A Project Report

On

ANDROID BASED ONLINE TESTING SYSTEM

Submitted in the partial fulfillment of the requirement for the degree of

Bachelor of Computer Engineering

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CERTIFICATE

This is to certify that **Harshal Dalvi, Pranav Firake and Aditya Gaikar** have successfully completed their project work on **ANROID BASED ONLINE TESTING SYSTEM** in the partial fulfillment of the degree of Bachelor of Computer Engineering, University of Mumbai during the academic year 2013-14.

(Prof. Nusrat Parveen)	(Prof. Amol. P. Pande)	(Dr. S. D. Sawarkar)
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External Examiner

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It gives us the pleasure to develop this project on Android-based Online Testing System and would like to take this opportunity to thank everyone who has been a part of making it.

Our gratitude and sincere thanks to Principal Sir Dr. S D Sawarkar and Prof. A. P. Pande (HoD of Computer Department) for providing all the necessary system facilities and privileges that enabled us to complete the project in time. I would also like to thank Mrs. Nusrat Parveen for her guidance, genuine suggestions and constant encouragement, without which this project would not be a success.

We would like to thank my colleagues and friends who helped us in the successful completion of the project.

ABSTRACT

Online assessment is the process used to measure certain aspects of information for a set purpose where the assessment is delivered via a computer connected to a network. Most often the assessment is some type of educational test. Different types of online assessments contain elements of one or more of the following components, depending on the assessment's purpose: formative, diagnostic, or summative. Instant and detailed feedback, as well as flexibility of location and time, is just two of the many benefits associated with online assessments. There are many resources available that provide online assessments, some free of charge and others that charge fees or require a membership.

'Online Exam' means the candidate sits in front of a computer at the examination center and the questions are presented on the computer monitor and the candidate answers the questions on the computer through the use of mouse. Unlike the traditional paper-pencil based test which is generally offered on a single day to all candidates, Online Exam will be offered over a period of time and the candidate can choose the Center, the Day and Time of his/her convenience to take the test.

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1. INTRODUCTION

In recent times, you’ll hardly find a college student or a job professional without any kind of mobile device, be it smartphones, tablets, readers or anything else. It has become absolutely essential to own one and majority of these devices, more than about 50% are operated on Android operating system. The need to provide a means of taking tests for the users constantly on the go has culminated in our desire to design an online testing service based on this operating system.

Android based online testing system is an extension to the simple testing systems that exist as the current means of conducting tests over desktop computers. The main objective of this system is to provide the user with the ability to give test and access the various facilities of the system on the go.

The system would allow administrators to create highly customizable tests depending on the specialised requirements on the type of system to be conducted. The administrator would have free reign as to the way in which the examination should be conducted and so on. The users would be able to access these tests on their android based handheld devices and thus would provide them with the required mobility and ease of use.

2. AIM AND OBJECTIVES

The objective of the android based online testing system is to enable users of mobile devices operating on different versions of android operating system to take tests in case of the unavailability of a hard and fast desktop computer or laptop in that instance. The main reason for a testing system based on android would be to keep up with the changing times and offering users the simplicity and effectiveness of just genuinely taking or giving a test on a device they all love to have.

This system, when completed may be used by anyone ranging from the faculty of a college or university, an organization conducting specific intelligence tests and even the placement cell of a big company or even that of a college. It would enable a lot of users to take tests concurrently in a given period of a professional sitting or even have these tests given by them in their own time in the comfort of their homes or workplaces.

To ensure the integrity and security of the system, proper steps would be taken and as the questions would mostly range from a given database of general intelligence quotient, vocabulary and fast math problems, the risk of cheating by users can be effectively avoided. As results and performance review would be quick and easy, it would result in a lot of time being saved and costs being cut down.

3. LITERATURE REVIEW

Review on Google Android a Mobile Platform

Android is an open source mobile platform provided by Google. This is a software stack for mobile devices which includes an operating system, applications development framework, runtime environment and library. Android's mobile operating system is based on a modified version of the Linux kernel. The application development uses Java programming language and the virtual machine that optimizes the usage of memory and resources. Since its official public release, Android has captured the interest from the market. The Android Market has experienced tremendous growth since its inception and has democratized application development by allowing anyone to upload applications to the market. Google entered into the mobile market not as a handset manufacturer, but by launching mobile platform called as “Android” for mobile devices such as Smart phones and PDA in November 2007. Google has a vision that Android based cell phone will have all the functions available in the latest pc’s. In order to make this effort possible, Google launched the Open Handset Alliance. Google introduced Android as an OS which runs the powerful applications and gives the users a choice to select their applications and their carriers. Android is gaining strength both in the mobile industry and in other industries with different hardware architectures. The increasing interest from the industry arises from two core aspects: its open-source nature and its architectural model. Being an open source project, Android allows us to fully analyse and understand it, which enables feature comprehension, bug fixing, further improvements regarding new functionalities and finally, porting to new hardware. On the other hand, its Linux kernel-based architecture model also adds the use of Linux to the mobile industry, allowing taking advantage of the knowledge and features offered by Linux.

The Android platform consists of several layers which provide a complete software stack. Android applications are Java-based and this factor entails the use of a virtual machine VM environment, with its advantages. Android uses its own VM called Dalvik, which interprets and executes portable Java-style byte code after transforming it, which is optimized to operate on the mobile platform. All of these aspects make Android an appealing target to be used in other type of environments. The remainder of this paper is organized as follows: Section II briefly describes the Android mobile platform. Section III presents Android application execution process. Section IV briefly describes the Android market share. Finally Section V concludes this paper.

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4. EXISTING SYSTEM

The systems that exist currently in the field of online examination services are either automated completely relying on huge resources generating large costs for the organisations involved or are completely manual relying on a large workforce to successfully conduct, grade and supervise the examinations.

The manual type of examination and testing has some definite disadvantages as it purely relies on the older methods and paper based tests resulting in a lot of time wastage for people with constraint. You would have to first reach a destined place for appearing the exam and then with all the writing and marking, a definite amount of resource both on the part of the user and conductor is used.

The desktop based online or offline kind of testing systems that exist are those that either use Internet based servers and databases for relying to provide the intended services and use. The offline systems use software data that are collected periodically resulting in the maintenance of a backend larger data house.

Although the online desktop based systems that exist are very effective, they have a disadvantage of being conducted on specifically designated machines with steadfast requirements that may hinder a normal user from taking the benefits of the system that is provided. The users, in order to access these systems, have to be at a specified place at a specified time like the manual system of examinations as the integrity of the test or users can be questioned.

Thus, the existing systems all have some or the other disadvantages which we hope to overcome in the development of the android based online testing system.

5. PROBLEM DEFINITION

The primary concern of project will be to develop an application for online exam system. Application should be designed as compatible to android OS. There will be two logins for the system. One will be by an Administrator. And other will be by student.

An administrator would have an access to whole databases and system flow. Admin can authenticate and authorise students. Admin can manage tests being conducted. Admin can set up exam policy for each test in the future versions. Exam policy may include whether to follow negative marking or not. Admin can also set marks distribution scheme under exam policy. Admin can set up temporal aspects to the test. Tests will be regarding mainly aptitude ability including quantitative knowledge and verbal proficiency. Admin can set up questions for the test. Admin can modify details of test regarding number of questions. Admin can add, delete, and modify the questions for the tests. Admin would give questions and answer options for the test. Tests will be objective type of tests with 4 answer choices for each question. Tests will be graded according to a +5 for the correct answer and -1 for a wrong one. Admin can view, modify, delete the reports of students and also can have overview to overall online test system. Admin can add or remove students in the system. Admin can see the reports of students and results of students.

Second login will be for students. Student must login to the application through their android enabled handheld device. Authenticated students can choose which test to appear and give the test. Students will be answering questions by clicking right choice from options offered for that question. The student may choose to answer all the questions or only those that he knows the correct answer to due to the inclusion of negative marking scheme. Database must be maintained with question IDs and answer choice student has stated.

Marks evaluation process is handled by the system. As the student terminates the test or test is over, system gets the database of students' questions and marked answers. Then system tallies these answer with database having right answer choices stated by test maker. Mark evaluation policy given by admin is strictly followed. After considering all constraints as negative marking, if applied, Marks are evaluated and flashed on screen of student. Database entry is also done stating the test ID, student ID and marks that student obtained.

System should be optimized to give quick results just after student gets finished with test. Reports can be made about students result. System should be developed so that it can be used under Android OS platform so that from handheld devices such as Android enabled Smartphones and Tablets with varied versions of android OS.

6. SCOPE OF THE PROJECT

The system will provide the users with the following functionalities:

Create an account: Users will be able to create their own accounts registered on a valid e-mail id and login name which would enable them to access the various services in the testing system as a whole.

Appear for the test: The main aim of the system is to enable the users to give tests and it will provide them with the functionality.

View results: As soon as a user is done with the test, his/her performance report or result will automatically be displayed on the screen. After the duration of a few days or weeks, the user would also be able to view his percentile performance based on the number of users who have actually given the tests in the stipulated duration.

Administrators or invigilators of the system would be provided with the following functionalities:

Set questions: Questions for the two sections, namely verbal and quantitative aptitude can be set from the application itself.

Update questions database: The administrators always have the option of setting the questions or in this case, actually updating the database of the question based on the requirements and so that the questions remain fresh and different every time.

View users: The administrators have the ability to see the users that have been registered on the system and make the necessary changes on their profiles.

7. SYSTEM REQUIREMENT SPECIFICATION (SRS)

The following requirements would be essential for the successful working and functioning of the system in an effective way:

7.1 Purpose:

The purpose of the android based online testing system is to enable users of mobile devices operating on different versions of android operating system to take tests in case of the unavailability of a hard and fast desktop computer or laptop in that instance. The main reason for a testing system based on android would be to keep up with the changing times and offering users the simplicity and effectiveness of just genuinely taking or giving a test on a device they all love to have.

7.2 Product Perspectives:

This can be used in educational institutions as well as in corporate world. This can be used anywhere any time as it is a android based application (user Location doesn't matter). There is no restriction that examiner has to be present when the candidate takes the test. It fulfils all an office application automatically with minimal overhead.

7.3 Product Functions:

Users will be able to create their own accounts registered on a valid e-mail id and login name which would enable them to access the various services in the testing system as a whole. The system will provide the users with the option of scheduling test slots from the different available slots. They would also be reschedule an already booked test and even cancel a test if they so wish. Administrators will have the option of designing a test based on the requirements and specific need like what type of test is to be taken, what would be the maximum score, the marking scheme and so on.

7.4 User Characteristics:

The main objective of this system is to provide the user with the ability to give test and access the various facilities of the system on the go. The system would allow administrators to create highly customizable tests depending on the specialised requirements on the type of system to be conducted. The administrator would have free reign as to the way in which the examination should be conducted and so on.

