may be used as input into many kinds of assignment and corporation selections consisting of determining the:

- Budget for application development or enhancement costs.
- Budget for the annual maintenance costs of the application portfolio.
- Project productivity after completion of the project.
- Software Size for cost estimating.

### Function-Oriented Metrics

$$FP = \text{count\_total} * [0.65 + 0.01 * \text{sum of } F_i]$$

1. Does the system require dependable backup and healing=five
2. Are records communications required=4
3. Are there distributed processing features=2
- Four. Is overall performance critical=five
- Five. Will the device run an current, heavily applied operational surroundings=five
6. Does device calls for on line statistics entry=5
7. Does on line statistics entry req. Enter transaction to be construct on a couple of displays=three
- Eight. Are grasp documents up to date on-line =4
- Nine. Are i/playstation , 0/ps, files and inquires complex=3
- 10.Is crucial processing complicated=5
- Eleven. Is code reusable=four
- 12.Are conversion and installation protected in layout=2
- 13.Is gadget supports a couple of installations =2
14. Is software designed to facilitate change and ease of use by using user=five

Sum of  $f_i = 54$

Measurement Parameter	Count		Simple	Average	Complex	=	
Number of User Inputs	12	*	3	4	6	=	36
Number of User outputs	4	*	4	5	7	=	16
Number of User inquires	1	*	3	4	6	=	6
Number of files	5	*	7	10	15	=	35
Number of External interface	3	*	5	7	10	=	15
Count Total							108

$$FP = \text{Count\_total} * [0.65 + 0.01 * \text{sum of } F_i]$$

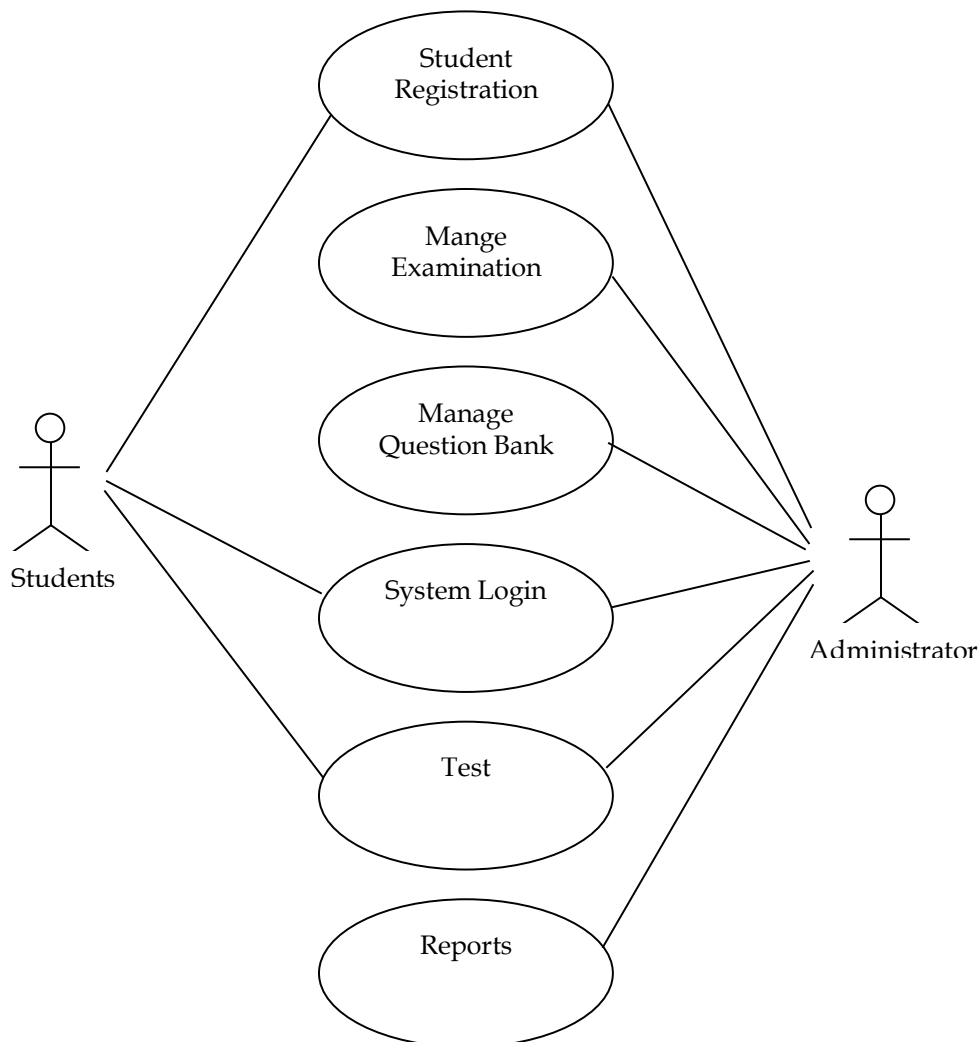
$$FP = 108 * [0.65 + 0.01 * 54]$$

$$FP = 129$$

## 7. Preliminary Design

### 7.1 Use Case

Eexamination utility 1.0 will address the subsequent use instances. The complete utilization scenarios could be finished at some stage in the statistics-accumulating method. Use instances may be created and prioritized. Decided on use instances may be increased into usage scenarios and features which might be derived from each use instances and the utilization situations, as represented within the following diagram:



[eExamination Usage Scenario - This utilization situation, or scenario for quick, describes a actual-world instance of how one or extra human beings or businesses engage with



eexamination gadget. it describe the steps, activities, and/or moves which occur in the course of the interplay. this utilization scenarios indicating precisely how a person works with the consumer interface, or reasonably high level describing the crucial commercial enterprise actions but now not the indicating how they're performed. ]

## 7.2 Specification of actors

The following actors are defined so far in the analysis phase of the eExamination Application for Online Examination System development process.

### 7.2.1 Student

Student	
Element	Details
Description	A student is a member of the eExamination system.
Examples	A Student select examination take the examination, view results online.

### 7.2.2 Administrator

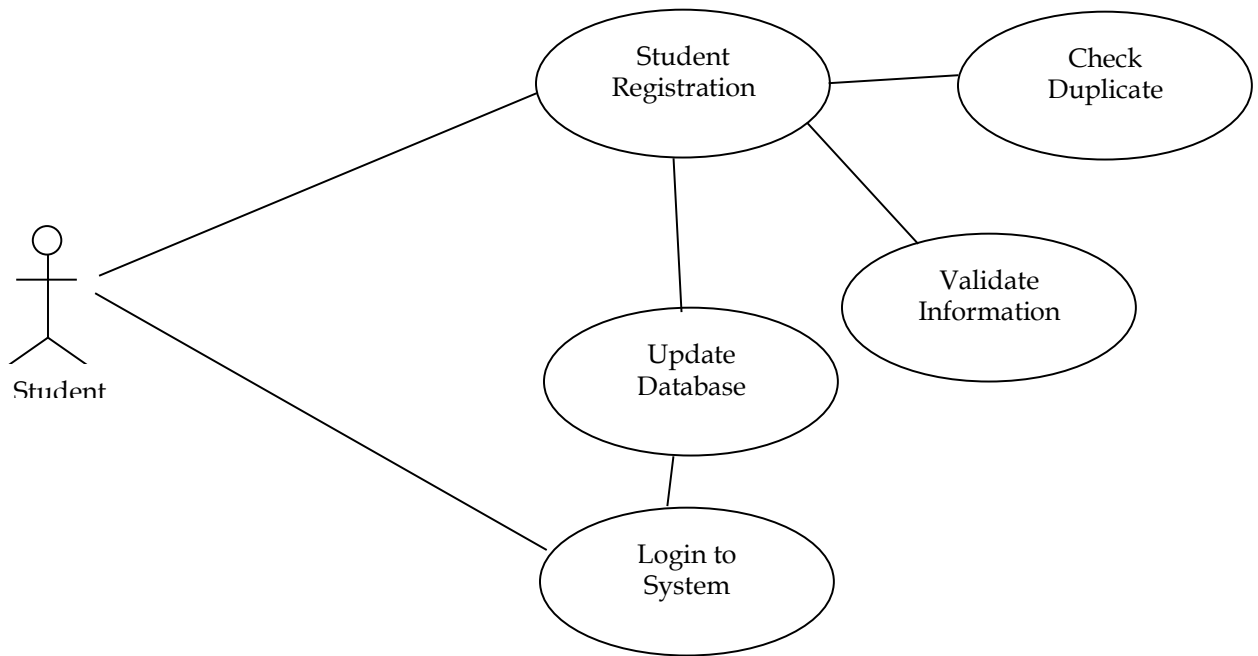
Administrator	
Element	Details
Description	The Administrator is the person who can update all the information like examination and question banks.
Examples	Administrator updates the examination details, add new question and answers in the eExamination application.

## 7.3 Specification of Use Cases

### 7.3.1 Use Case                      Student Registration

Student Registration	
Element	Details
Actor	Student
Trigger	Student is not registered in the System and the student wish to register for a test.
Pre Conditions	Student's Email ID is not listed in the system. Student opens the registration page, and the registration page is displayed.
Post Conditions	Student is registered in the system, the student is logged into the system, and the system menu is displayed.
Normal course	<ol style="list-style-type: none"> <li>1. Registration form appears on the screen</li> <li>2. System increment the last registered Student ID by 1 to get the ID for the new student.</li> <li>3. Student fill in the Student's information including Email ID, Name, Adress(es), Phone number(s),</li> <li>4. System update</li> </ol>
Alternative courses	<ol style="list-style-type: none"> <li>3a. Not all mandatory data fields are filled               <ol style="list-style-type: none"> <li>3a1. Student fills in the missing data fields</li> </ol> </li> </ol>

### Use Case Diagram : Student Registration

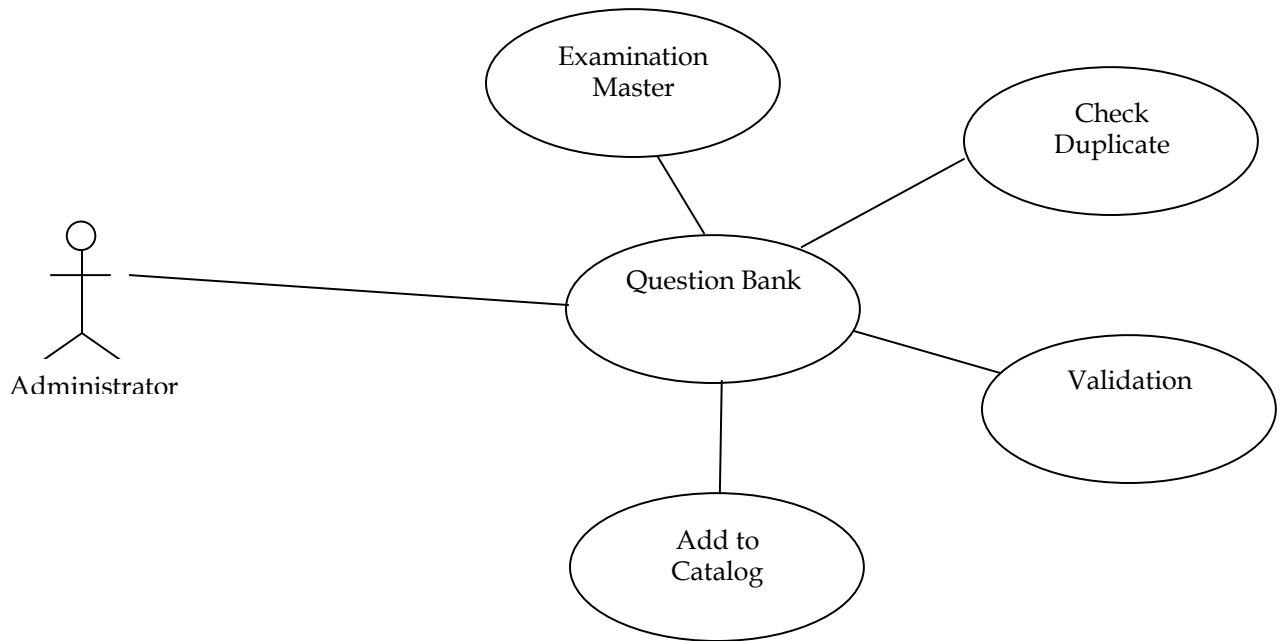


[Use Case: Student Registration - This use case scenario, or scenario for short, describes how student will registered into eExamination System. It describes the steps, events, and/or actions which occur during the interaction. This Usage scenarios indicating exactly how someone works with the student registration interface.]

### 7.3.2 Use Case. Mange Question Banks

Mange Question Banks	
Element	Details
Actor	Administrator
Trigger	Add new question and answer for an examination
Pre Conditions	The question is not in the question bank, the administrator is logged into the system, and the system menu is displayed.
Post Conditions	The question and associate answers is in the question bank, the administrator is logged into the system, and the system menu is displayed.
Normal Event Flow	<ol style="list-style-type: none"> <li>1. The administrator open the question bank page form by choosing the menu item for this action</li> <li>2. Administrator enters all necessary information about the question and answers in the system.</li> <li>3. Administrator update the System by confirming the data entered into the registration form.</li> <li>4. Administrator repeats the steps until complete entry for all questions.</li> </ol>
Variations	<ol style="list-style-type: none"> <li>3a. Mandatory fields in the registration form are missing               <ol style="list-style-type: none"> <li>3a.1 The system reject the entry and system update with an error</li> </ol> </li> </ol>

## Use Case Diagram: Manage Question Bank

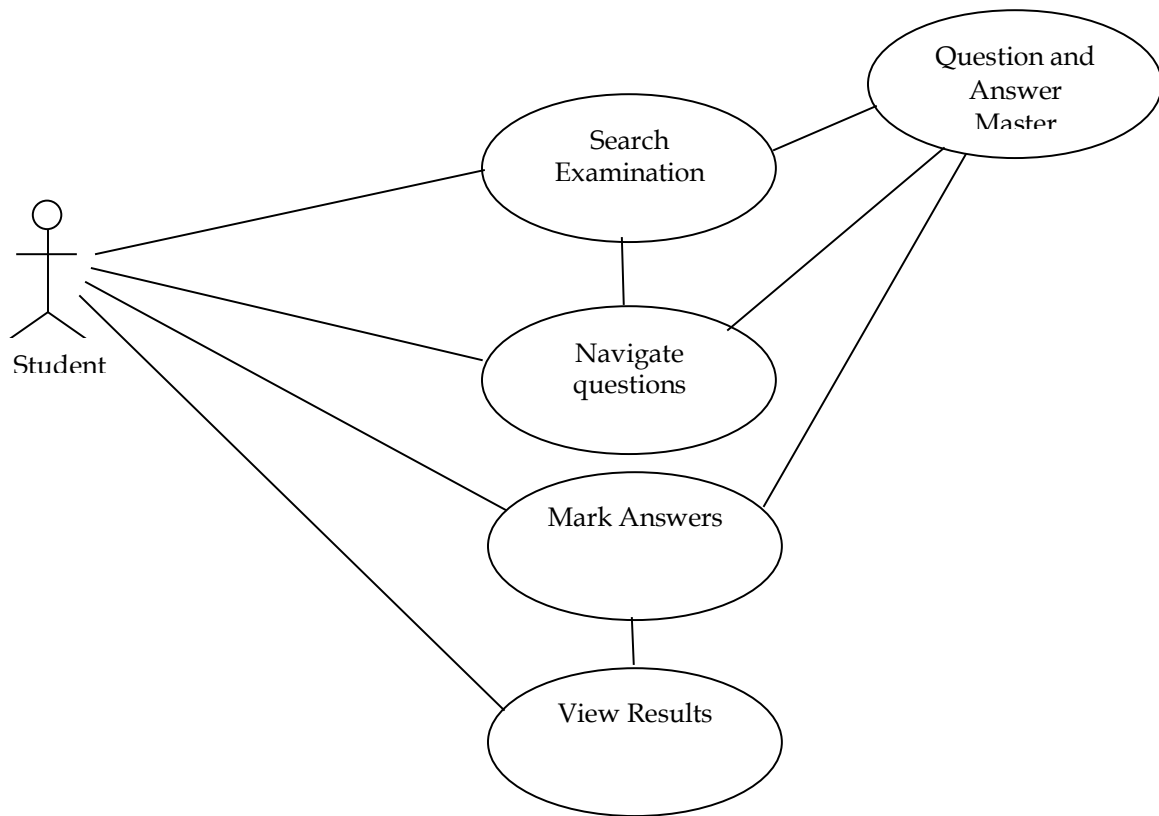


[Use Case: Manage Question Bank - This use case scenario, or scenario for short, describes how administrator will add new question and answer details into eExamination System. It describes the steps, events, and/or actions which occur during the interaction. ]

### 7.3.3 Use Case. Examination

EXamination	
Element	Details
Actor	Student
Trigger	Student wants to give an examination
Pre Conditions	The student must register into the system, the student is logged into the system, and the system menu is displayed.
Post Conditions	The examination is completed and result is saved and displayed. User is logged out from the system, and the system menu is displayed.
Normal event flow	<ol style="list-style-type: none"> <li>1. Student logged in.</li> <li>2. Student selects the examination and start the examination..</li> <li>3. Navigate the question and answers, mark the answers</li> <li>4. The system calculates the result and displayed the results.</li> <li>5. Student logged out from the system.</li> </ol>
Variations	<ol style="list-style-type: none"> <li>5a.The system check for the available question from question bank.</li> <li>2a1.The system informs if found mismatch</li> </ol>

### Use Case Diagram: Examination



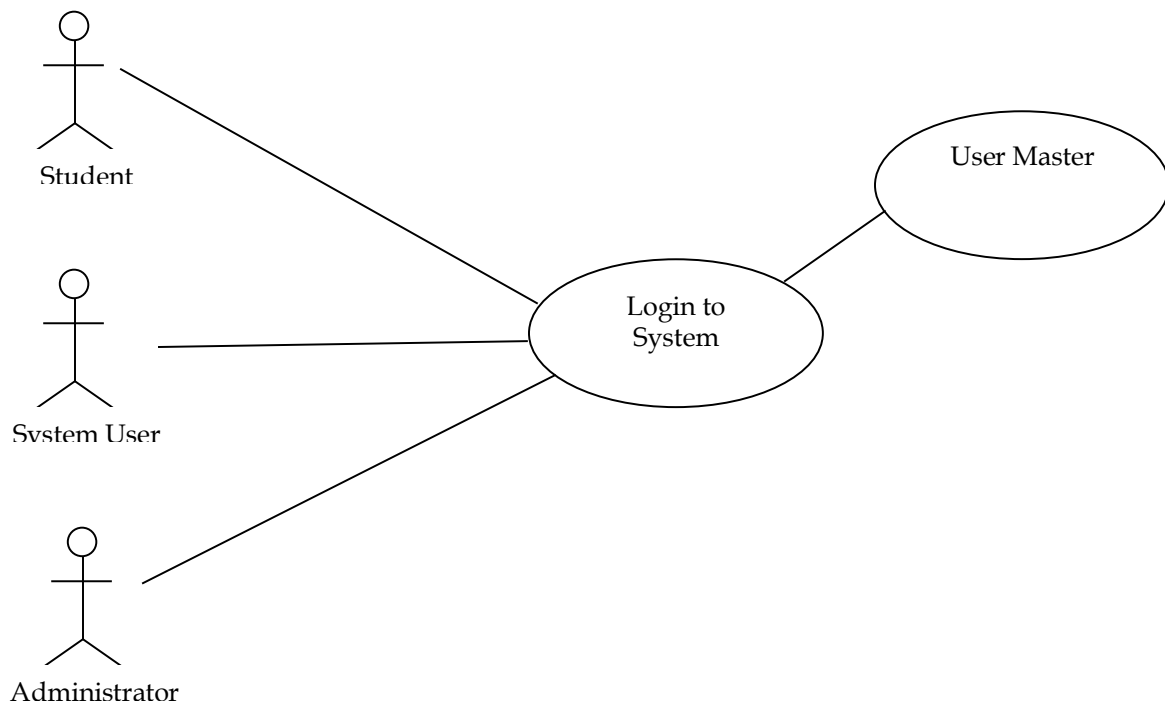
[Use Case: Sales Registration - This use case scenario, or scenario for short, describes how student will give examination and view the results in eExamination system It describes the steps, events, and/or actions which occur during the interaction. ]

<b>System Login</b>	
<b>Element</b>	<b>Details</b>
Actor	Student, Administrator
Trigger	The user wish to start using the system.
Pre Conditions	The user is not logged into the system.
Post Conditions	The user is logged into the system, and the system menu is displayed.
Normal course	<ol style="list-style-type: none"> <li>1. The user click the link for the eExamination application and a login page appear on the screen.</li> <li>2. The user types his username and password into the form and press the login button.</li> <li>3. The system confirms that the user is logged on.</li> </ol>
Alternative courses	<ol style="list-style-type: none"> <li>2a. The user is not a valid user or the user name or the password is mistyped.               <ol style="list-style-type: none"> <li>2a1. The system reject login with an error message that express wrong login name or password.</li> </ol> </li> </ol>

**7.3.4 Use Case.****System Login**



### Use Case Diagram: System Login



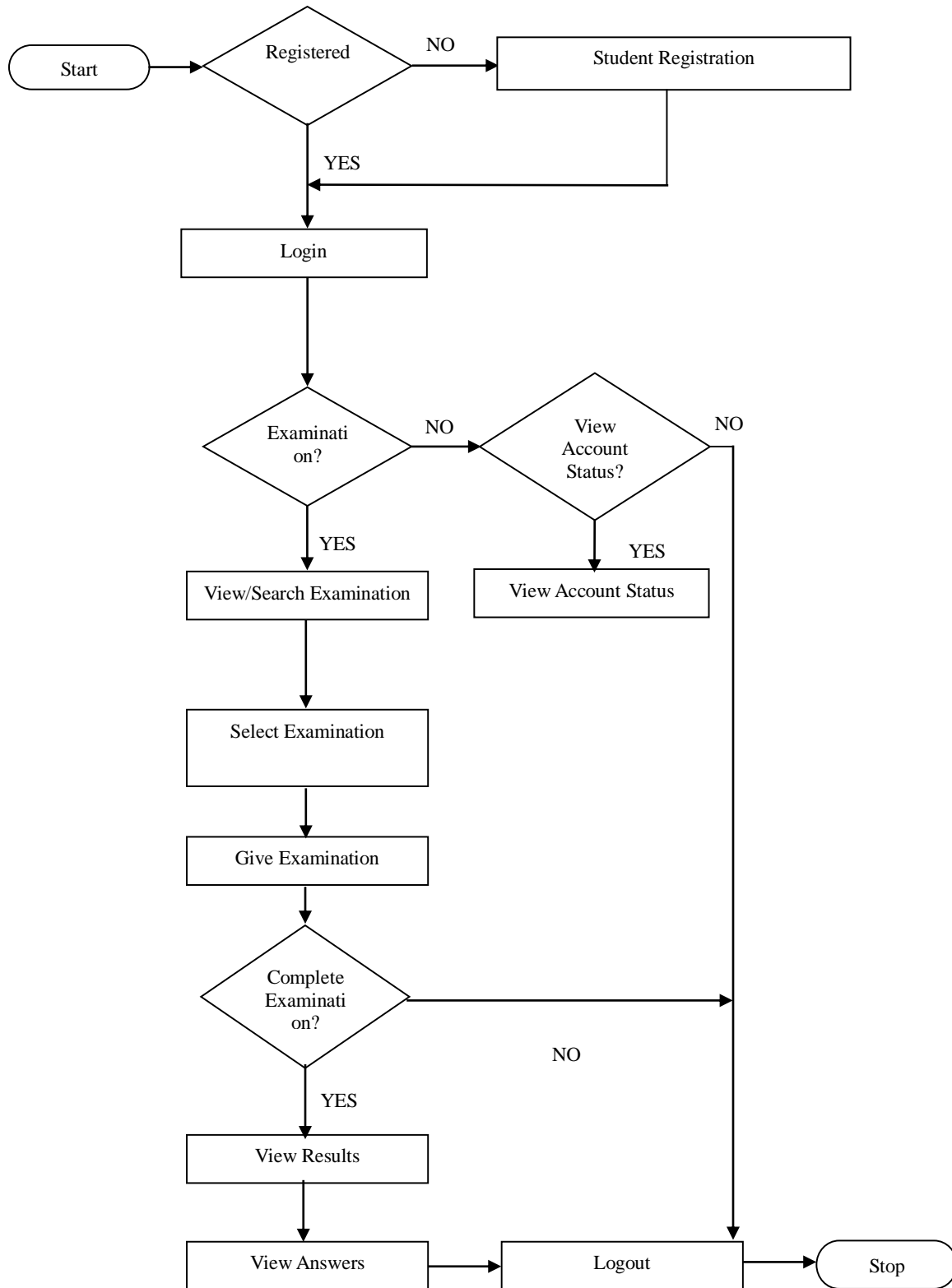
[Use Case: System Login - This use case scenario, or scenario for short, describes how actors will perform login eExamination System. It describes the steps, events, and/or actions which occur during the interaction. ]