7.5 General Constraints:

Environment under which application is being developed is android. So it is constraint to this application that every user that seek for access to this application must have a handheld device with android OS. Constraints for specially admin will be to manage tests and see the reports. Students should give test under supervision.

7.6 Assumptions and dependencies:

Assumption regarding application is that all the students being consider and the admin have android enable handheld device with internet connection in terms of Wi-Fi or any data connection. It is assumed that student give test under supervision. Being an android application, our system depends on hardware in terms of RAM and battery and also type of smartphone as it is compatible with only android OS.

7.7 External Interface Requirements:

Being an online system, Application needs to have proper synchronisation of application database over network. System requires online database to be maintained. So external interface in terms of database servers such as sql servers are required to store the data. For executing this application on computer device one must have an android simulator.

7.8 Functional requirements:

This section gives a functional requirement that applicable to the On-Line Exam system. There are two sub modules in this phase.

- Student module.
- Administrator module.

The functionality of each module is as follows:

- Student module: The candidate will logon to the software and take his examination. He can also check his previous examinations marks and his details. The candidate will get result immediately after the completion of the examination.
- Admin module: The database is prepared & loaded into the software. Selection for examination can be done language wise by the admin. The results will be displayed immediately after completion of the examination. The administrator collects all the results after successful completion of the examination.

The features that are available to the Administrator are:

- The administrator has the full-fledged rights over the system.
- Can create/delete an account.
- Can view the accounts.
- Can change the password.
- Can hide any kind of features from the both of users.
- Insert/delete/edit the information of available on system.
- Can access all the accounts of the faculty members/students.
- Can view the different categories of Test conducted by users.
- Can view their marks.
- Can view and modify Results.

The features available to the Students are:

- Can view the different categories of Test available in their account.
- Can change password.
- Can view their marks.
- Can view and modify its profile but can modify it to some limited range.

7.9 Non-functional requirements

7.9.1. Performance Requirements

Some Performance requirements identified is listed below:

- The database shall be able to accommodate a minimum of 1,000 records of students.
- The software shall support use of multiple users at a time.
- There are no other specific performance requirements that will affect development.

7.9.2. Reliability

System is reliable for whole application area. Reliability measures are followed in the development of android based system.

7.9.3. Availability and portability

System will be available in form of .apk file which is extension used for android applications. System is available everywhere as handheld mobile device inclines the view to system towards more easily available and databases are maintained online, As far as you have android device and you have internet connection you can access the system. Even one can get system on PC via android simulators.

7.9.4. Security

Some of the factors that are identified to protect the software from accidental or malicious access, use, modification, destruction, or disclosure are described below. Keep specific log or history data sets

- User authentication and verification.
- Assign certain functions to different modules
- Restrict communications between some areas of the program
- Check data integrity for critical variables
- Later version of the software will incorporate encryption techniques in the user/license authentication process.

7.9.5. Maintainability

The Quality of the System is maintained in such a way so that it can be very user friendly to all the users.

The software quality attributes are assumed as under:

- Accurate and hence reliable.
- Secured.
- Fast speed.
- Compatibility.

7.10. Design constraints

The design implemented in the system will be according to the software development kit given for android OS.

7.11. Risk Analysis

Project Risks:			
Risk	**Probability**	**Effects**	**Risk planning strategy**
The experienced staff in the team leave the project before it finishes, or someone was ill	low	serious	Use more than one staff for each section, which might minimize this risk. Also, manager tries to increase salary for him.
The methodology to solve the problem can't work in a proper manner.	high	serious	Must be study more than one methodology to minimize this risk.
Budget not enough or there is no budget.	low	catastrophic	Put a condition in the contract if there any more expenses, the funded side must be pay it. To avoid this risk.

HW requirement aren’t available in time.	moderate	serious	See if there is any more time to delay the project or not. If there is no more time work by the team computers, to minimize this risk.

Product Risks:

Risk	Probability	Effects	Risk planning strategy
Packages and Development tools are not enough.	high	serious	Put a condition in the contract to increase the time of project delivery depends on the problem occur. To avoid this risk.
Cannot find suitable components.	high	tolerable	Programmer must have professional programming skills to write a new code, which minimize this risk.

Business Risks:

Risk	Probability	Effects	Risk planning strategy
Cannot find suitable place for meeting the team.	moderate	tolerable	Monitoring the work by E-mail every day. To avoid this risk.
Damage the electricity generator.	high	serious	There is a spare generator to avoid this risk.
Marketing the product system.	low	catastrophic	Distribution of advertisements, which minimize this risk.

8. METHODOLOGY

For designing Android based Online Exam System, we will use following methodology:

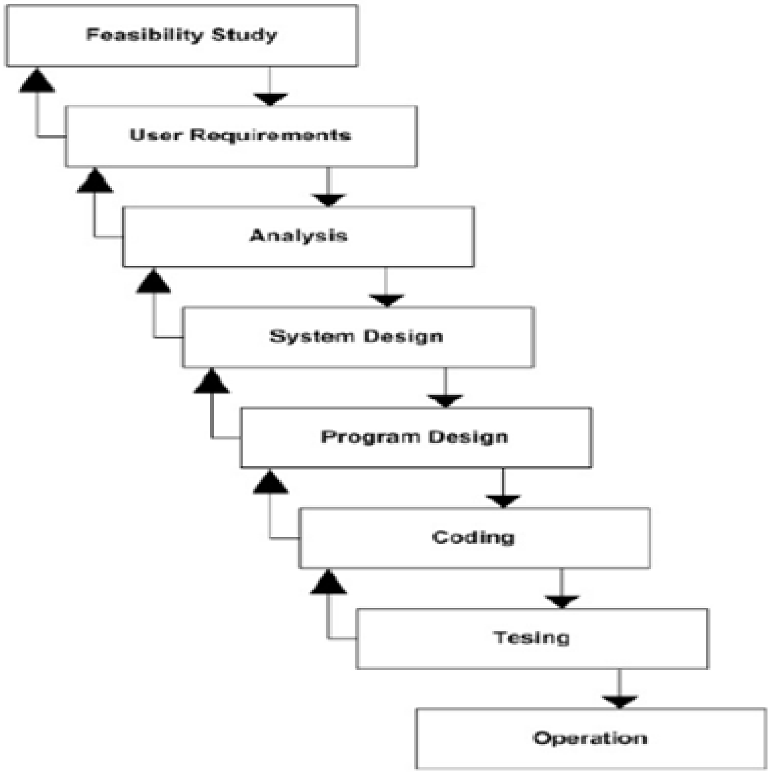
8.1. Software Process Model:

To solve an actual problems in an industry, software developer or a team of developers must integrate with a development strategy that include the process, methods and tools layer and generic phases. This strategy is often referred to a process model or a software developing paradigm.

Our project follows the waterfall model.

The steps of waterfall model are:

- Requirement Definition
- System and Software Design
- Implementation
- Integration and System Testing
- Operation and Maintenance



8.1: Waterfall model

8.2. Technologies Used:

Front End:

XML for frame design

Android SDK through Eclipse IDE

Back End:

Java

Parse Android SDK

Database Tools:

Parse.com

Java:

It is a general-purpose, concurrent, class-based, object-oriented computer programming language that is specifically designed to have as few implementation dependencies as possible. It is intended to let application developers "write once, run anywhere" (WORA), meaning that code that runs on one platform does not need to be recompiled to run on another. Java applications are typically compiled to byte code (class file) that can run on any Java virtual machine (JVM) regardless of computer architecture. Java is, as of 2012, one of the most popular programming languages in use, particularly for client-server web applications, with a reported 9 million developers. Java was originally developed by James Gosling at Sun Microsystems (which has since merged into Oracle Corporation) and released in 1995 as a core component of Sun Microsystems' Java platform. The language derives much of its syntax from C and C++, but it has fewer low-level facilities than either of them. It is most useful language and has vast application over varied aspects.

Eclipse IDE:

Eclipse is a multi-language Integrated development environment (IDE) comprising a base workspace and an extensible plug-in system for customizing the environment. It is written mostly in Java. It can be used to develop applications in Java and, by means of various plug-ins, other programming languages such as python, PHP etc. Eclipse is platform that helps to synchronise xml schema files, java swing with database query languages such as MySQL, SQLite etc. One can also synchronise android SDK and ADT to back end programming using Eclipse IDE.

Android SDK:

Android is an operating system for mobile phone and tablets owned by Google Inc. Android SDK is software development kit for android OS applications. One can develop application that is compatible to android OS with the help of SDK. Enhancements to Android's SDK go hand in hand with the overall Android platform development. The SDK also supports older versions of the Android platform in case developers wish to target their applications at older devices. Development tools are downloadable components, so after one has downloaded the latest version and platform, older platforms and tools can also be downloaded for compatibility testing. For integrated environment, Android SDK is often used with Android ADT plugging which gives varied abstract data tools for software development process.

XML:

Extensible Mark-up Language (XML) is a mark-up language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable. Although the design of XML focuses on documents, it is widely used for the representation of arbitrary data structures, for example in web services. One can use xml for developing design for applications. Many application programming interfaces (APIs) have been developed to aid software developers with processing XML data, and several schema systems exist to aid in the definition of XML-based languages.

Parse:

With Parse, you can add a scalable and powerful backend in minutes and launch a full-featured app in record time without ever worrying about server management. We offer push notifications, social integration, data storage, and the ability to add rich custom logic to your app’s backend with Cloud Code. Parse allows your team to focus on creating a great user experience and forget server maintenance and complex infrastructure. Instantly add push notifications, data storage, social integration, and more the moment you integrate a Parse SDK into your app. Our native SDKs for iOS, Android, Windows 8, Windows Phone 8, OS X, Xamarin, Unity and JavaScript make it easy to create beautiful and powerful apps for all of your favourite devices. From desktop to mobile apps, Parse has a SDK for everyone.

9. SYSTEM ANALYSIS

The Online Examination application will have the following functionalities:

- The application will enable a user to Exam.
- The application will enable a student of the Institute to register to use the application.
- The application will enable registered members cannot re-Examination after entering their Examination details.
- The application will enable to view Examination details to the administrator.
- The registered user cannot be able to modify any personal details such as address or phone number after Examination.

Following are the modules of Online Exam software:

(1) **Verifier:**

This module verifies the authentication of the users/examinees and provides the further access to authenticated users.

(2) **Conductor:**

This module conducts the examination and provides different menus to users/examinees. The user interacts with the system with module. It provides a user friendly interface to users. Student when chooses to start the test, Questions are flashed on device screen with options. Students have to click on the answer which is probable answer by his/her perceptive. Activities involved are:

1. Setting a test:-

Admin decides a particular test to be set for students. When admin creates such test would be given unique test ID.