7.4

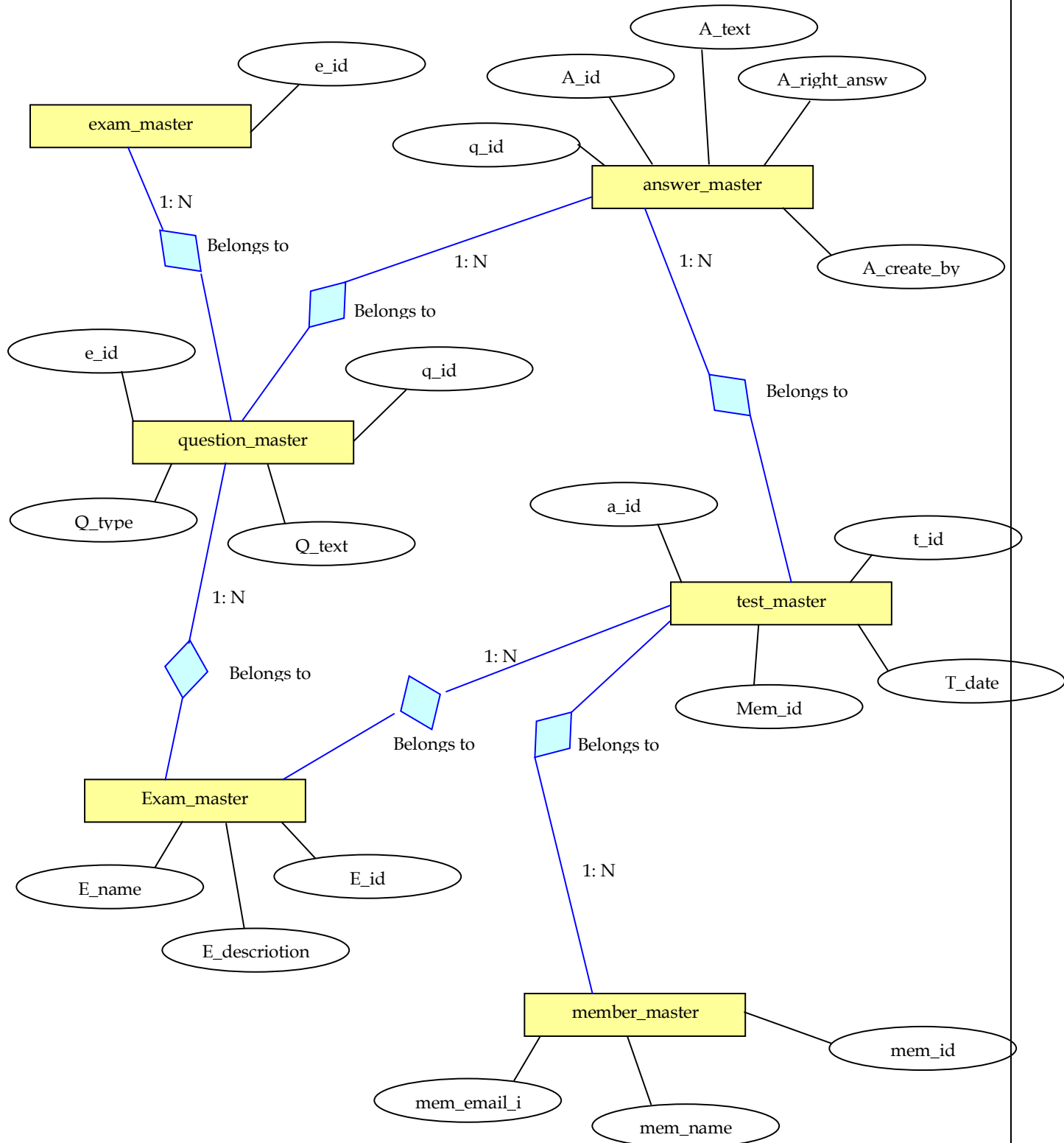
Process

Flow

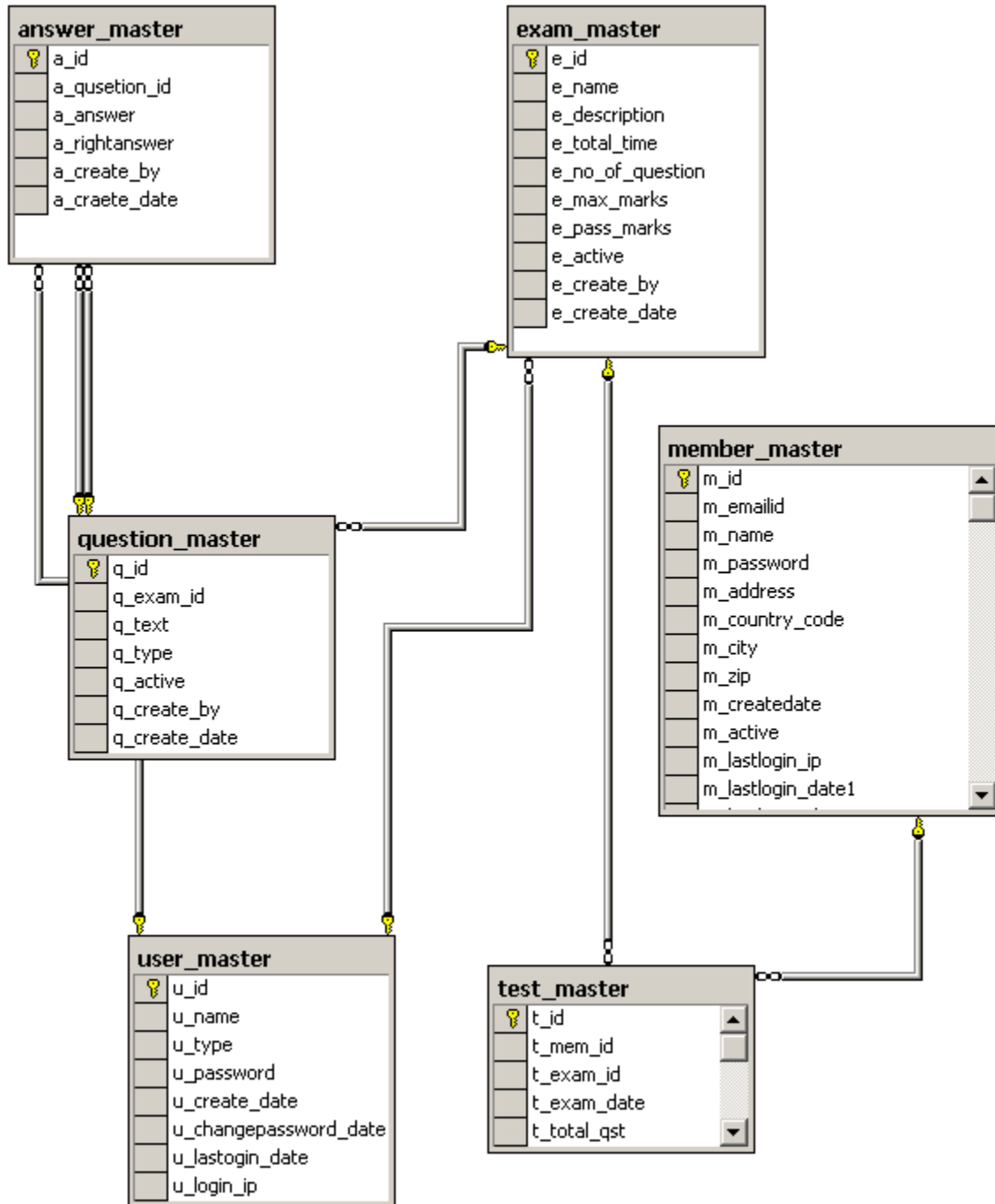
Chart



### 7.5 ER Diagram 1



## 7.6 Schema Diagram



## 7.7 Data Dictionary

### 7.7.1 Table: answer\_master

Sr.	Field Name	Type	Primary Key	Foreign Key
1	a_id	int	Y	
2	a_question_id	int		question_master(q_id)
3	a_answer	varchar(3500)		
4	a_rightanswer	int		
5	a_create_by	int		user_master(u_id)
6	a_create_date	datetime		

[*answer\_master* table is used to store multiple answers for every questions, *a\_question\_id* is reference to question\_master table and link to each question]

**7.7.2 Table: exam\_master**

Sr.	Field Name	Type	Primary Key	Foreign Key
1	e_id	int	Y	
2	e_name	varchar(50)		
3	e_description	varchar(250)		
4	e_total_time	int		
5	e_no_of_question	int		
6	e_max_marks	int		
7	e_pass_marks	int		
8	e_active	int		
9	e_create_by	int		user_master(u_id)
10	e_create_date	datetime		

[exam\_master table is used to store each examination details like name of examination, total marks, passing marks, e\_id is the primary key and used in question\_master, exam\_master tables as foreign key]

**7.7.3. Table: member\_master**

Sr.	Field Name	Type	Primary Key	Foreign Key
1	m_id	int	Y	
2	m_emailid	varchar(50)		
3	m_name	varchar(50)		
4	m_password	varchar(50)		
5	m_address	varchar(150)		
6	m_country_code	varchar(50)		
7	m_city	varchar(50)		
8	m_zip	varchar(6)		
9	m_createdate	datetime		
10	m_active	int		
11	m_lastlogin_ip	varchar(50)		
12	m_lastlogin_date1	datetime		
13	m_lastlogin_date2	datetime		
14	m_password_change_date	datetime		

[*member\_master* table is used to store student/member details of the student it stores details of mem\_id, name, email id, contact details, login details]

#### 7.7.4 Table: question\_master

Sr.	Field Name	Type	Primary Key	Foreign Key
1	q_id	Int	Y	
2	q_exam_id	Int		exam_master(e_id)
3	q_text	Varchar(3500)		
4	q_type	Varchar(10)		
5	q_active	int		
6	q_create_by	int		
7	q_create_date	Date		

[Table *question\_master* is used to store question details, it stores record of question id, question text, question type whether it is single selection or multiple choice. *q\_id* is the primary key and represent for the question in eExamination database]



**7.7.5. Table: test\_master**

Sr.	Field Name	Type	Primary Key	Foreign Key
1	t_id	Int	Y	
2	t_mem_id	Int		member_master(mem_id)
3	t_exam_id	Int		exam_master(e_id)
4	t_exam_date	Int		
5	t_total_qst	Int		
6	t_total_attempt	Int		
7	t_total_right	Int		
8	t_total_wrong	Int		
9	t_total_marks	Int		
10	t_marks_get	Int		
11	t_percent	Int		

[Table *test\_master* is used to store examination result details, it stores record of for each successfully saved test results for all students.]

**7.7.6 Table: user\_master**

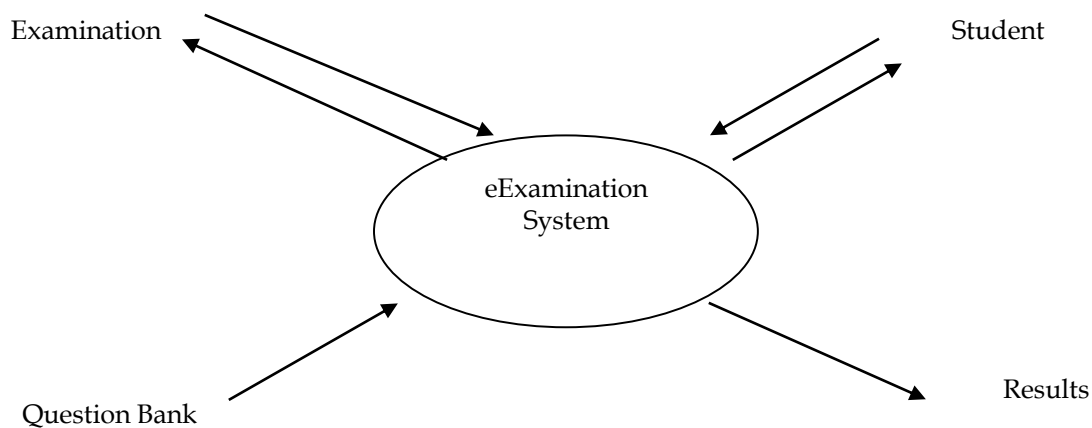
Sr.	Field Name	Type	Primary Key	Foreign Key
1	u_id	Int	Y	
2	u_name	Varchar(50)		
3	u_type	Varchar(50)		
4	u_password	Varchar(50)		
5	u_create_date	Date		
6	u_changepassword_date	Date		
7	u_lastlogin_date	Date		
8	u_login_ip	Varchar(50)		

[Table *userter* is used to store login details for system user includes admin user]

## 7.8 Data Flow Diagram DFD

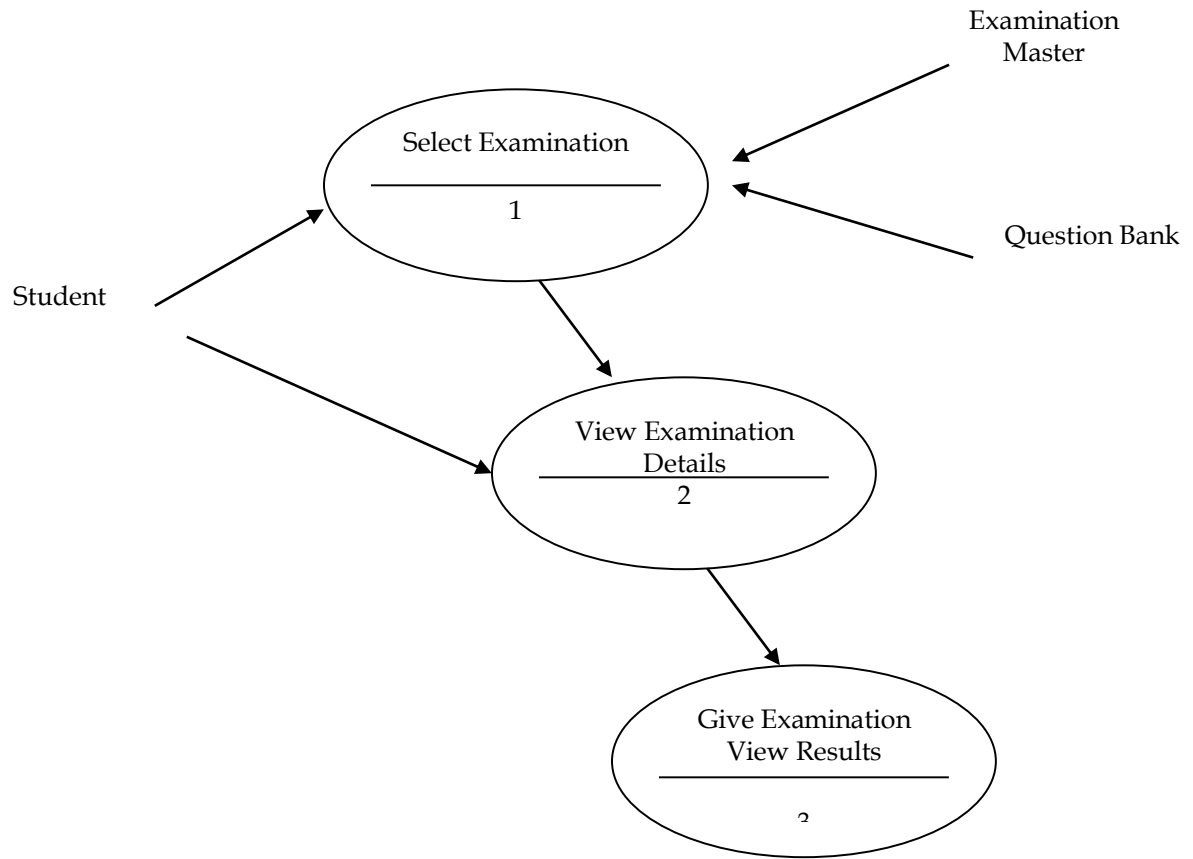
A data-flow diagram (dfd) is a graphical representation of the "flow" of statistics through an records gadget. Dfds can also be used for the visualization of facts processing (established design). On a dfd, information items go with the flow from an outside facts source or an inner facts shop to an inner records shop or an outside data sink, thru an internal process.

### 7.8.1 Context Level



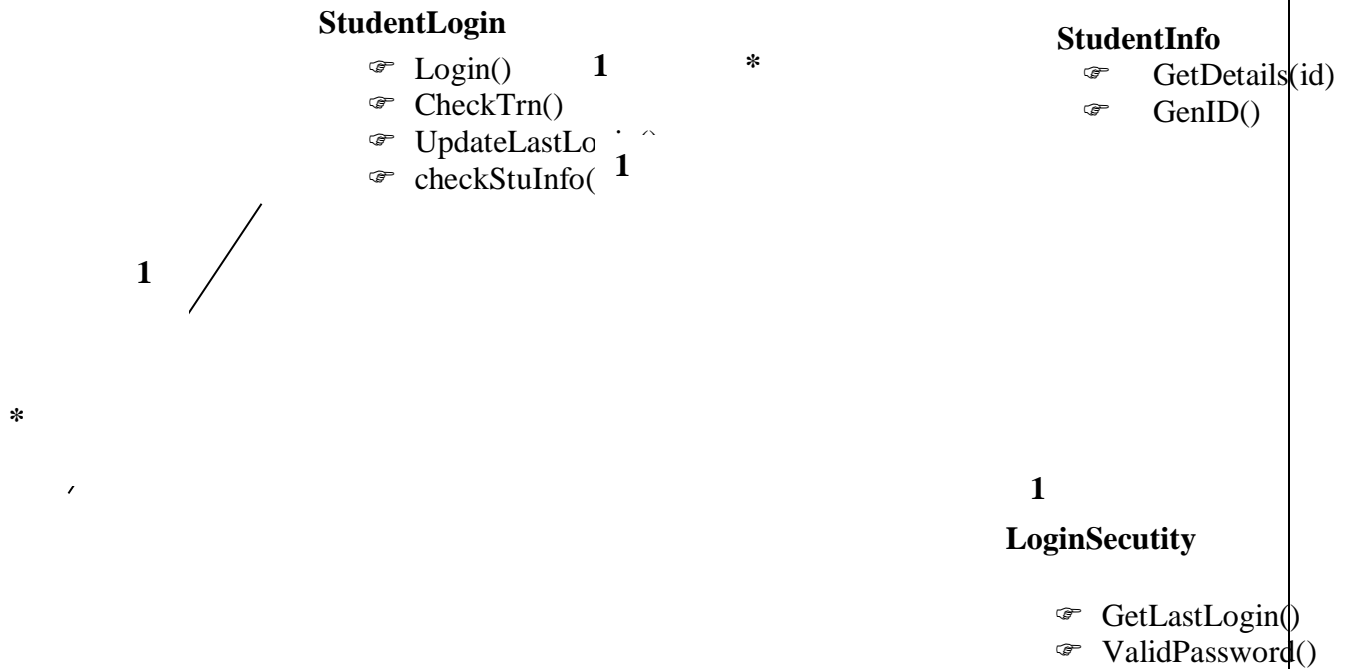
This context-stage statistics go with the flow diagram first, which shows the interaction among the machine and outside marketers which act as data assets and records sinks. At the context diagram (also known as the extent 0 dfd) the device's interactions with the outside international are modelled merely in terms of facts flows across the system boundary. This context diagram shows the whole eexamination as a single system,

### 7.8.2 Level 1 (High Level Diagram)



This degree (stage 1) suggests all approaches at the first stage of numbering, statistics shops, outside entities and the statistics flows among them. The purpose of this stage is to reveal the essential excessive-stage processes of the eexamination machine and their interrelation. A stage-1 diagram ought to be balanced with its parent context level diagram, i.E. There have to be the same external entities and the same data flows, those can be broken right down to more detail inside the degree 1, e.G. The "pick examination" information flow may be spilt into "view info" and "view effects" and still be legitimate.

### 7.9 Class Diagram



## ***7.10 Project Planning And Scheduling***

Making plans could be very crucial in every issue of development paintings. Software mission plan indicated scope of the challenge, milestones and deliverables, undertaking estimates, resource allocation, risk control, scheduling techniques and first-class manipulate and preferred. Software program project plan may be considered as the following:

### **User Interfaces**

The use of textbox and listing box for accepting records. The input records are then stored within the database. Those records also can be retrieved from the database and displayed within the form of tables.

### **Hardware Interfaces**

Raw records inserted into this software program are completely saved in tables; for this reason processor having loose space could be beneficial for quicker garage and retrieval of facts. Here we've used three.6 ghz p4 processor, with a view to have an additional guide for our software.

### **Software Interfaces**

This software program is operated in a home windows xp surroundings. This will assist for firewall protection provisions if the software program is used along side internet connection.

Java is itself very secure, as it doesn't have any memory pointers, and programs run inside virtual machine sandbox.

### **Cost of Implementation**

This challenge can be implemented in the enterprise in a single to 2 weeks. The value of this mission is derived from attempt, hardware cost, tour expenses, education cost, telecommunication expenses and many others.

**a. Effort:** It includes the entire wide variety of manpower in step with months. As this challenge is absolutely computerized therefore much less quantity of manpower may be used to efficaciously run this assignment. At least 2-three individuals may be sufficient to maintain this undertaking.

**b. Hardware cost:** It includes 2 INTEL P4 Standalone Computers. Cost around 60,000.

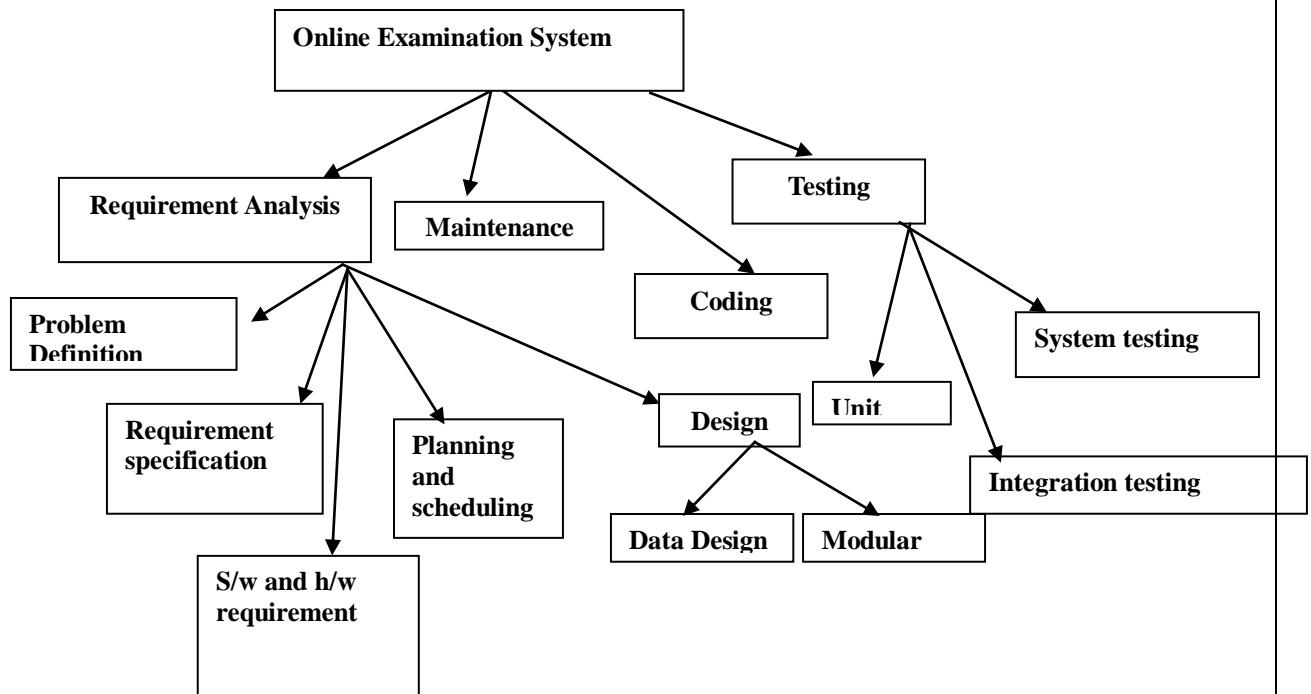
**c. Training Cost:** One Software personnel will be allotted for providing training to the manpower allotted

**d. Project duration:** It will take entire 2 months for crowning glory. After that it'll take another 2-3 weeks for implementation and trying out. Every other 1-2 weeks is stored in hand for any inconvenience.

**With respect to the customer:** Weekly or well timed conferences can be scheduled with the customers for getting time to time comments. Those conferences could be observed with presentation reviews. Upon getting remarks further modifications and tendencies might be completed.

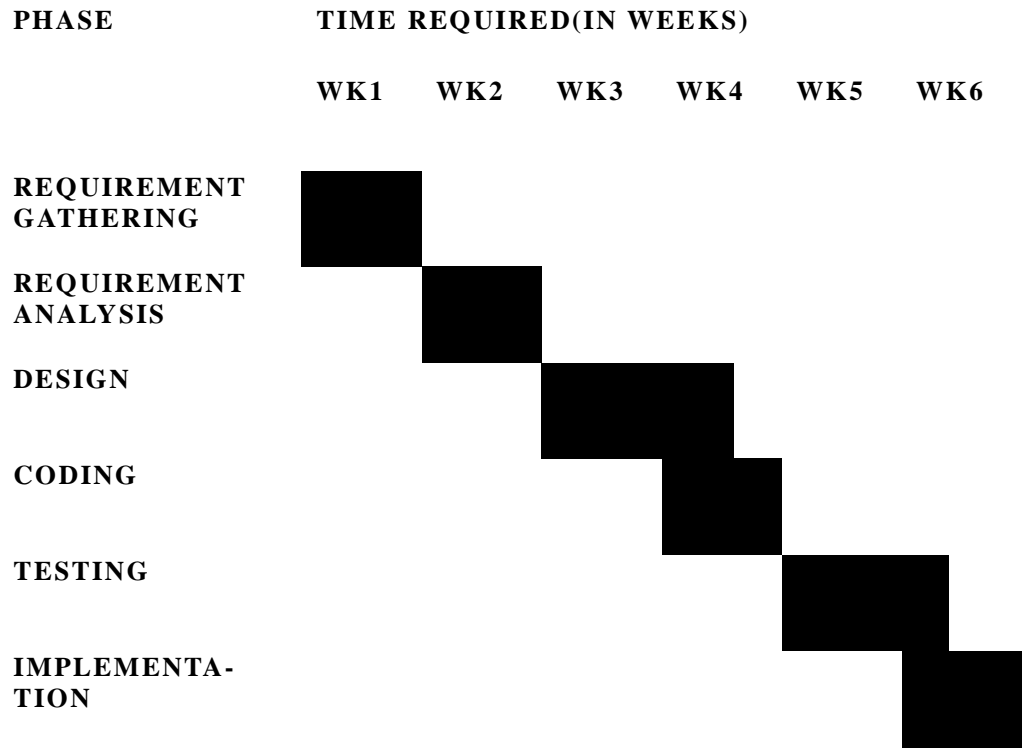
### 7.11 Scheduling

Scheduling of a challenge can be correlated to prioritizing numerous jobs with admire to their fee, time and length. Scheduling may be finished with useful resource constraint or time constraint in mind.