2. Setting marks evaluation policy:-

Admin decides set of rules for evaluating marks of student. Rules may include whether to keep negative marking or not and so on.

3. Setting questions:-

Admin set questions, options for those questions as well as he/she state the right answer choice to the system so that system can tally those answers in marks evaluation.

(3) **Test Giver:-**

Students are the actual test givers. They select test from test pool to answer. Students have to log in first. Then they will give test. Various activities involved are

1. Authentication:-

Only the authenticated students can give the test. If students enter wrong user ID or password, he/she won't be permitted to

2. Selecting the test:-

From pool of tests, students have to select the test he/she wanted to see.

3. Selecting the mode: -

Test will be in timed or practice mode. So student has to decide whether to give exam in practice or timed mode.

4. Giving test: -

In actual test giving, student sees questions and marks the most probable answer.

(4) **Result maker:**

This module declares the marks/result after the examination. It takes care of marks calculation scheme such as negative marking etc. Accordingly result is developed.

Examination process:

First of all the user/examinee gets a valid identification number - user ID (same as the roll no for a normal examination).The user can log on with this identification no. and can take up the examination. After logging in the user can see various options and can choose the option from the menu.

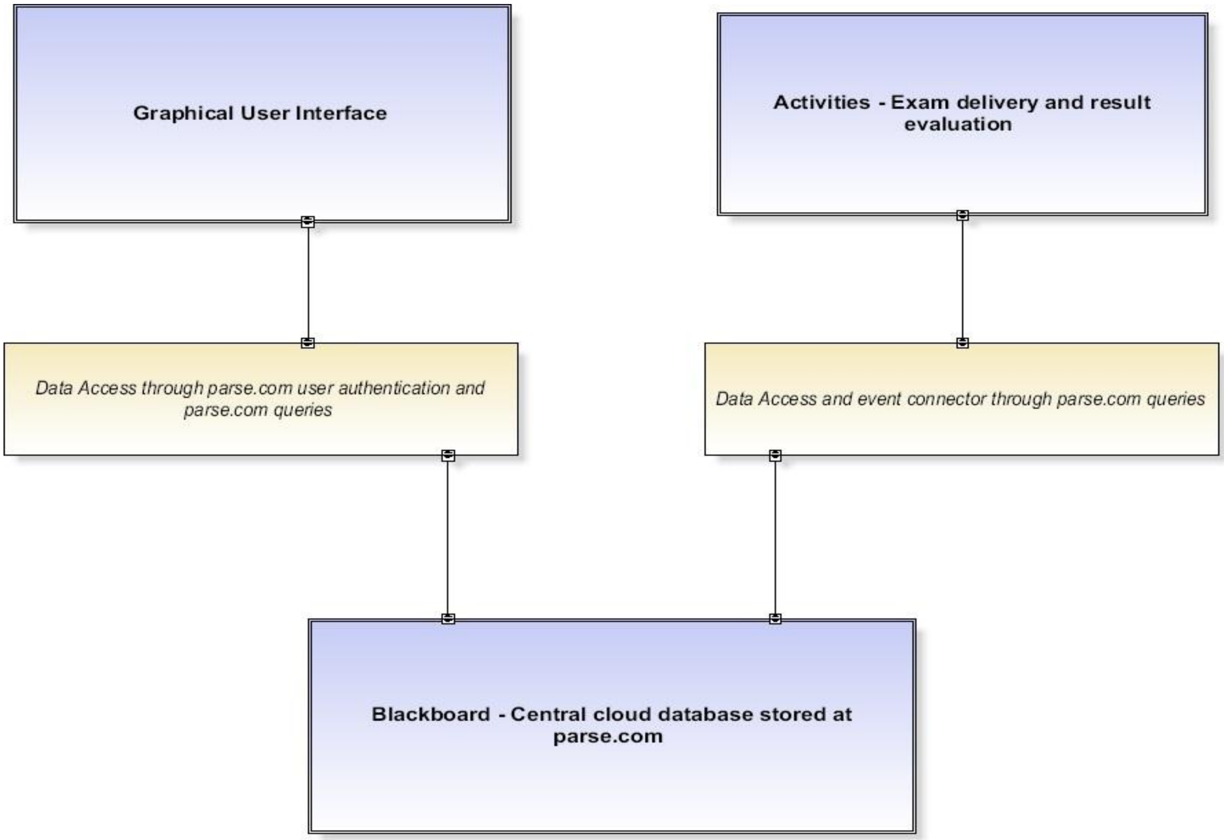
Results:

After completion of examination the administrator can view the results within seconds. And also these results are displayed on screen

10. SYSTEM ARCHITECTURE

10.1 Software Architecture:

The Project Architecture diagram describes the general software architecture used in this project.


Graphical User Interface
Activities - Exam delivery and result evaluation
Data Access through parse.com user authentication and parse.com queries
Data Access and event connector through parse.com queries
Blackboard - Central cloud database stored at parse.com

10.1: Software Architecture

The above Style is popularly known as the “blackboard style” under ‘shared memory and state’ kind of architectural styles. The main reasons for adapting this style were:

- Requirement of a central database
- Allows a program to run on a machine without compiling the program into native code

Any architecture in general should follow any two of the three basic principles to achieve success; they are Scalability, Performance and Functionality.

For our project, performance and functionality were of utmost important hence we choose the above architectural style which best describes the same.

10.2 Data Flow Diagrams:

The Data flow Diagram shows the flow of data. It is generally made of symbols given below:

A square shows the Entity.

A Circle shows the Process

An open Ended Rectangle shows the data store.

An arrow shows the data flow.

The DFD can be up to several levels. The 0 level DFD states the flow of data in the system as seen from the outward in each module.

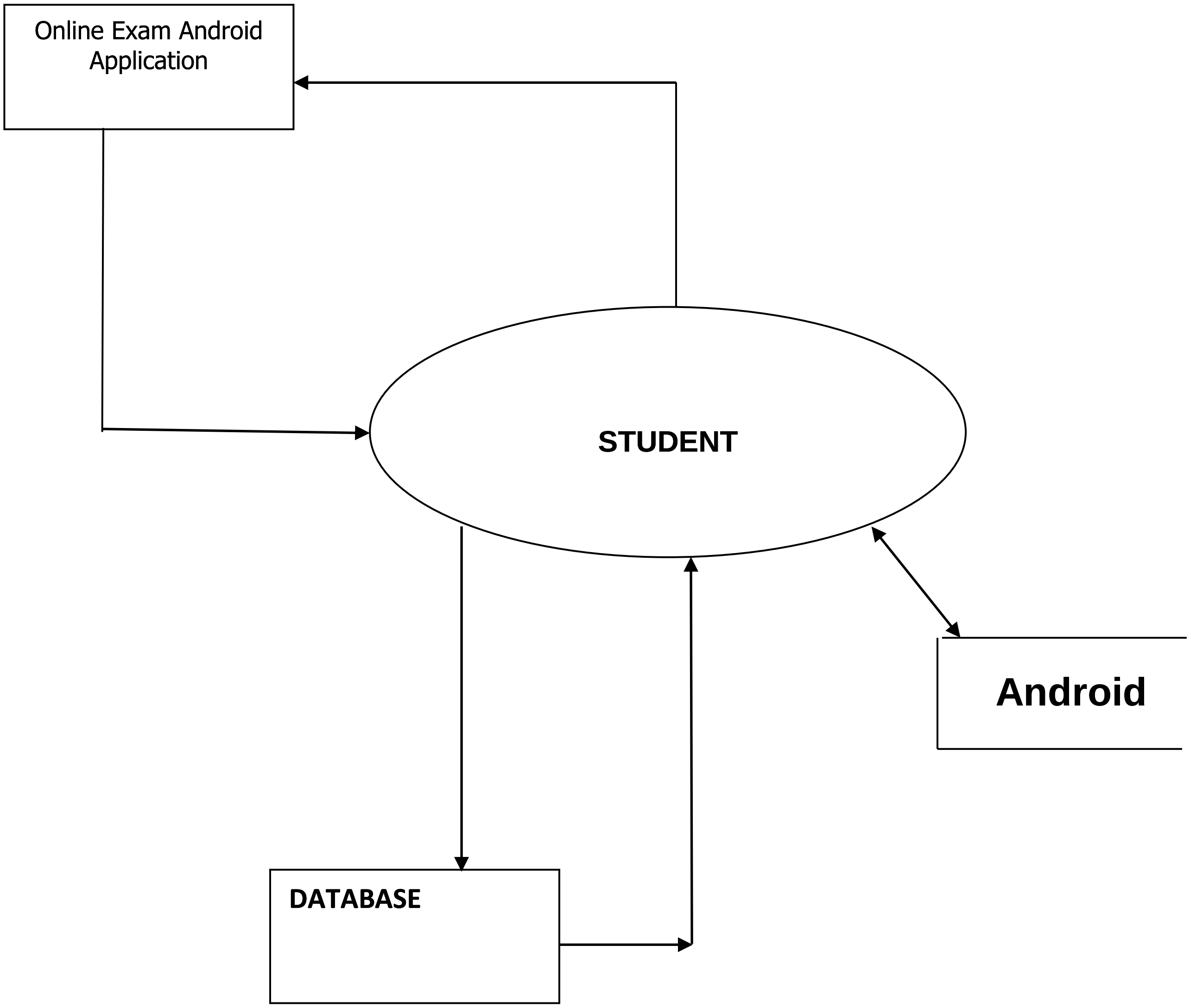
The first level DFD show more detail, about the single process of the 0 level DFD

The second level DFD can show even more details and so on.

Construction a DFD:

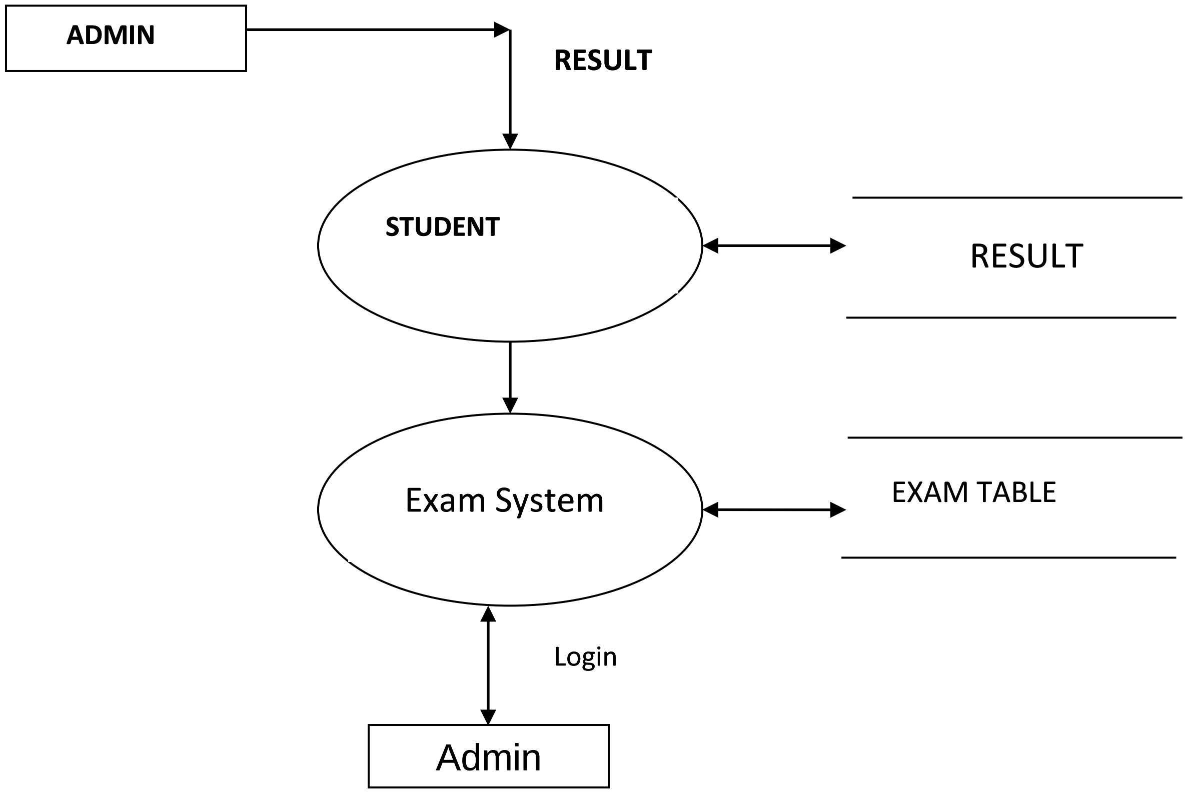
- Process should be named.
- The direction of flow is from top to bottom and from left to right.
- When a process is exploded into lower level details, they are numbered.
- The name of data stores, sources, and destinations are written in capital letters. Process and data flow names have the first letter of each word capitalized.