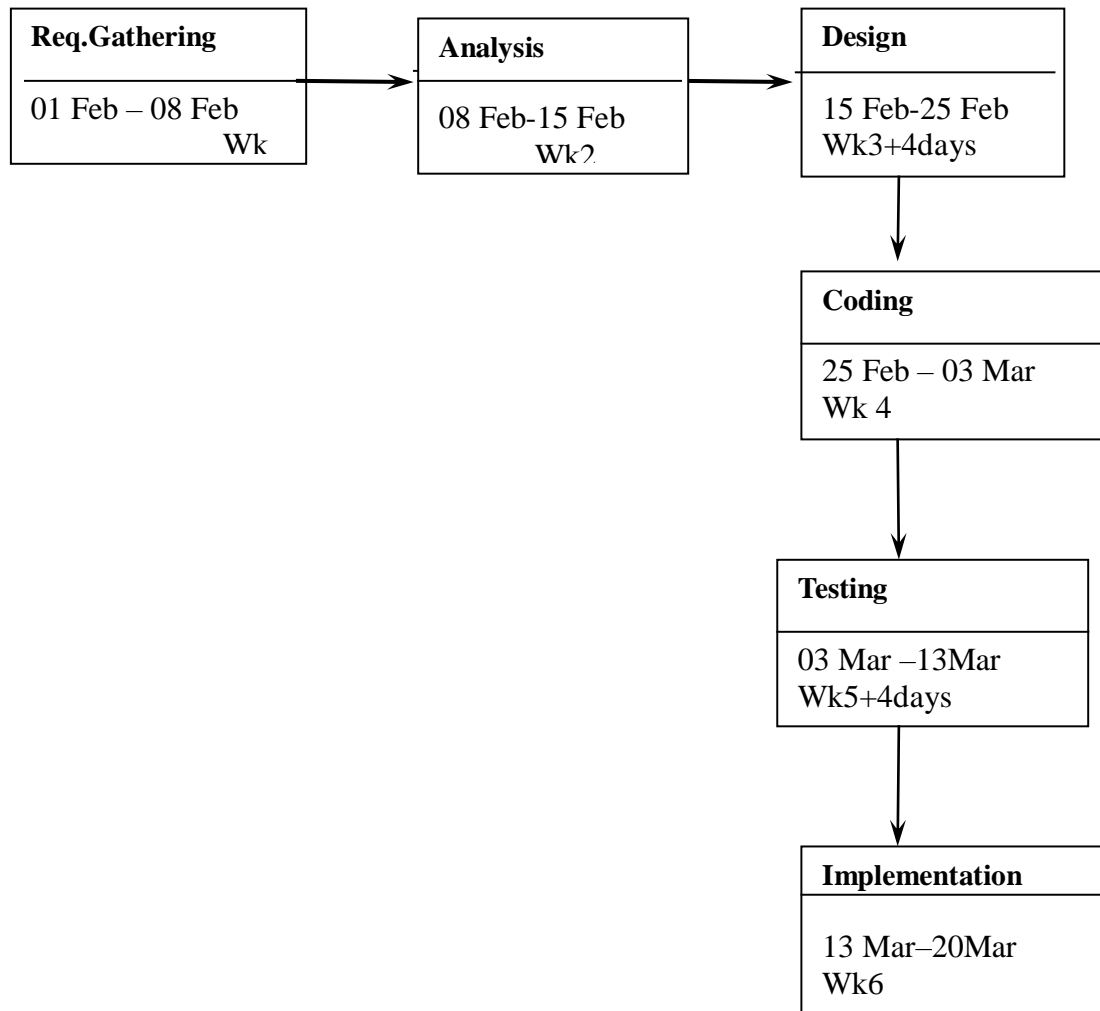




**7.11.1 Gantt chart:**

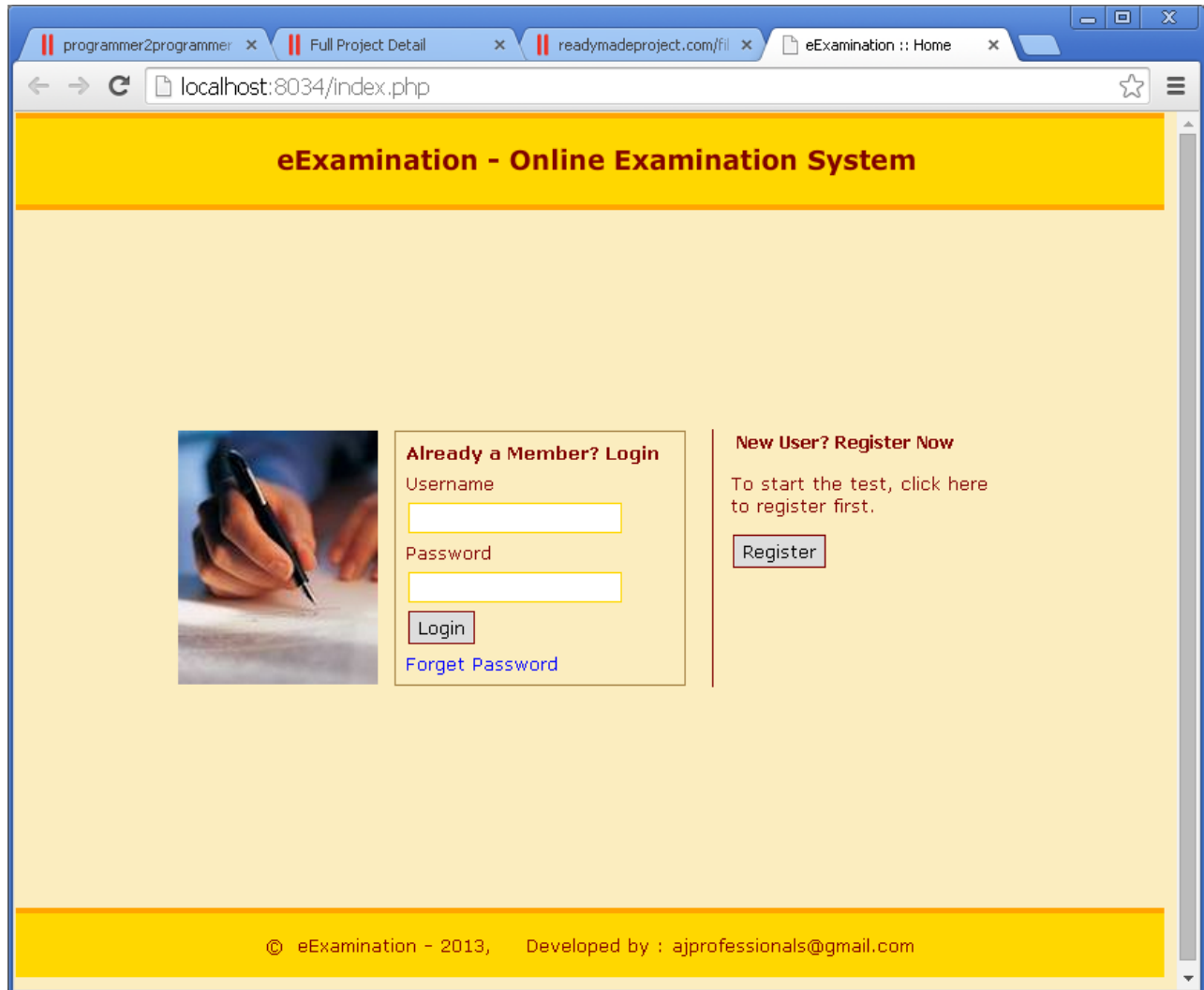


### 7.11.2 PERT chart:



## 8 Coding and Web Pages

### 8.1 eExamination Home Page



## 8.2 eExamination - Registration Page

**eExamination - Online Examination System**

**Member Registration**

Login Email ID

Username

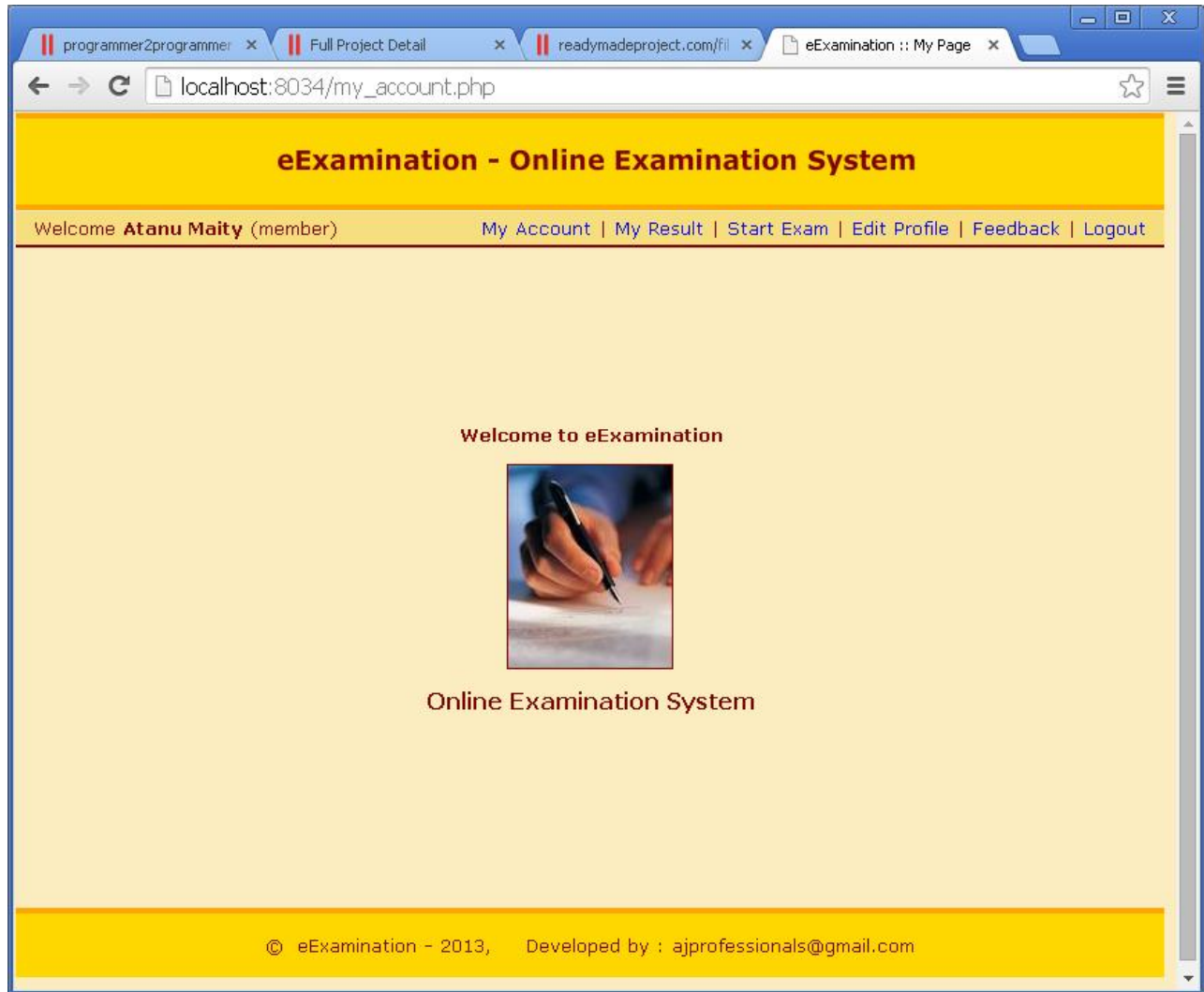
Password

Confirm Password

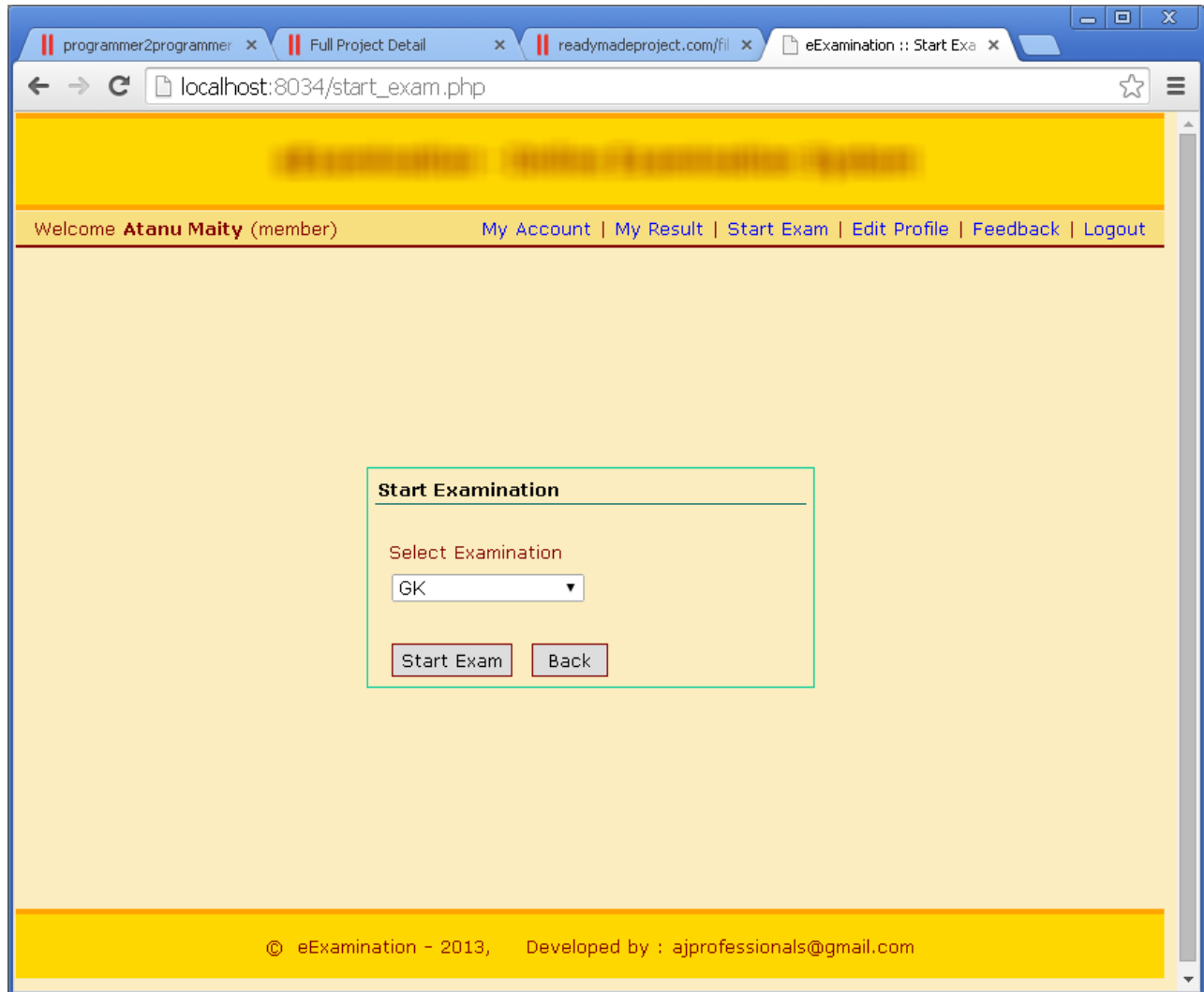
Already a Member click here to [Login](#)

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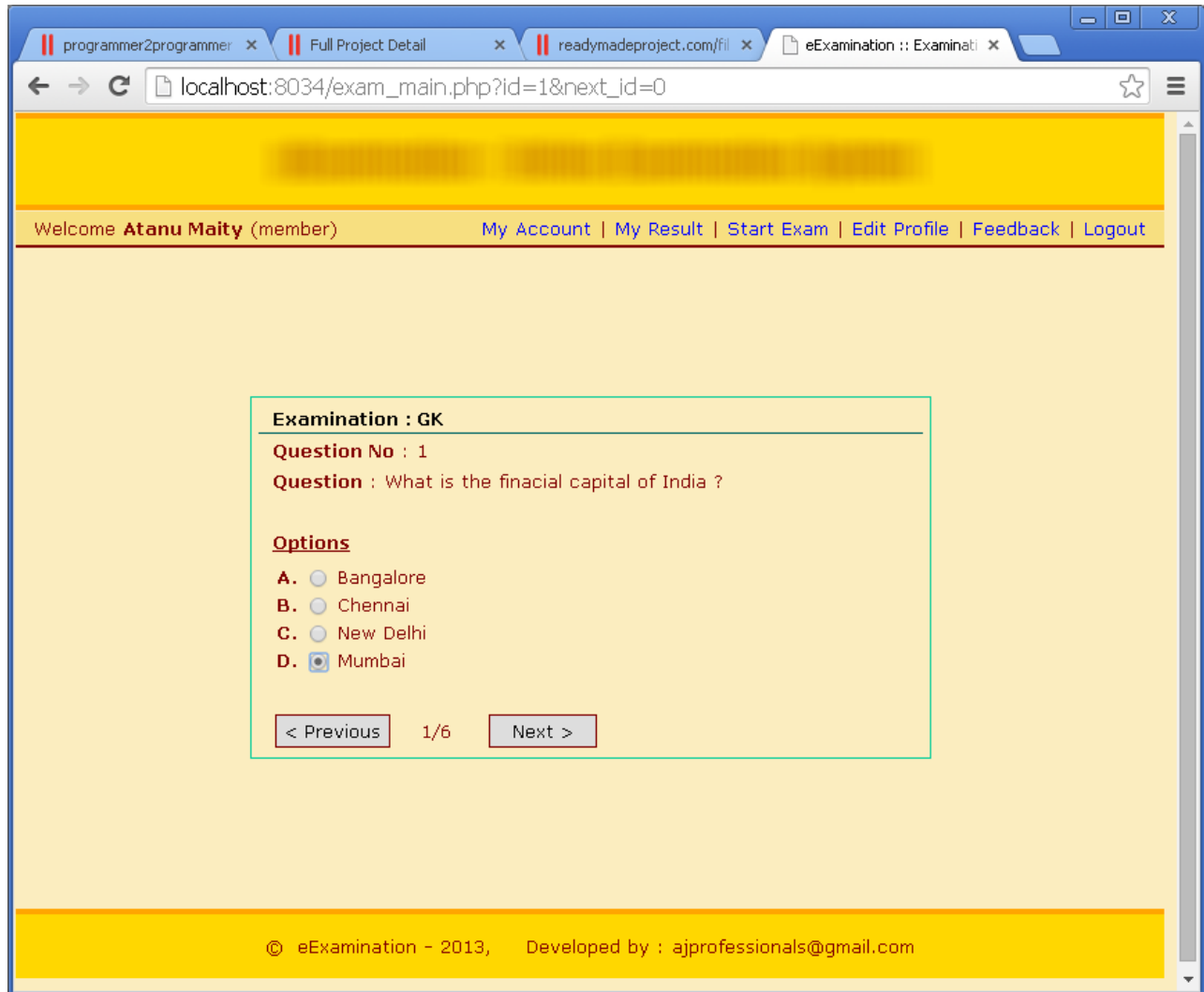
### 8.3 eExamination - My Account