10.2.1. LEVEL-0 Data Flow Diagram:



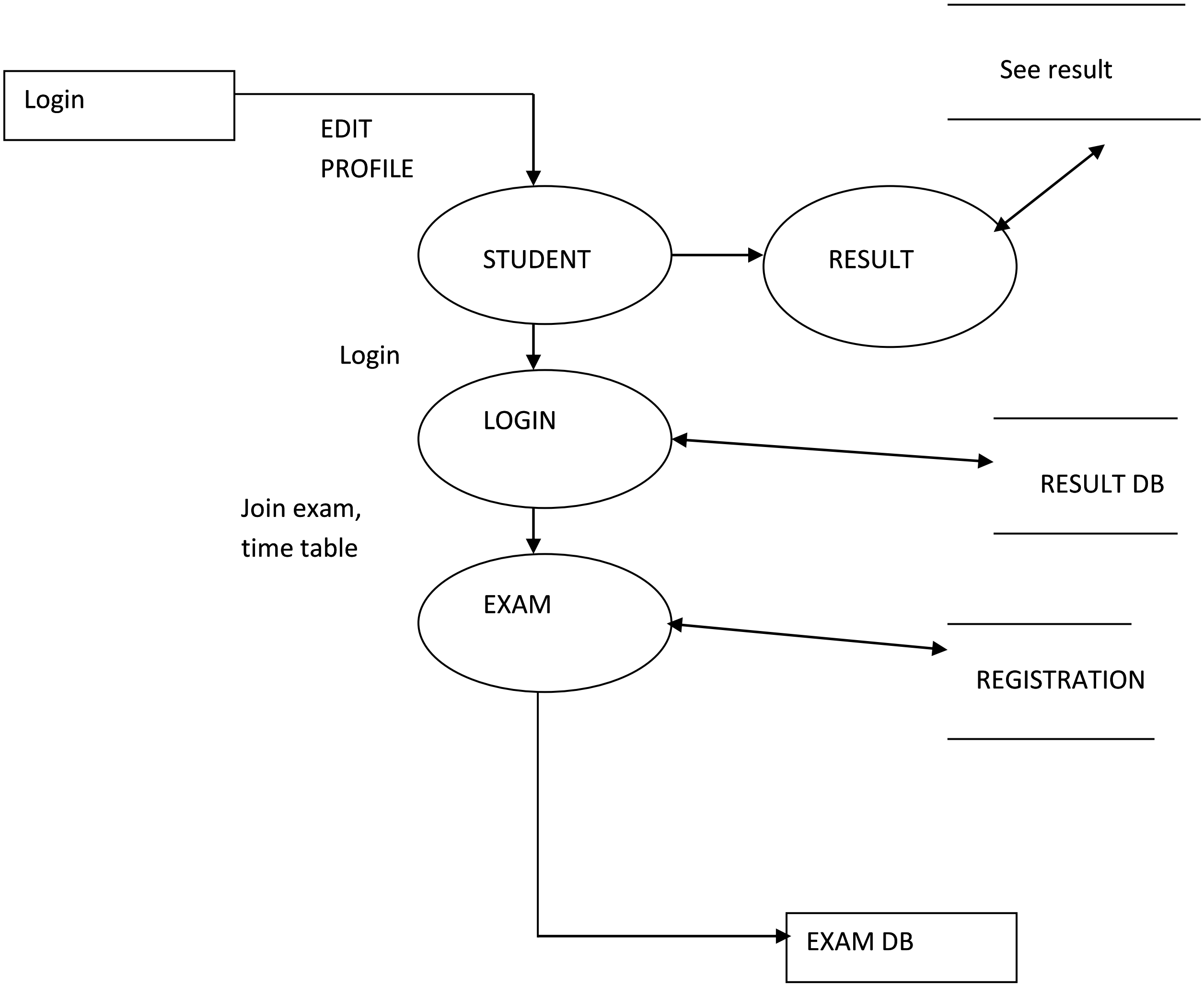
10.2.1: LEVEL 0 DFD

10.2.2 LEVEL-1 Data Flow Diagram:



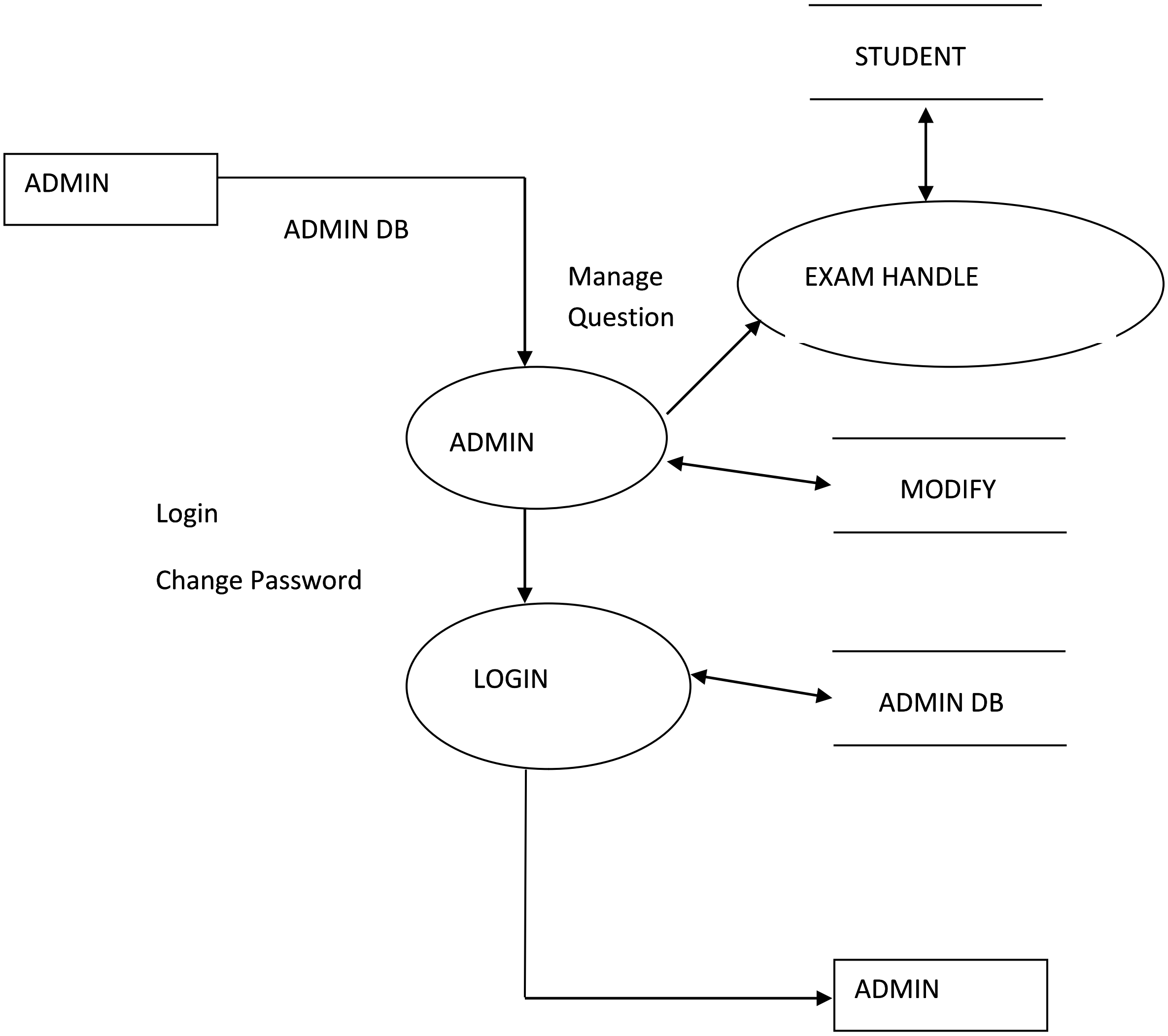
10.2.2: LEVEL 1 DFD

10.3.3 LEVEL-2 Data Flow Diagram:



10.2.3: LEVEL 2 DFD

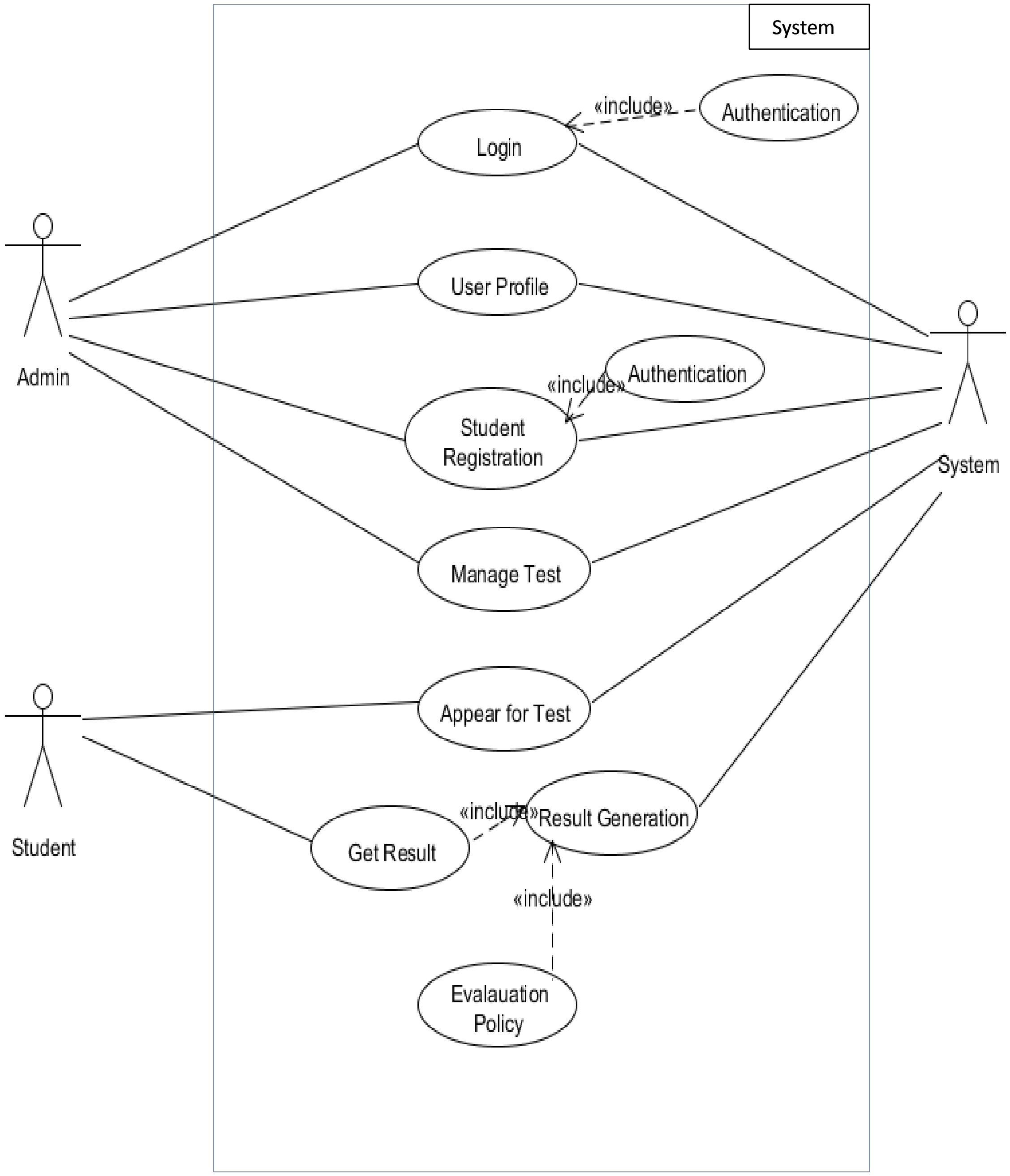
10.3.4 LEVEL-3 Data Flow Diagram:



10.2.4: LEVEL 3 DFD

11. DESIGN AND MINUTIAE

11.1 Use Case Diagram:



11.1: Use Case Diagram

A use case diagram at its simplest is a representation of a user's interaction with the system and depicting the specifications of a use case. A use case diagram can portray the different types of users of a system and the various ways that they interact with the system. While a use case itself might drill into a lot of detail about every possibility, a use case diagram can help provide a higher-level view of the system. It has been said before that "Use case diagrams are the blueprints for your system".

In the system, the administrator is provided with the facilities of setting user profiles, authenticating student registration and managing tests. These tasks, in turn are all verified by the system. A student can appear for the test and get the results. Authentication and result generation tasks are performed by the system.

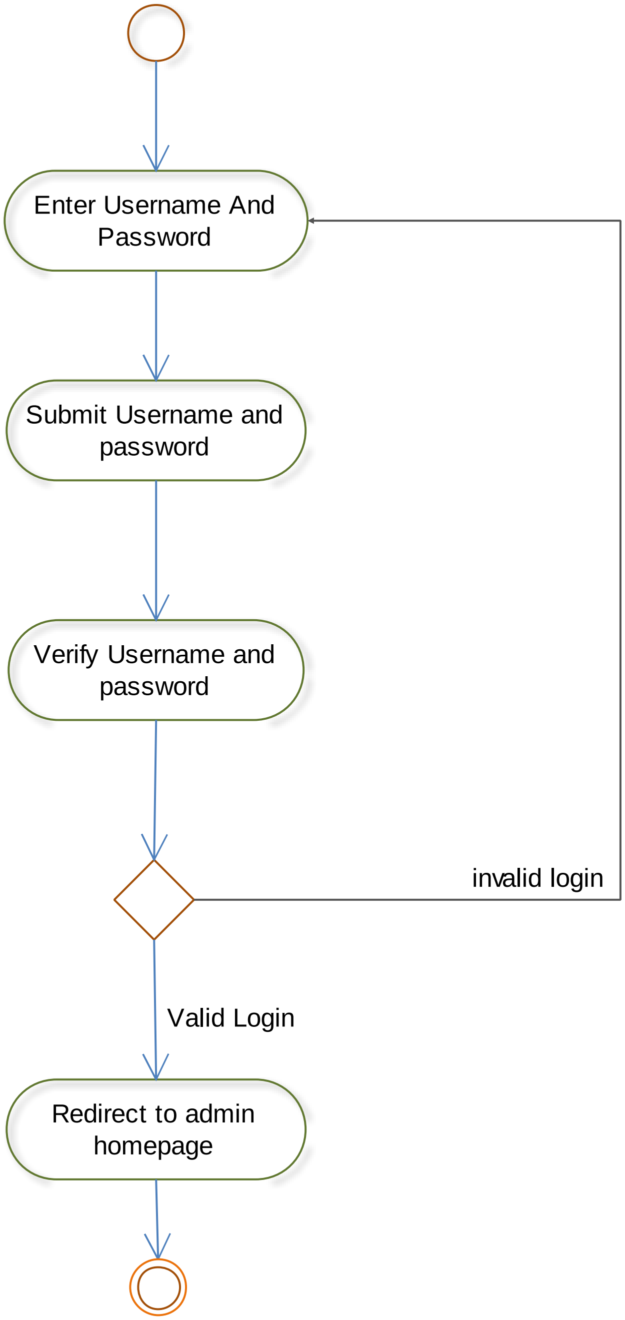
11.2 Activity Diagrams:

Activity diagrams are graphical representations of workflows of stepwise activities and actions with support for choice, iteration and concurrency. In the Unified Modelling Language, activity diagrams can be used to describe the business and operational step-by-step workflows of components in a system. An activity diagram shows the overall flow of control.

The below illustrated diagrams shows the each activity in detail as it takes place accordingly in the system detailing the flow of interaction between users and the administrative system.

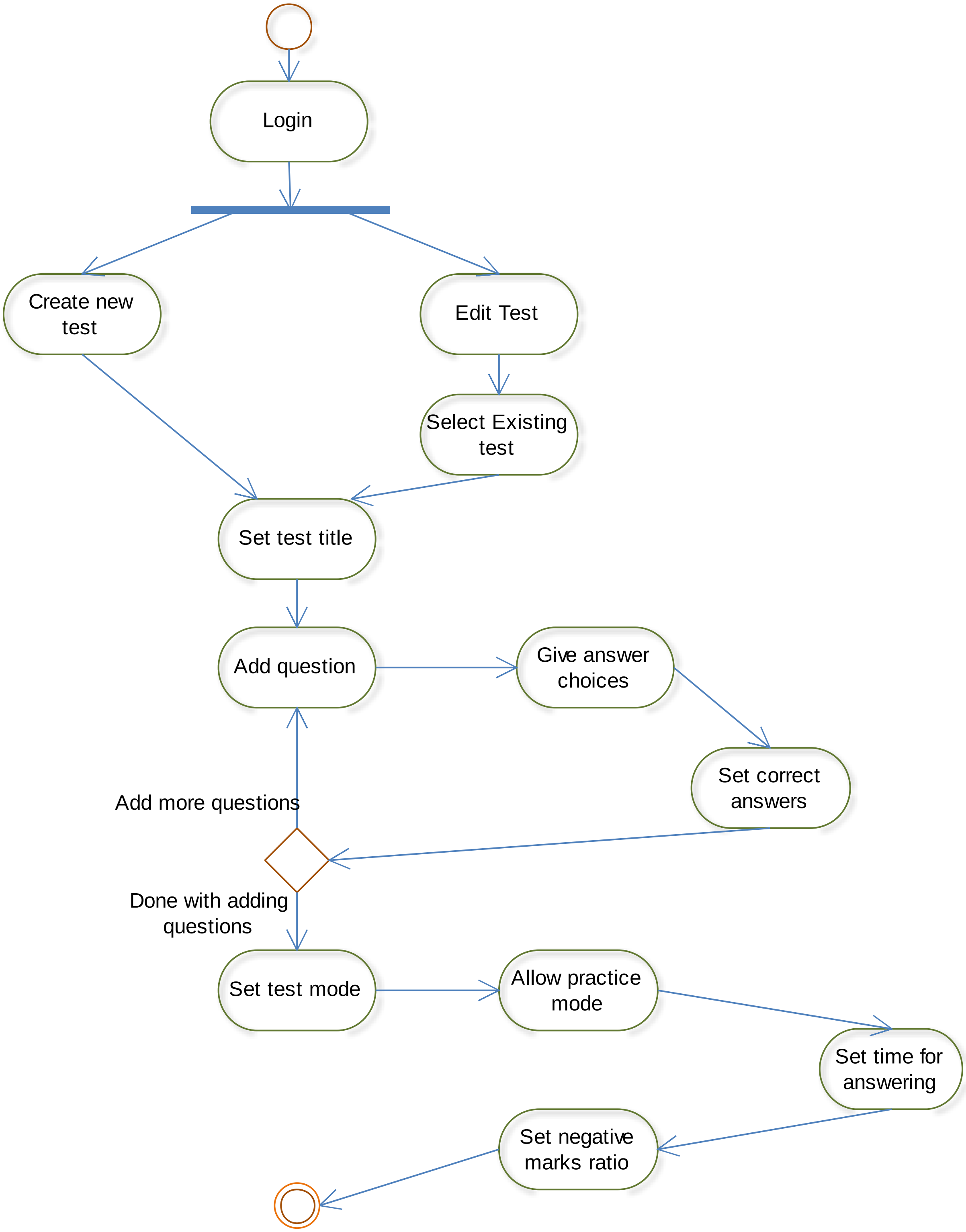
Each of the following diagrams is unique in the aspect of the activity under consideration and display.

11.2.1. Login Activity


Enter Username And Password
Submit Username and password
Verify Username and password
invalid login
Valid Login
Redirect to admin homepage

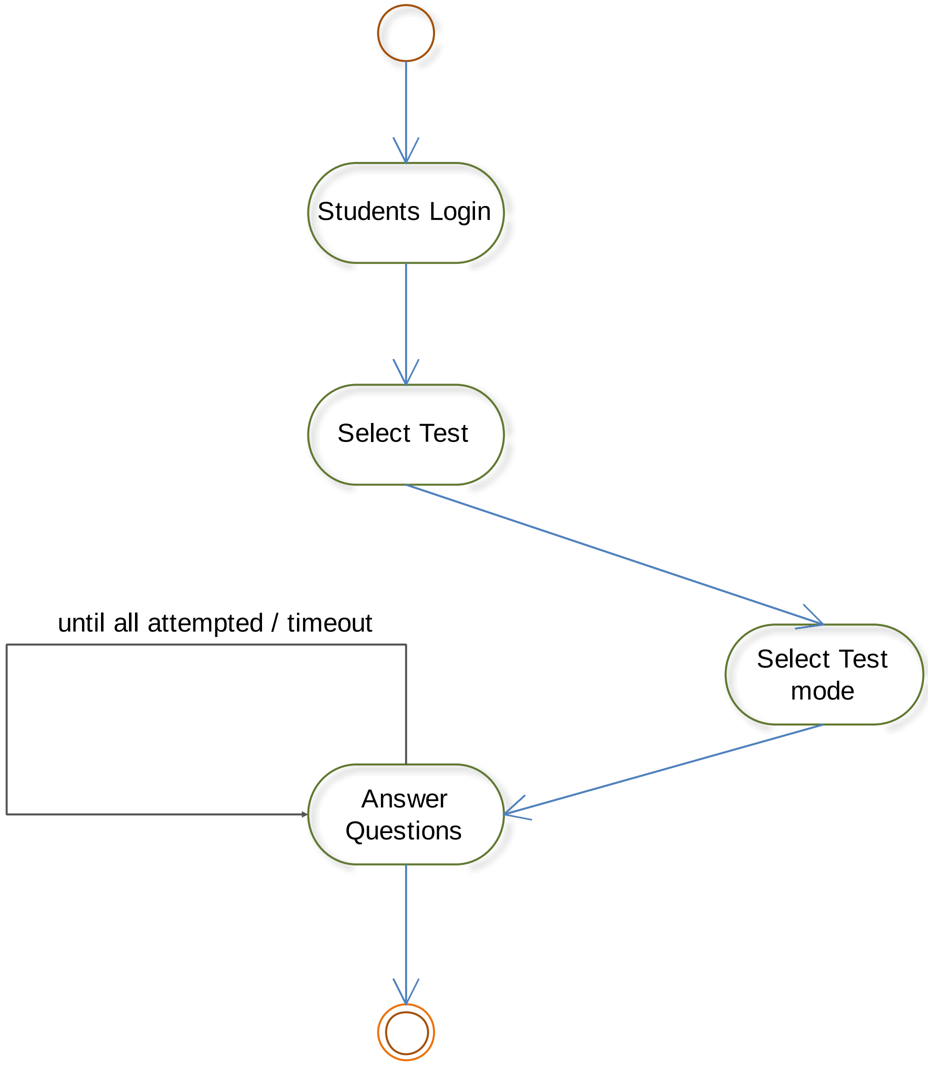
11.2.1: Login

11.2.2 Manage Test Activity



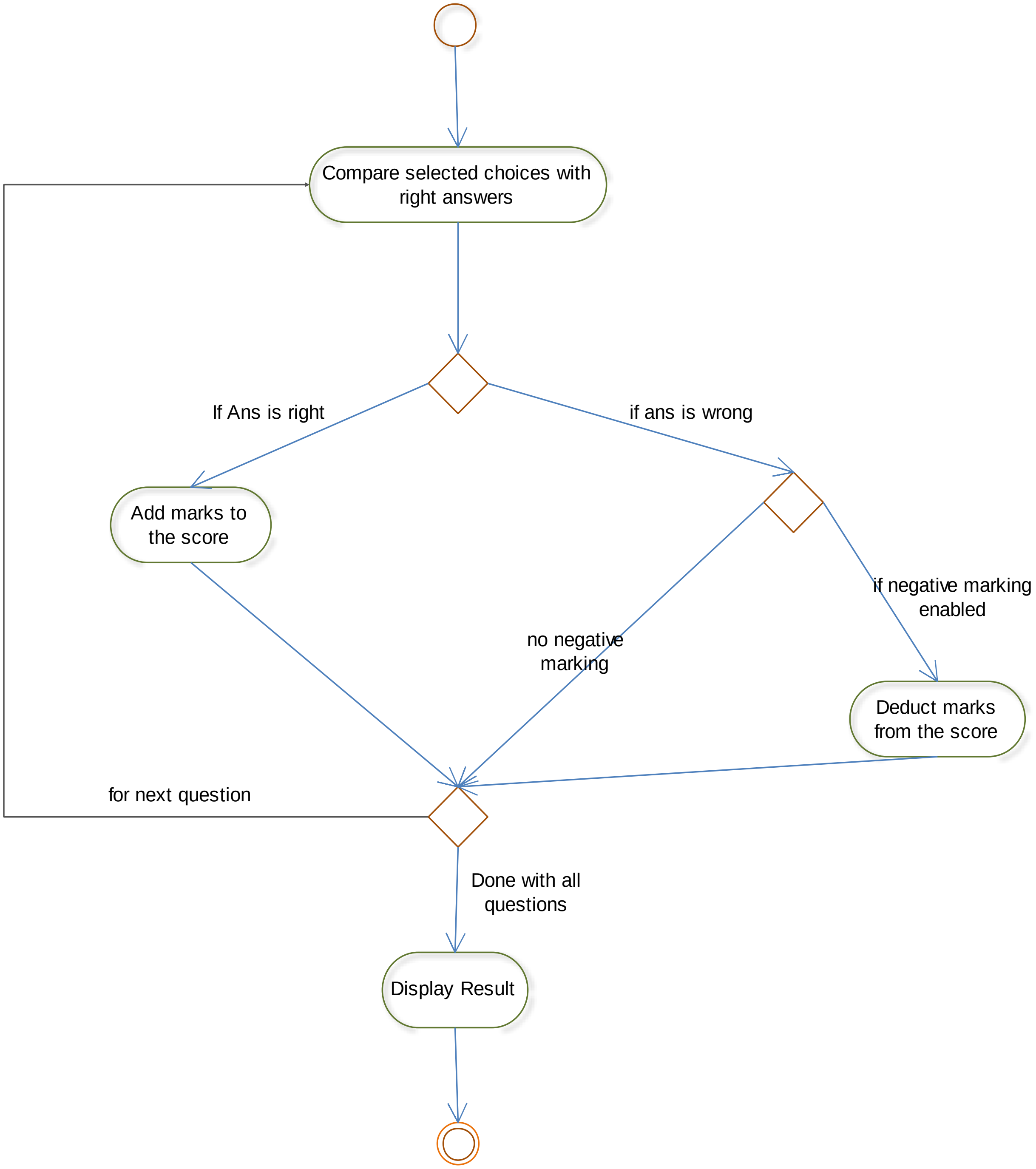
11.2.2: Manage Tests

11.2.3 Answer Test Activity



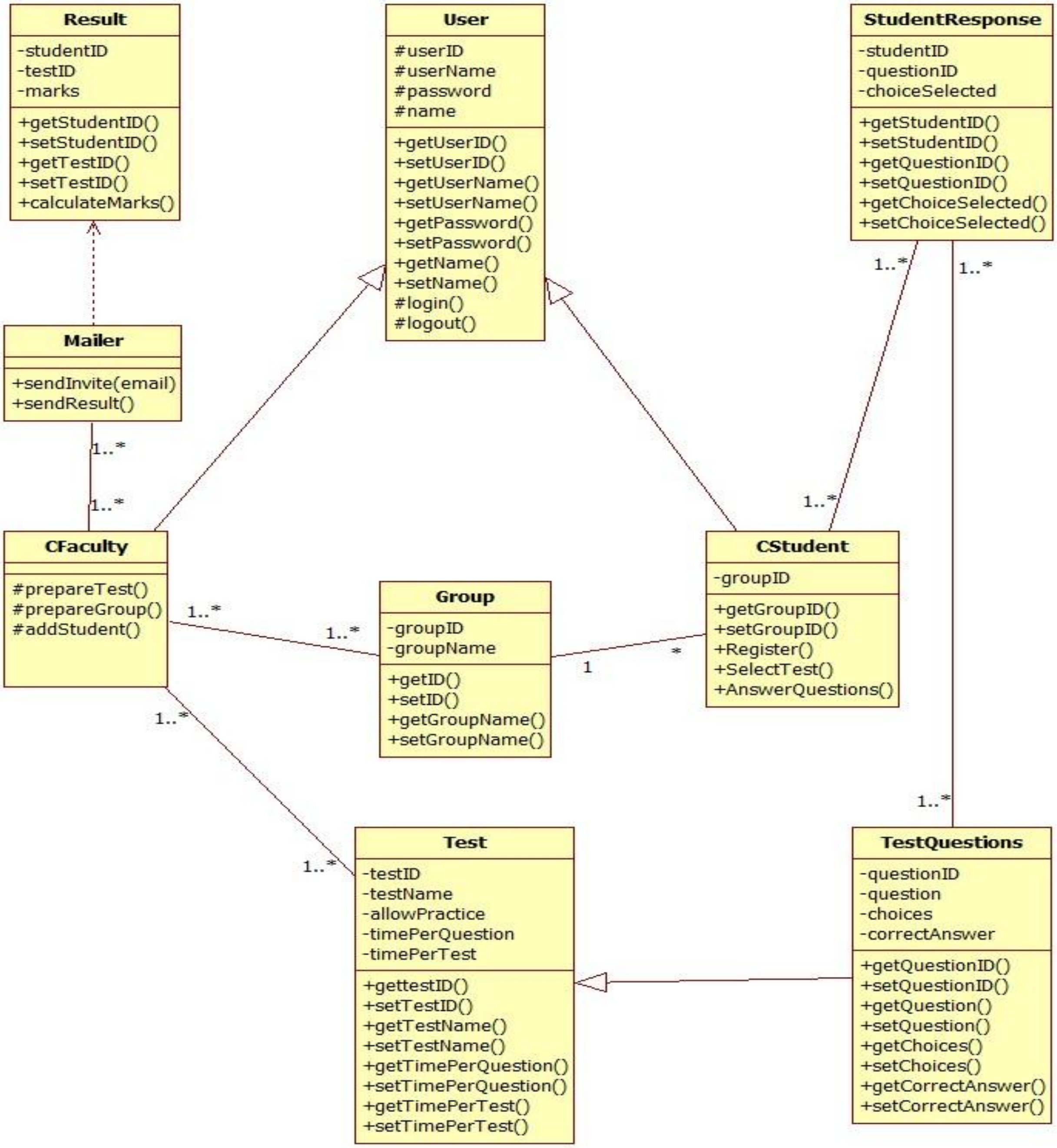
11.2.3: Answer

11.2.4 Generate Results Activity



11.2.4: Generate Results

11.3 Class Diagram:

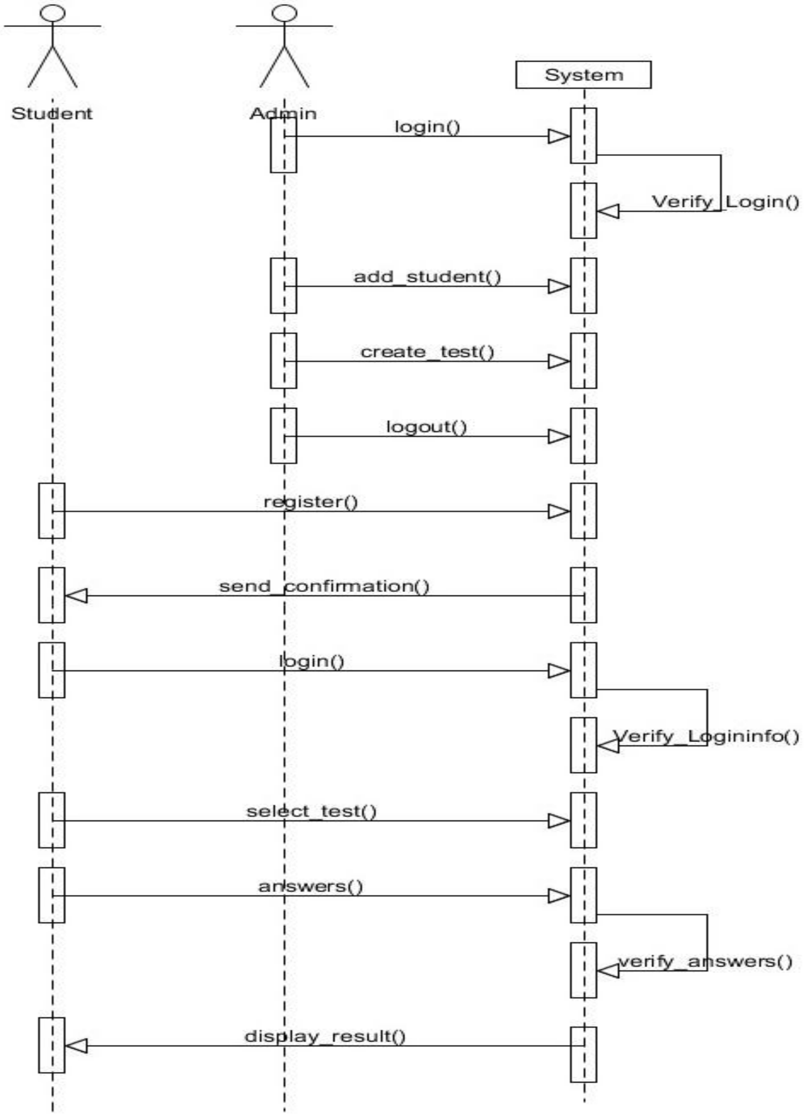


11.3: Class Diagram

Class Diagram is a static structure diagram that describes the structure of a system by showing the system's classes, their attributes, operations (or methods), and the relationships among the classes.

11.4 Sequence Diagram:

A sequence diagram is a kind of interaction diagram that shows how processes operate with one another and in what order. A sequence diagram shows object interactions arranged in time sequence. It depicts the objects and classes involved in the scenario and the sequence of messages exchanged between the objects needed to carry out the functionality of the scenario.

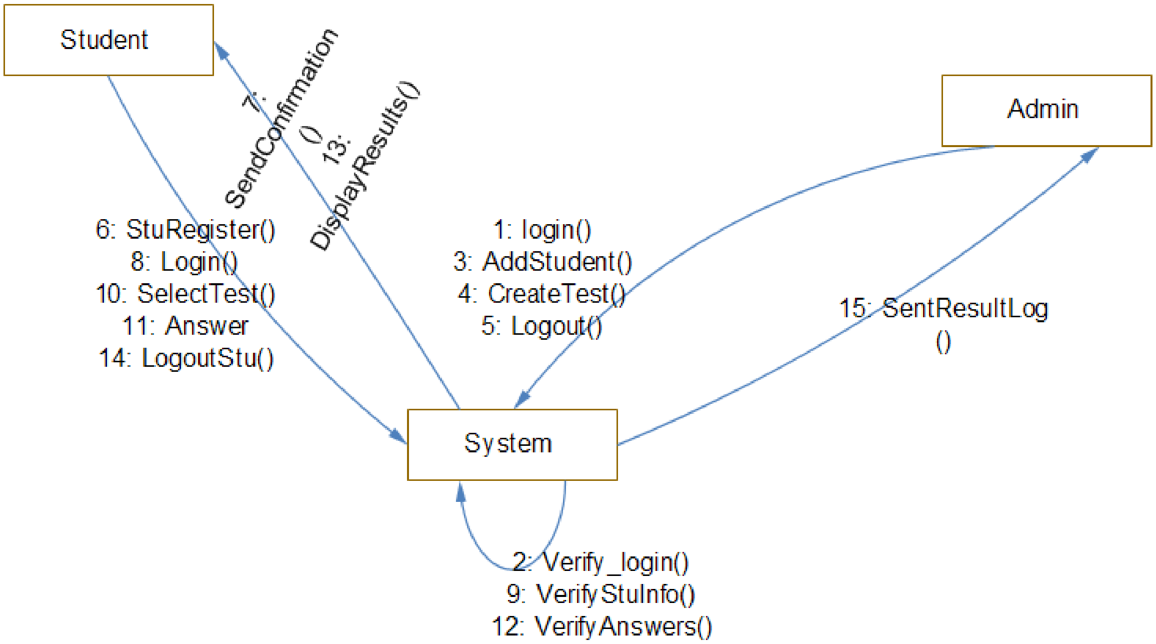


11.4: Sequence Diagram

The above diagram shows the sequence of steps as they are performed between various objects and classes. Here the objects are Student, Administrator and System and the arrows represent the various methods accessing them. Each particular step shows the sequence in which everything is carried out by the particular users of the system.

11.5 Collaboration Diagram:

A collaboration diagram describes interactions among objects in terms of sequenced messages. Collaboration diagrams represent a combination of information taken from class, sequence, and use case diagrams describing both the static structure and dynamic behavior of a system.



11.5: Collaboration Diagram

The above diagram explains the interactions between the various objects in this system. Here, the objects which access the system and perform their respective functions are shown collaborating according to their individual sequences. The users, the administrators and the system all come together to form a responsible and successful interaction application amongst themselves.

12. IMPLEMENTATION

12.1 Introduction

Implementation is the carrying out, execution, or practice of a plan, a method, or any design for doing something. As such, implementation is the action that must follow any preliminary thinking in order for something to actually happen. In an information technology context, implementation encompasses all the processes involved in getting new software or hardware operating properly in its environment, including installation, configuration, running, testing, and making necessary changes. The word deployment is sometimes used to mean the same thing.

12.2 Database Schema Design

studAuth

StudUserName	StudPassword	StudPhnNo

User

username	Password

Vex

vqno	vque	vopt1	vopt2	vopt3	vopt4	vrightans

Exams

qno	Que	opt1	opt2	opt3	opt4	rightans

Results

Studname	quantmarks	verbmarks	totalmarks

12.2 Coding

The XML file:

The easiest and most effective way to define application layout is with an XML file. XML offers a human-readable structure for the layout, similar to HTML. The example XML file for the frame of start page of quant test is as below:

```
<?xml version="1.0" encoding="utf-8"?>
<RelativeLayout xmlns:android="http://schemas.android.com/apk/res/android"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical" >


    <Button
        android:id="@+id/qtsexit"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentBottom="true"
        android:layout_alignParentLeft="true"
        android:text="Exit Test" />