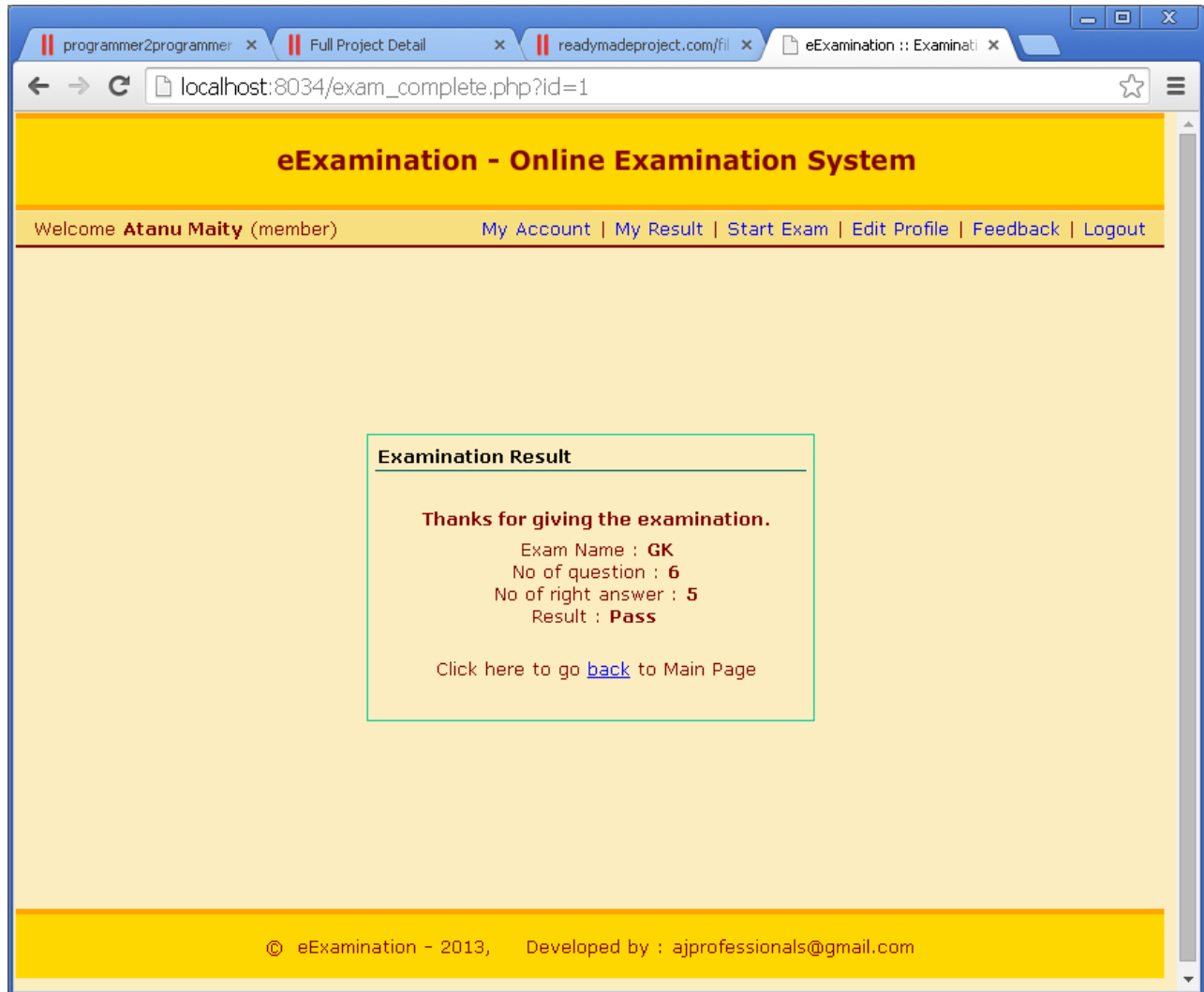
## 8.4 eExamination - New Examination



## 8.5 eExamination – Give Examination

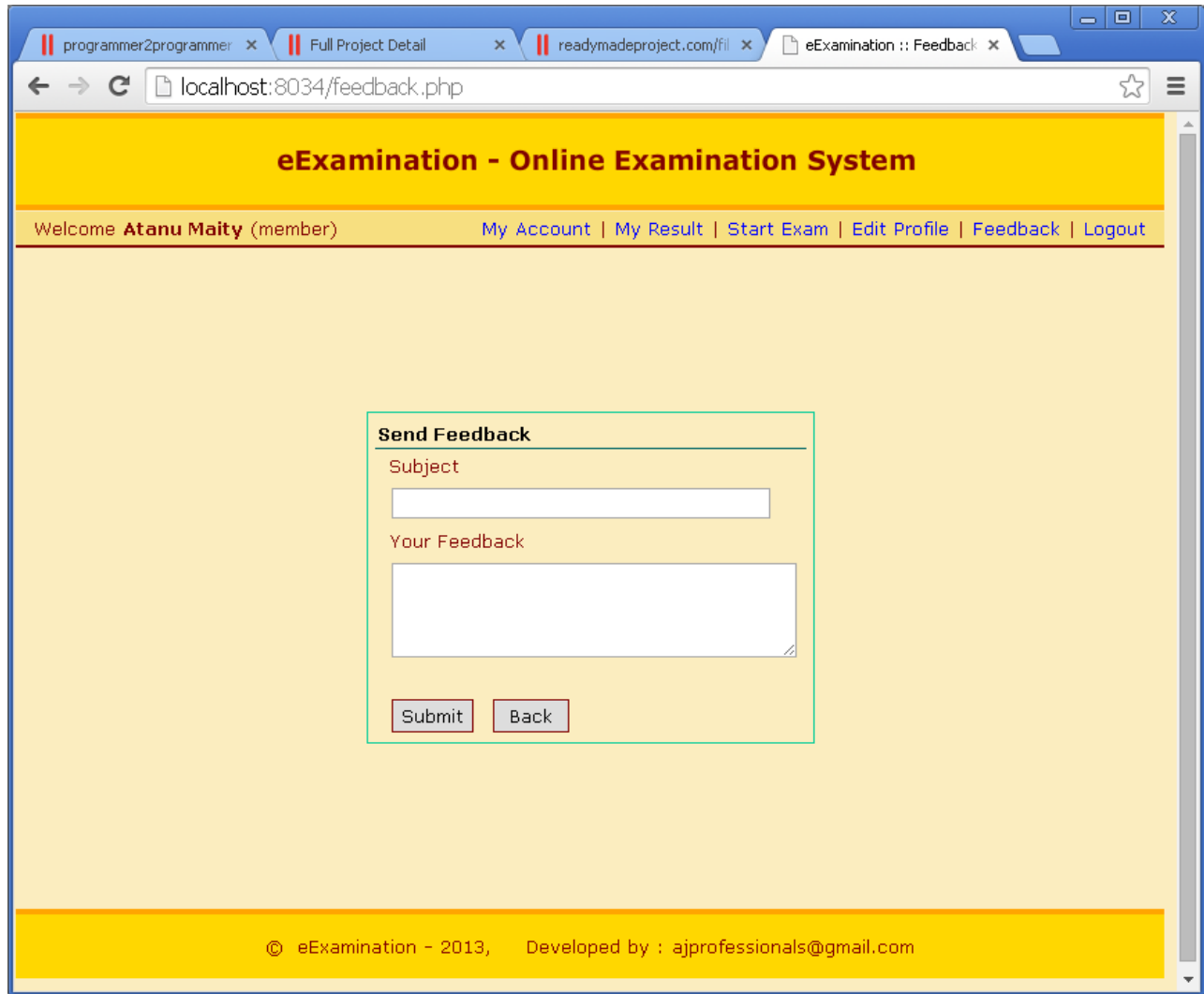


## 8.6 eExamination - Results

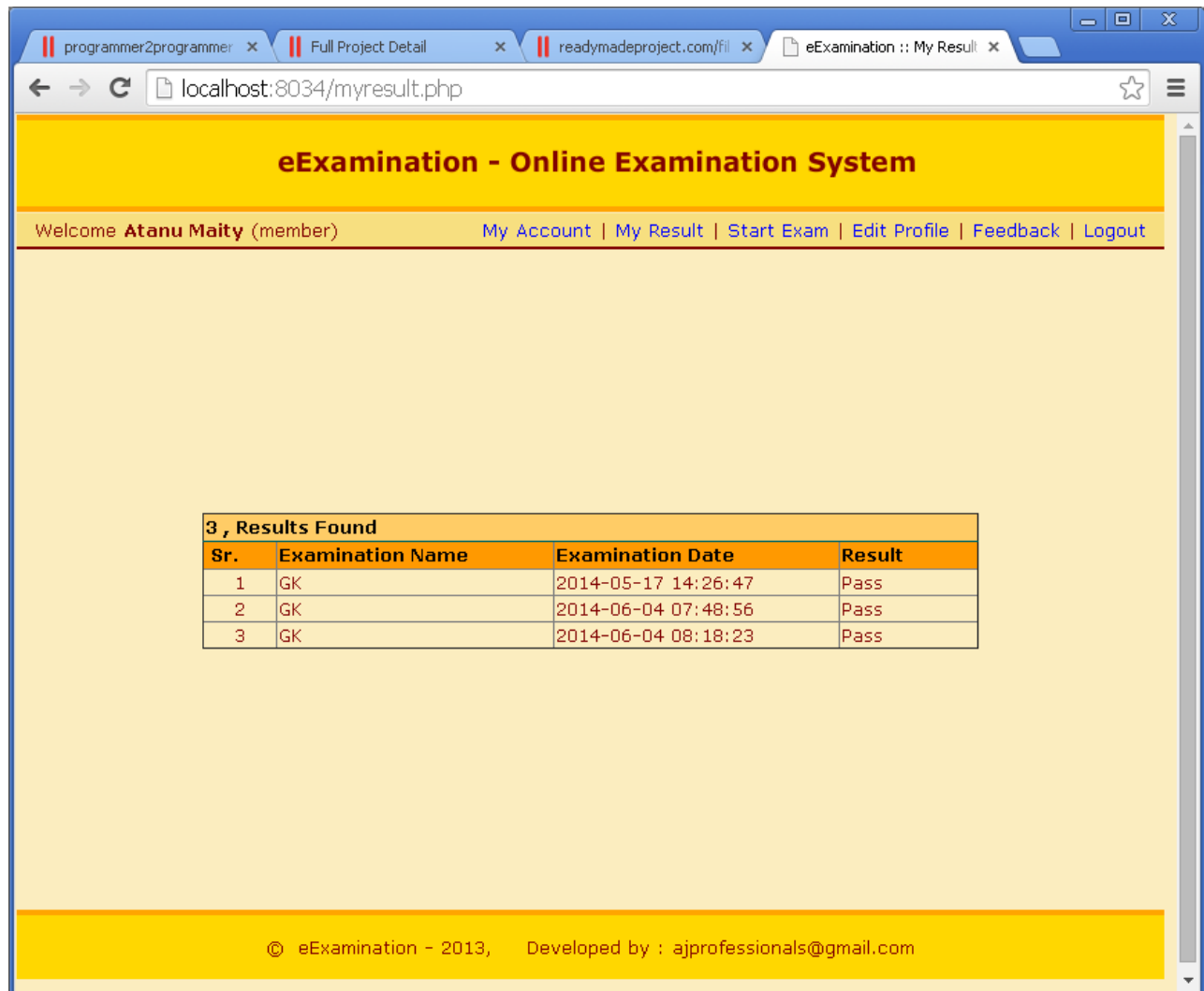




## 8.7 eExamination -Feedback



## 8.8 eExamination -View Results



The screenshot displays a web browser window with the URL `localhost:8034/myresult.php`. The page title is "eExamination - Online Examination System". A navigation bar at the top right contains links: "My Account", "My Result", "Start Exam", "Edit Profile", "Feedback", and "Logout". The user is identified as "Atanu Maity (member)".

The main content area displays a table titled "3 , Results Found". The table has four columns: "Sr.", "Examination Name", "Examination Date", and "Result".

Sr.	Examination Name	Examination Date	Result
1	GK	2014-05-17 14:26:47	Pass
2	GK	2014-06-04 07:48:56	Pass
3	GK	2014-06-04 08:18:23	Pass

The footer of the page contains the copyright information: "© eExamination - 2013, Developed by : ajprofessionals@gmail.com".

## 8.9 eExamination -Edit Profile

The screenshot shows a web browser window with the URL `localhost:8034/edit_profile.php`. The page title is "eExamination - Online Examination System". A navigation bar at the top right contains links: "My Account", "My Result", "Start Exam", "Edit Profile", "Feedback", and "Logout". The user is logged in as "Atanu Maity (member)".

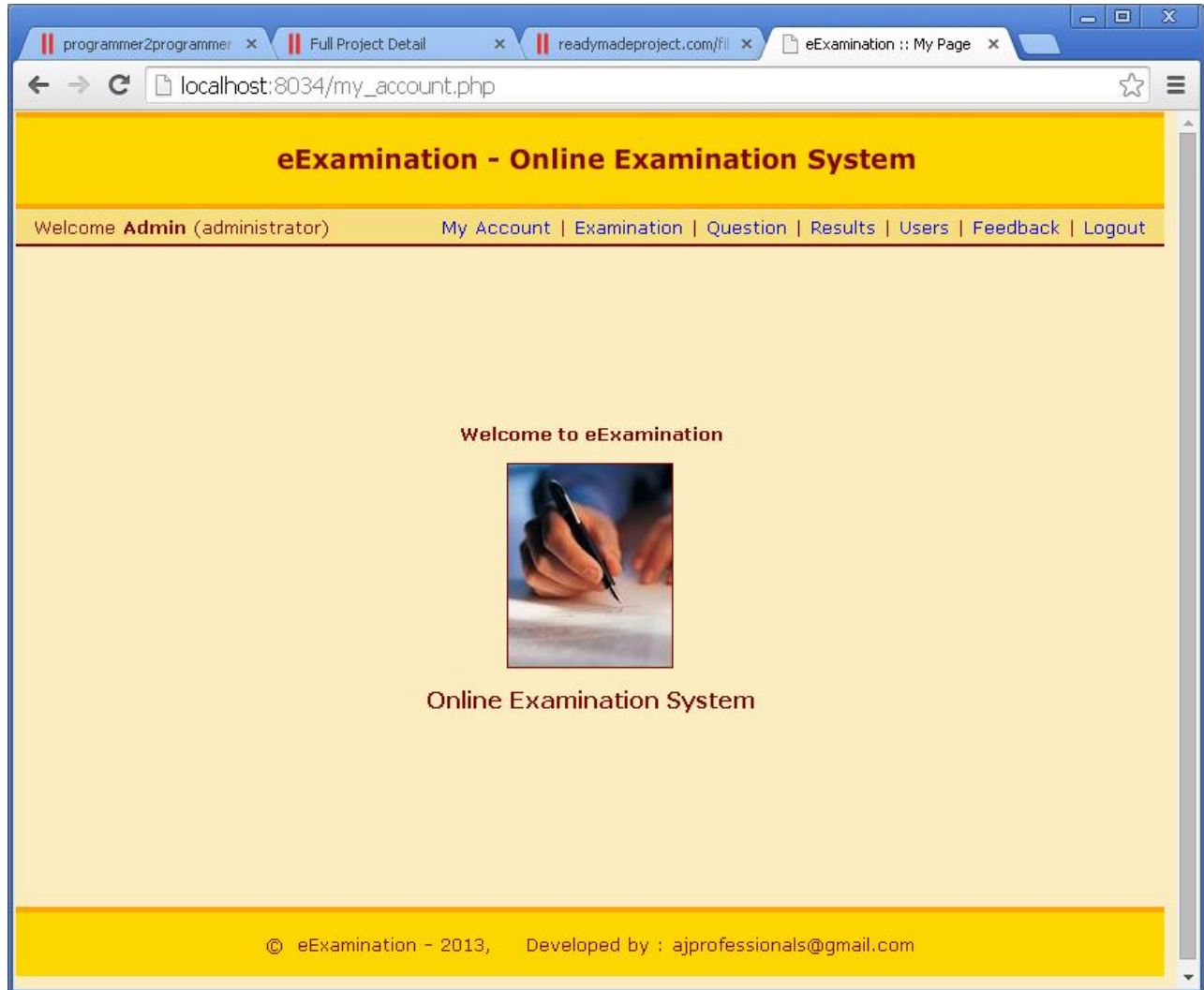
The main content area features an "Edit Profile" form with the following fields:

- Email ID:
- Username:
- Password:
- Confirm Password:

At the bottom of the form are two buttons: "Submit" and "Reset".

The footer of the page contains the text: "© eExamination - 2013, Developed by : ajprofessionals@gmail.com".

## 8.10 eExamination -Admin Home



## 8.11 eExamination -Admin View Examination

Welcome **Admin** (administrator)      [My Account](#) | [Examination](#) | [Question](#) | [Results](#) | [Users](#) | [Feedback](#) | [Logout](#)

**3 Examination Available**      [Add New Examination](#)

ID	Examination	Description	
1	GK	General Knowledge	<a href="#">Edit</a> <a href="#">Delete</a>
2	VB.NET	Visual Basic .NET	<a href="#">Edit</a> <a href="#">Delete</a>
3	Oracle	Oracle PL/SQL	<a href="#">Edit</a> <a href="#">Delete</a>

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## 8.12 eExamination -Admin New Examination

The screenshot shows a web browser window with the URL `localhost:8034/exam_addedit.php?mode=add&id=0`. The page has a yellow header and a navigation bar with the text "Welcome Admin (administrator)" and links for "My Account", "Examination", "Question", "Results", "Users", "Feedback", and "Logout". The main content area features a form titled "Exam - Add New Exam" with the following fields and controls:

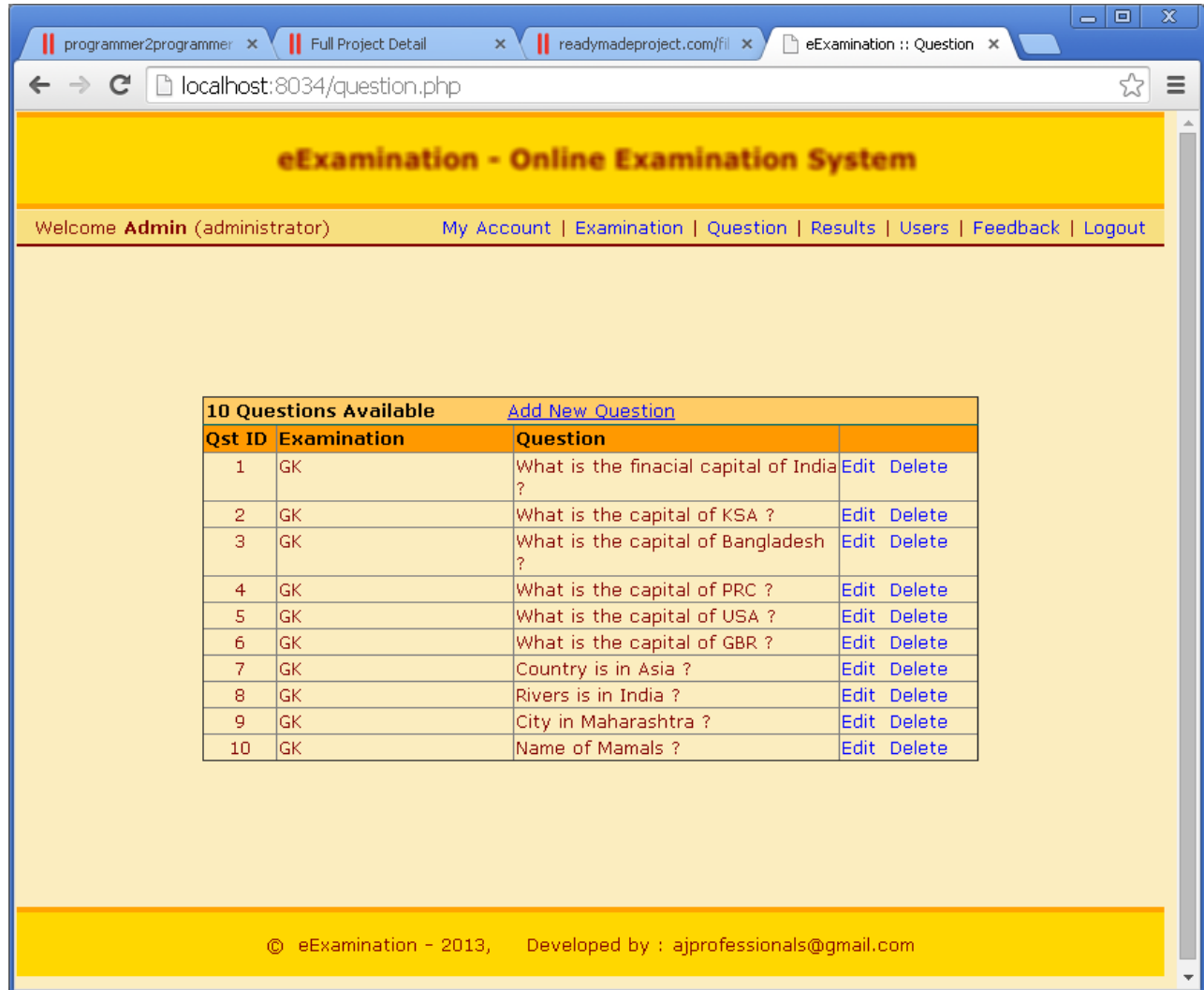
- Exam ID:
- Exam Name:
- Exam Description:
- Exam Questions:
- Exam Pass Percentage:
- Exam is Active
- Submit, Reset, and Back buttons

The footer of the page contains the text: "© eExamination - 2013, Developed by : ajprofessionals@gmail.com".

### 8.13 eExamination -Admin Edit Examination



## 8.14 eExamination -Admin View Question Bank



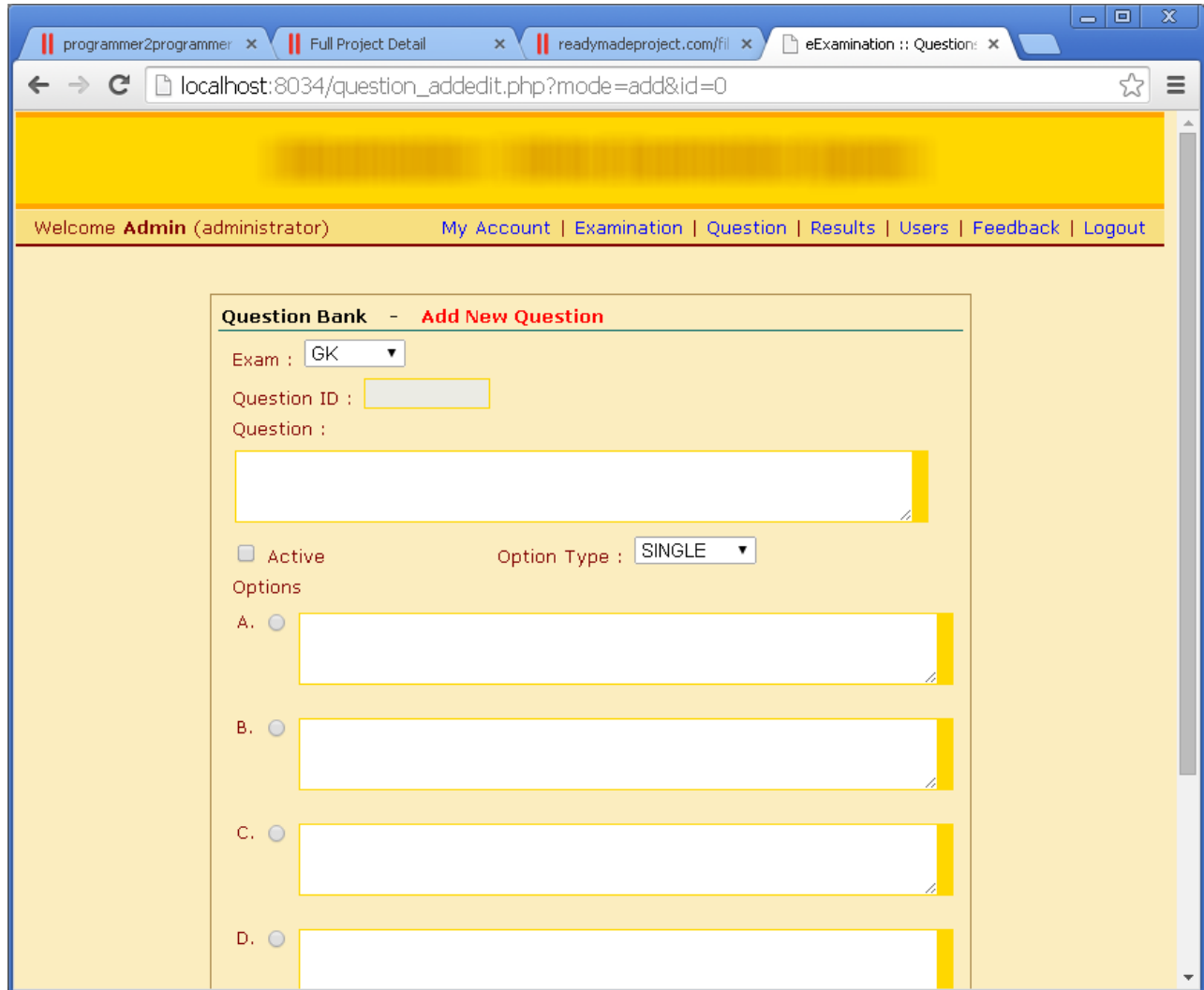
10 Questions Available [Add New Question](#)

Qst ID	Examination	Question	
1	GK	What is the financial capital of India ?	<a href="#">Edit</a> <a href="#">Delete</a>
2	GK	What is the capital of KSA ?	<a href="#">Edit</a> <a href="#">Delete</a>
3	GK	What is the capital of Bangladesh ?	<a href="#">Edit</a> <a href="#">Delete</a>
4	GK	What is the capital of PRC ?	<a href="#">Edit</a> <a href="#">Delete</a>
5	GK	What is the capital of USA ?	<a href="#">Edit</a> <a href="#">Delete</a>
6	GK	What is the capital of GBR ?	<a href="#">Edit</a> <a href="#">Delete</a>
7	GK	Country is in Asia ?	<a href="#">Edit</a> <a href="#">Delete</a>
8	GK	Rivers is in India ?	<a href="#">Edit</a> <a href="#">Delete</a>
9	GK	City in Maharashtra ?	<a href="#">Edit</a> <a href="#">Delete</a>
10	GK	Name of Mamals ?	<a href="#">Edit</a> <a href="#">Delete</a>

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### 8.15 eExamination –Admin New Question



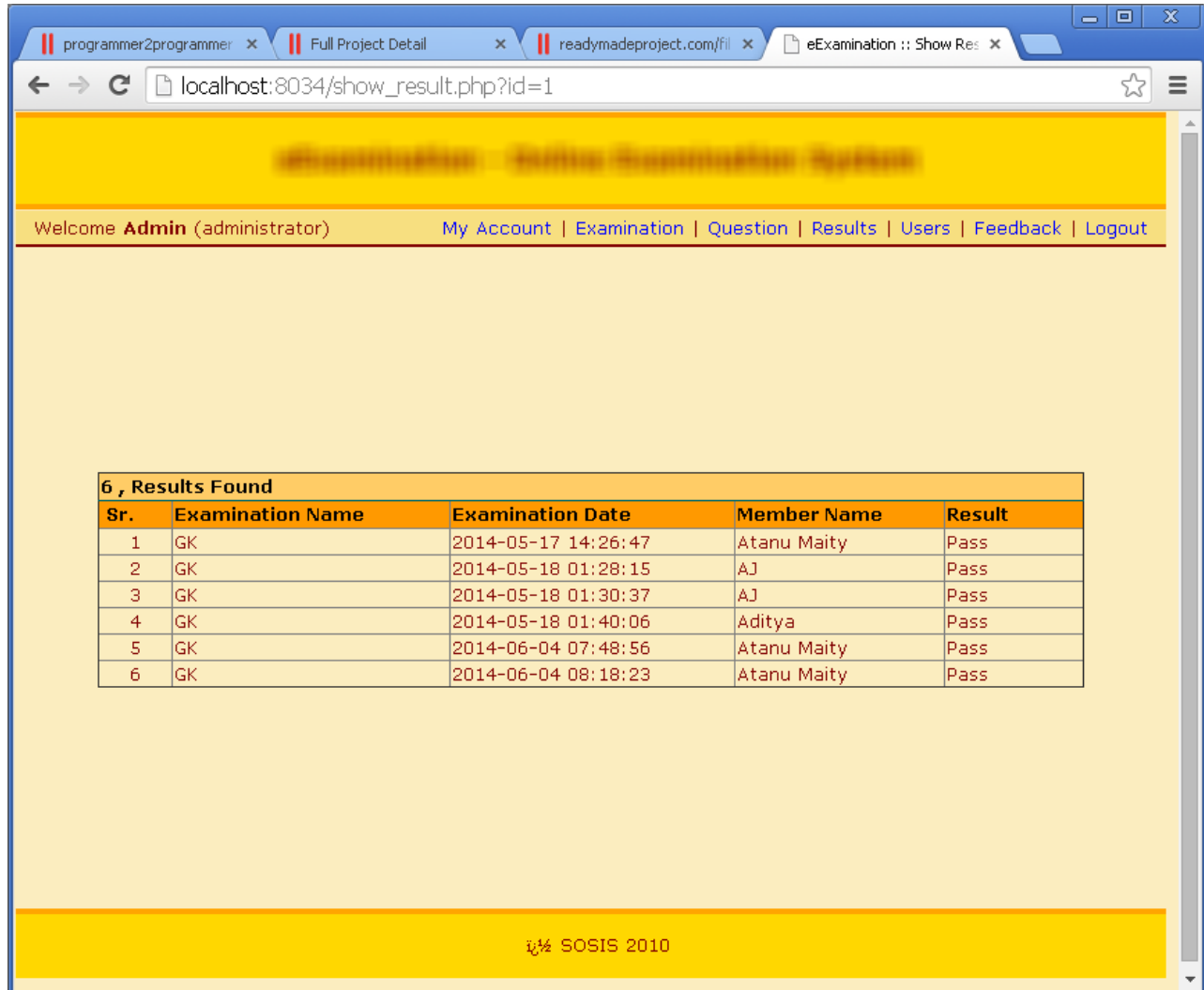
## 8.16 eExamination –Admin Edit Question

The screenshot shows a web browser window with the URL `localhost:8034/question_addedit.php?mode=edit&id=1`. The page title is "eExamination - Online Examination System". The user is logged in as "Admin (administrator)". The navigation menu includes "My Account", "Examination", "Question", "Results", "Users", "Feedback", and "Logout".

The main content area is titled "Question Bank - Edit Question". It contains the following form elements:

- Exam : GK (dropdown menu)
- Question ID : 1 (text input)
- Question : What is the financial capital of India ? (text area)
- Active (checkbox)
- Option Type : SINGLE (dropdown menu)
- Options section with four radio buttons and text input fields:
  - A.  Chennai
  - B.  New Delhi
  - C.  Mumbai
  - D.  Bangalore

## 8.17 eExamination –Admin View Results

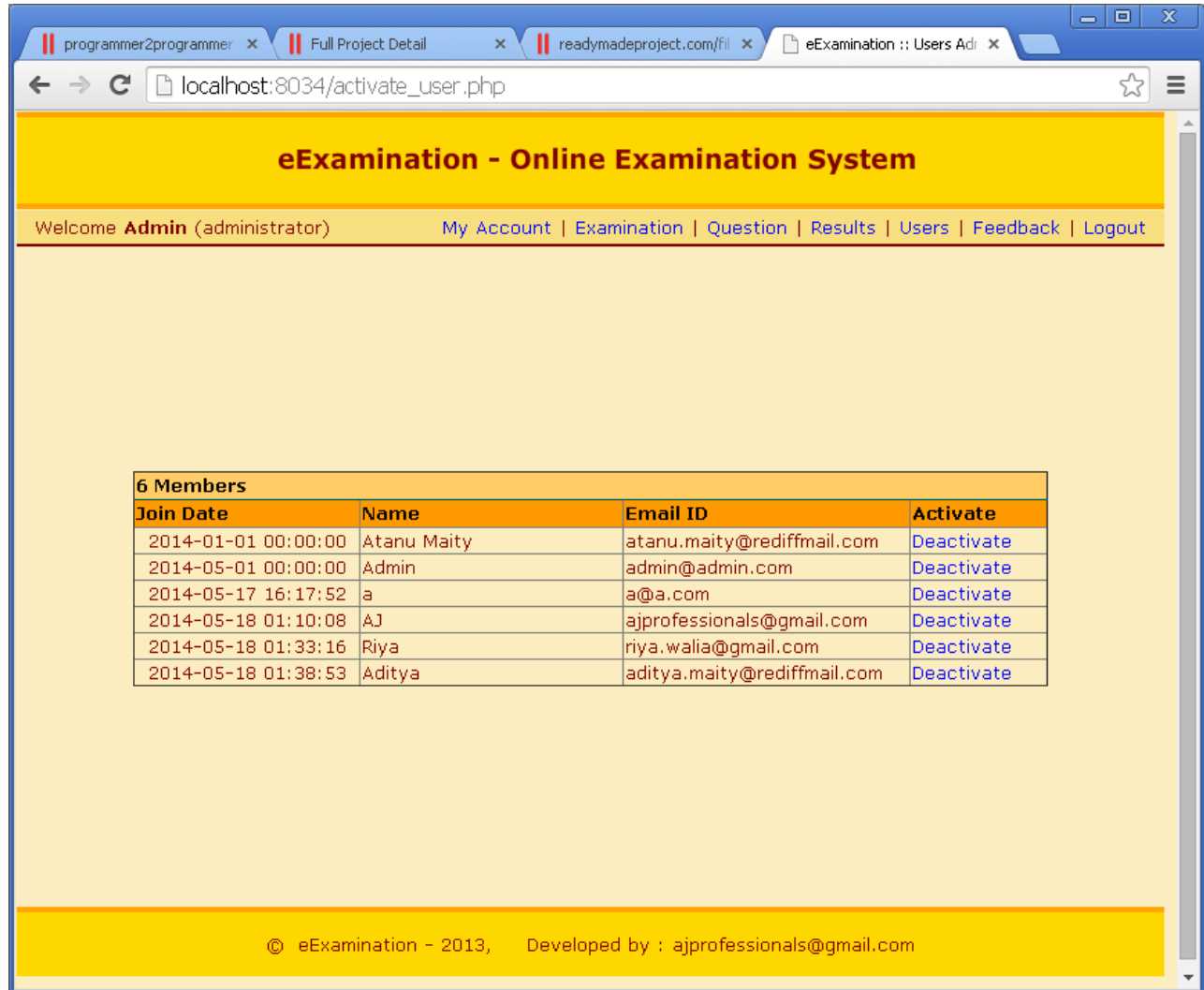


The screenshot shows a web browser window with the URL `localhost:8034/show_result.php?id=1`. The page title is "eExamination - Online Examination System". The user is logged in as "Admin (administrator)". The navigation menu includes "My Account", "Examination", "Question", "Results", "Users", "Feedback", and "Logout". The main content area displays a table with 6 results found. The table has the following data:

Sr.	Examination Name	Examination Date	Member Name	Result
1	GK	2014-05-17 14:26:47	Atanu Maity	Pass
2	GK	2014-05-18 01:28:15	AJ	Pass
3	GK	2014-05-18 01:30:37	AJ	Pass
4	GK	2014-05-18 01:40:06	Aditya	Pass
5	GK	2014-06-04 07:48:56	Atanu Maity	Pass
6	GK	2014-06-04 08:18:23	Atanu Maity	Pass

The footer of the page contains the text "SOSIS 2010".