    <Button
        android:id="@+id/qtssubmit"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentBottom="true"
        android:layout_marginLeft="26dp"
        android:layout_toRightOf="@+id/textView7"
        android:text="Submit" />

    <Button
        android:id="@+id/qtsnext"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentBottom="true"
        android:layout_alignParentRight="true"
        android:text="Next" />

    <TextView
        android:id="@+id/textView2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_alignParentLeft="true"
        android:layout_alignParentRight="true"
        android:layout_below="@+id/textView9"
        android:layout_marginTop="14dp"
        android:text="Question"
        android:textAppearance="?android:attr/textAppearanceMedium" />
```

```
<TextView
    android:id="@+id/textView9"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignParentTop="true"
    android:layout_toRightOf="@+id/textView8"
    android:text="Hello"
    android:textAppearance="?android:attr/textAppearanceLarge" />

<TextView
    android:id="@+id/TextView02"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignParentLeft="true"
    android:layout_centerVertical="true"
    android:text="Option (4) :"
    android:textAppearance="?android:attr/textAppearanceMedium" />

<TextView
    android:id="@+id/TextView03"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_above="@+id/TextView02"
    android:layout_toLeftOf="@+id/textView9"
    android:text="Option (3) :"
    android:textAppearance="?android:attr/textAppearanceMedium" />

<TextView
    android:id="@+id/TextView01"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_above="@+id/TextView03"
    android:layout_toLeftOf="@+id/textView9"
    android:text="Option (2) :"
    android:textAppearance="?android:attr/textAppearanceMedium" />

<TextView
    android:id="@+id/textView8"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_above="@+id/TextView01"
    android:layout_alignParentLeft="true"
    android:text="Option (1) :"
    android:textAppearance="?android:attr/textAppearanceMedium" />

<TextView
    android:id="@+id/textView3"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_above="@+id/textView4"
    android:layout_alignLeft="@+id/qtssubmit"
    android:text="Opt1"
    android:textAppearance="?android:attr/textAppearanceMedium" />

<TextView
    android:id="@+id/textView4"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_above="@+id/textView5"
    android:layout_alignLeft="@+id/textView3"
    android:text="Opt2"
    android:textAppearance="?android:attr/textAppearanceMedium" />
```

```
<TextView
    android:id="@+id/textView5"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_above="@+id/textView6"
    android:layout_alignLeft="@+id/textView4"
    android:text="Opt3"
    android:textAppearance="?android:attr/textAppearanceMedium" />

<TextView
    android:id="@+id/textView7"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_alignParentLeft="true"
    android:layout_below="@+id/TextView02"
    android:layout_marginTop="26dp"
    android:text="Answer"
    android:textAppearance="?android:attr/textAppearanceLarge" />

<EditText
    android:id="@+id/editText1"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_below="@+id/textView7"
    android:layout_toRightOf="@+id/textView7"
    android:ems="10"
    android:hint="Write option number here" />

<TextView
    android:id="@+id/textView6"
```

```
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:layout_above="@+id/textView7"
        android:layout_alignRight="@+id/textView9"
        android:text="Opt4"
        android:textAppearance="?android:attr/textAppearanceMedium" />

</RelativeLayout>
```