## 8.18 eExamination -Admin View Members

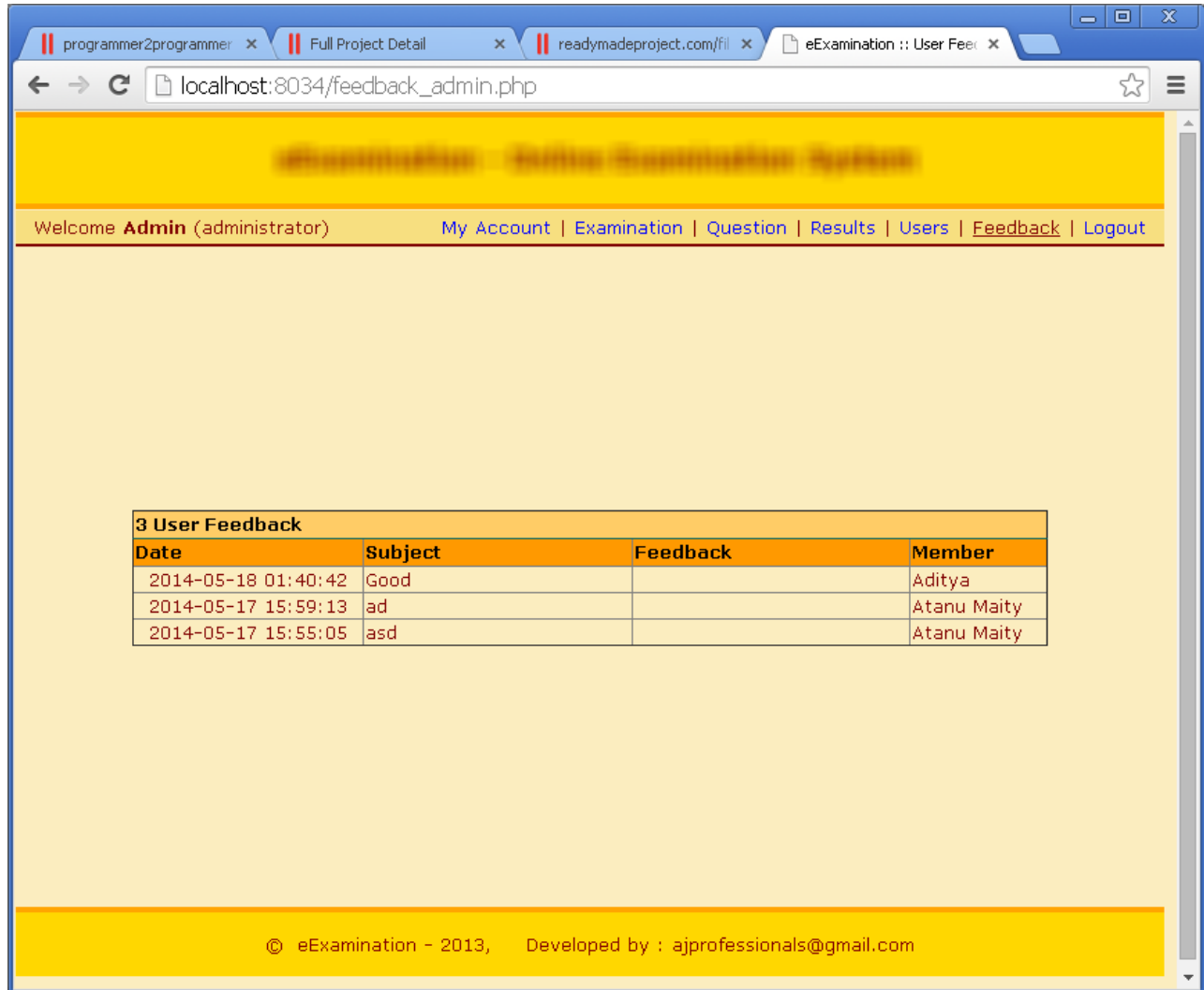


The screenshot displays the 'Admin View Members' page of the eExamination system. The page features a yellow header with the title 'eExamination - Online Examination System' and a navigation menu. The main content area shows a table with 6 members, including their join dates, names, email IDs, and deactivate links.

Join Date	Name	Email ID	Activate
2014-01-01 00:00:00	Atanu Maity	atanu.maity@rediffmail.com	<a href="#">Deactivate</a>
2014-05-01 00:00:00	Admin	admin@admin.com	<a href="#">Deactivate</a>
2014-05-17 16:17:52	a	a@a.com	<a href="#">Deactivate</a>
2014-05-18 01:10:08	AJ	ajprofessionals@gmail.com	<a href="#">Deactivate</a>
2014-05-18 01:33:16	Riya	riya.walia@gmail.com	<a href="#">Deactivate</a>
2014-05-18 01:38:53	Aditya	aditya.maity@rediffmail.com	<a href="#">Deactivate</a>

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### 8.18 eExamination -Admin View Feedback



## 9. Test Plan

### *Introduction*

This record describes the consumer recognition take a look at plan for the eexamination software for on-line exam system. The whole check approach for the eexamination application for on line exam machine is to perform the following kinds of exams, in series:

**1.COMPONENT TESTING OF EACH ASPECT THAT MAKES UP THE EEXAMINATION UTILITY FOR ON-LINE EXAMINATION MACHINE**

**2.INTEGRATION CHECKING OUT OF THE EEXAMINATION UTILITY FOR ON LINE EXAMINATION GADGET, TO MAKE CERTAIN THE BEST INTERWORKING OF ITS COMPONENTS**

**THREE.VALIDATION TESTING OF THE EEXAMINATION UTILITY FOR ON-LINE EXAM DEVICE, TO MAKE SURE THAT IT WORKS CORRECTLY IN A PSEUDO-STAY SURROUNDINGS**

**FOUR.USER RECOGNITION TESTING OF THE EEXAMINATION SOFTWARE FOR ON LINE EXAMINATION MACHINE, TO MAKE SURE THAT ITS FUNCTION IS APPROPRIATE TO ITS USERS**

Acceptance testing is the last set of tests to be performed before the application goes officially live.

### *9.1 Test Scope*

The scope of the user acceptance testing covers:

- Version 1 of the eExamination Application for Online Examination System
- User-facing functionality defined by a set of use cases
- Administrator-facing functionality defined by a set of use cases

The purpose of the testing is to determine how properly the utility meets its useful necessities from the perspective of the user, and to discover any issues so they can be resolved. Additionally, the trying out serves to assemble a fixed of test information and results that may be used during subsequent check cycles, to test for non-regression of the software in later releases or after the application is in renovation.

Running practices may range from person to consumer and are considered out of doors the scope of the testing.

### *9.2 Test Strategy*

The idea of person reputation trying out is that other tests have been completed effectively, so the software and its required infrastructure are taken into consideration to be solid and dependable. Popularity testing concentrates at the utility from the consumer's angle, that is, how the application is used and whether it meets the vital quality criteria.

Trade requests will be sent to the development crew because the actionable documentation. Exchange criteria will be decided by means of the test team and the improvement team previous to the start of testing. As an example, standards can also include impact to favored functionality, amount of code impacted by means of proposed trade, and design required by proposed trade. The tester will compare the criteria. The test lead will decide alternate required or now not. As soon as a bug has been decided as alternate required, the bug record can be translated into a exchange request and exceeded directly to development.

The member of the recognition trying out is the machine users, supervisor, supervisor and mis govt for eexamination utility for on-line examination gadget. The progress of the acceptance checking out can be mentioned to the patron, collectively with any problems that are determined and their deliberate resolutions. Sign-off of the assessments, and consequently the acceptance of the application, might be performed by using the patron or a particular representative.

### ***9.3 Preconditions***

The following items are required before testing can take place:

- a whole and coherent useful specification of the eexamination software for on-line examination gadget expressed as use cases and utilization eventualities
- a complete and validation-examined release of eexamination utility for on-line examination system, brought in keeping with the shipping plan
- an agreed-upon technique for handling any anomalies that are located during the testing process
- a fixed of take a look at specifications describing how every useful place of the eexamination utility for on-line examination device is to be popularity tested
- an implemented test surroundings for the trying out
- enough, appropriate resources to perform the trying out
- to be had requirements for the acceptance trying out

### ***9.4 Test Priorities***

At some stage in checking out of the eexamination utility for on-line examination device, the subsequent characteristics will be examined in order of precedence:

- capability – whether the specified functions are available and operating as predicted
- usability – how consumer-friendly and intuitive the eexamination utility for on line examination system is.
- safety – how nicely-protected and warranted company and user records is
- performance – whether the response times are inside acceptable limits

- customization—how straightforward it's miles to apply the software in new, unexpected ways

### **9.5 Test Techniques**

- The following techniques might be carried out:
- ☐ scripted checks—sequences of person interactions (based at the use case and usage scenarios) the usage of predefined information units in opposition to anticipated effects
- ☐ unscripted checks—based on scripted checks, the tester tries to modify the situations to discover what-if opportunities
- ☐ penetration exams—scripted assessments to try unauthorized entry into the device
- ☐ usability checklists—checks to determine the complexity of interactions
- Overall performance statistics—technology of performance information to check towards desired overall performance standards

### **9.6 Test Organization**

#### **Roles and Responsibilities**

The following roles are defined:

- ☐ qa lead/check supervisor—answerable for planning and ensuring the smooth walking of the take a look at procedure
- ☐ tester—carries out the checks consistent with the check plan, after which reports the consequences
- ☐ product manager—guarantees that the checks are done efficiently from a consumer perspective
- ☐ undertaking sponsor/patron—acts as principal stakeholder, and ensures that the wishes of the patron network as a whole are considered
- ☐ check assist—affords technical assistance, such as take a look at environment configuration, and non-technical help, along with methodological help

Weekly team meetings will be held involving the test manager, testers, and product managers. At these meetings, the progress of the testing process will be reported, any issues will be discussed, and actions will be agreed upon.

### **9.7 Deliverables**

The following deliverables will be expected from the user acceptance testing process:

- test plan—this report, collectively with any updates which have passed off all through the testing technique
- alternate requests—any insects, defects, or other adjustments required to the eexamination utility for on-line examination device because of the checking out process



- weekly reviews – development reports to allow the popularity of the testing technique to be determined
- finishing touch document – a record to be signed off by using the client, to suggest the a success crowning glory of the person reputation trying out

## ***9.8 Test Environment***

### **Hardware and Software**

The test environment will consist of:

#### **Server**

A single Intel-based computer running:

- Microsoft Windows
- eExamination Application for Online Examination System components

#### **Client Workstations**

Two Intel-based client laptop computers, each running:

- Microsoft Windows XP Professional
- Microsoft Office
- Internet Explorer 6 or greater

The subsequent additional hardware may be required:

- one laser printer to print reviews
- one coloration printer (laser or inkjet) to print display screen dumps
- one cd-rom power to enable smooth installation of the eexamination application for on line exam gadget
- networking connectivity to permit interconnection of the server, clients.

## ***9.9 Testing Automation Software***

No testing automation software packages are selected at present.

## ***9.10 Application Configuration***

The following user accounts will be configured on the server:

- System Administrator
- System Users 1
- System Users 2
- Student 1
- Student 2

### ***9.11 Test Management***

Assessments will be managed in line with the company check control standards, which cover:

- Conduct of assessments
- reporting of check effects
- illness monitoring and determination
- configuration management of the test surroundings
- configuration control of test deliverables.

### ***9.12 Testing Schedules***

The user acceptance testing schedules are shown in the project structure document and resulting Gantt charts.

### ***9.13 Threats to Testing***

***Capacity threats to the checking out procedure are as follows:***

- insufficient assets available for checking out. Testing resources had been seconded from the improvement departments, whose time is at a premium. Mitigation: make sure department heads apply a high priority to the checking out of the eexamination application for online exam machine.
- Availability of income employees for testing. The test group must be overseen by means of at least one administrator.

## 10. Future Enhancement

This project become evolved to satisfy person requirement; but there are masses of scope to improve the overall performance of the eexamination application for online examination gadget within the place of person interface, database performance, and question processing time. And many others.

So there are many things for destiny enhancement of this project. The destiny upgrades that are feasible within the task are as follows.

- linking and integration of other on line educational web websites.
- integration with college database via internet services
- connection to third-birthday party olap applications
- within the region of information safety and system safety.
- offer extra on-line pointers and help.
- to optimize the query which is embedded within the machine

## 11. Bibliography

### 11.1 Websites

Following websites are referring to create this project reports.

- <http://www.google.com>
- <http://www.microsoft.com>
- <http://www.programmer2programmer.net>
- <http://www.codeproject.com>
- <http://www.php.net/>
- <http://www.mysql.com/>
- <http://www.wikipedia.org>

### 11.2 Books

Following books and ebook are used to complete this project reports.

- Mastering PHP (Paperback)
- MySQL Bible (Paperback)
- PHP Black Book (Paperback)
- MySQL Database Usage & Administration