The Java File:

The JAVA files works as backend of the frames. It generates functionalities for buttons, text views from the XML file. The corresponding Java file of start page of quant test is as follows:

```
package com.example.Aphexams;
import com.parse.*;
import java.io.*;
import java.util.*;
import android.os.Bundle;
import android.app.Activity;
import android.app.ProgressDialog;
import android.content.Intent;
import android.widget.*;
import android.util.Log;
import android.view.Menu;
import android.view.View;
import android.view.View.OnClickListener;
import android.app.Activity;
import android.content.Intent;
import android.widget.*;
import android.view.Menu;
import android.view.View;
import android.view.View.OnClickListener;
import java.util.*;
public class QTestStart extends Activity{

        Button bqtssubmit,bqtsnext,bqtsexit;
        TextView oop1,oop2,oop3,oop4,textView1,qquestn;
        EditText ccorrect;
        public static int  num4=1;
        public static int counter=0;

        @Override
        protected void onCreate(Bundle savedInstanceState) {
                super.onCreate(savedInstanceState);
                setContentView(R.layout.qtest_start);
                Parse.initialize(this, "eX31t72OF1l2SfT72YlLNkBiCiMwRGCf6S8QGMHB",
"r70qpWRJ6IMNgTn7YW2dLZUFMmvTn5GQRfNQcwsd");
                counter=0;
                num4=1;

                Intent intentIndex = getIntent();
     final String studname = intentIndex.getStringExtra("studentInvoking");
     final TextView tw= (TextView)findViewById(R.id.textView9);
     tw.setText("Hello "+studname);
     final String tillNow = intentIndex.getStringExtra("tillnow");
     final String verbo = intentIndex.getStringExtra("verbo");
     final String quanto = intentIndex.getStringExtra("quanto")
     ParseQuery<ParseObject> query = ParseQuery.getQuery("exams");
                query.whereEqualTo("qno",num4);
                query.getFirstInBackground(new GetCallback<ParseObject>() {
                public void done(ParseObject object, ParseException e) {
```

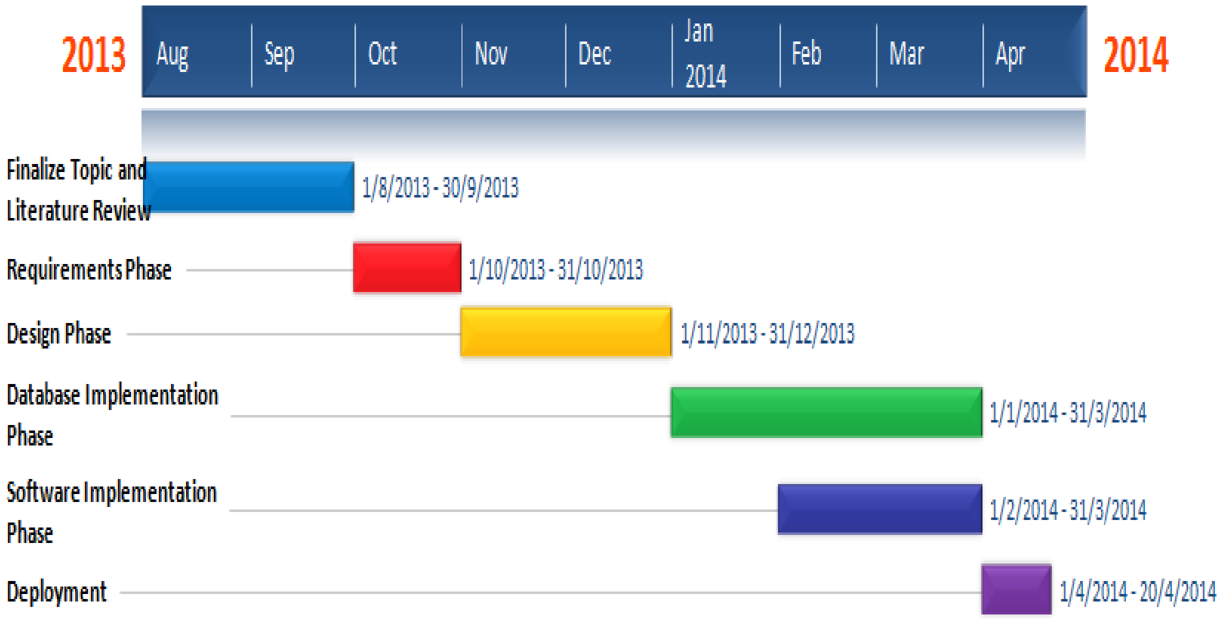
```
                if (object == null) {
                Log.d("que", "The getFirst request failed.");
                   } else {
                    Log.d("que", "Retrieved the object.");
                    String questiondata=object.getString("que");
                    final TextView qquestn = (TextView) findViewById(R.id.textView2);
                    qquestn.setText(questiondata);
                    String option1=object.getString("opt1");
                    final TextView oop1 = (TextView) findViewById(R.id.textView3);
                    oop1.setText(option1);
                    String option2=object.getString("opt2");
                    final TextView oop2 = (TextView) findViewById(R.id.textView4);
                    oop2.setText(option2);
                    String option3=object.getString("opt3");
                    final TextView oop3 = (TextView) findViewById(R.id.textView5);
                    oop3.setText(option3);
                    String option4=object.getString("opt4");
                    final TextView oop4 = (TextView) findViewById(R.id.textView6);
                    oop4.setText(option4); }}});
                bqtssubmit = (Button)findViewById(R.id.qtssubmit);
                bqtssubmit.setOnClickListener(new OnClickListener() {
                public void onClick(View v) {
                if(num4==20){
                        final ProgressDialog dlg = new ProgressDialog(QTestStart.this);
                        dlg.setTitle("Please wait.");
                        dlg.setMessage("Processing request.  Navigating to result evaluation.
Please wait.");
                        dlg.show();
                        Intent indexIntent=new Intent(QTestStart.this,Result.class);
                        indexIntent.putExtra("studentInvoking",studname);
                        indexIntent.putExtra("quanto",Integer.toString(counter));
```

```
		indexIntent.putExtra("verbo",verbo);
		indexIntent.putExtra("which","verbal");
		if(tillNow.equals("")){indexIntent.putExtra("tillnow","q");}
		else if(tillNow.equals("v")){indexIntent.putExtra("tillnow","vq");}
		startActivity(indexIntent);
			}else{
		final EditText ccorrect = (EditText) findViewById(R.id.editText1);
		String cor=ccorrect.getText().toString().trim();
		ParseQuery<ParseObject> query = ParseQuery.getQuery("exams");
		query.whereEqualTo("qno",num4);
		query.whereEqualTo("rightans",Integer.parseInt(cor));
		query.getFirstInBackground(new GetCallback<ParseObject>() {
		public void done(ParseObject object, ParseException e) {
			if (object == null) {
			Log.d("que", "The getFirst request failed.");
			ccorrect.setEnabled(false);
			counter=counter-1;
			} else {
			Log.d("que", "Retrieved the object.");
			counter=counter+5;
			ccorrect.setEnabled(false); }}}); }}});
	bqtsnext = (Button)findViewById(R.id.qtsnext);
	bqtsnext.setOnClickListener(new OnClickListener() {
		public void onClick(View v) {
		num4++;
		if(num4==21){
		Intent indexIntent=new Intent(QTestStart.this,Result.class);
		indexIntent.putExtra("studentInvoking",studname);
		indexIntent.putExtra("quanto",Integer.toString(counter));
		indexIntent.putExtra("verbo",verbo);
		indexIntent.putExtra("which","verbal");
```

```
        if(tillNow.equals("")){indexIntent.putExtra("tillnow","q");}
        else if(tillNow.equals("v")){indexIntent.putExtra("tillnow","vq");}
        startActivity(indexIntent);
        }
        final EditText ccorrect = (EditText) findViewById(R.id.editText1);
        ccorrect.setEnabled(true);
        ccorrect.setText("");
        ParseQuery<ParseObject> query = ParseQuery.getQuery("exams");
        query.whereEqualTo("qno",num4);
        query.getFirstInBackground(new GetCallback<ParseObject>() {
        public void done(ParseObject object, ParseException e) {
        if (object == null) {
        Log.d("que", "The getFirst request failed.");
        } else {
        Log.d("que", "Retrieved the object.");
        String questiondata=object.getString("que");
        final TextView qquestn = (TextView) findViewById(R.id.textView2);
        qquestn.setText(questiondata);
        String option1=object.getString("opt1");
        final TextView oop1 = (TextView) findViewById(R.id.textView3);
        oop1.setText(option1);
        String option2=object.getString("opt2");
        final TextView oop2 = (TextView) findViewById(R.id.textView4);
        oop2.setText(option2);
        String option3=object.getString("opt3");
        final TextView oop3 = (TextView) findViewById(R.id.textView5);
        oop3.setText(option3);
        String option4=object.getString("opt4");
        final TextView oop4 = (TextView) findViewById(R.id.textView6);
        oop4.setText(option4); }}});}});
final int fverbo=0;
```

```
        bqtsexit = (Button)findViewById(R.id.qtsexit);
        bqtsexit.setOnClickListener(new OnClickListener() {
        public void onClick(View v) {
        final ProgressDialog dlg = new ProgressDialog(QTestStart.this);
        dlg.setTitle("Please wait.");
        dlg.setMessage("Processing request.  Exiting the test.  Please wait.");
        dlg.show();
        Intent indexIntent=new Intent(QTestStart.this,Result.class);
        indexIntent.putExtra("studentInvoking",studname);
        indexIntent.putExtra("quanto",Integer.toString(counter));
        indexIntent.putExtra("verbo",verbo);
        indexIntent.putExtra("which","verbal");
        if(tillNow.equals("")){indexIntent.putExtra("tillnow","q");}
        else if(tillNow.equals("v")){indexIntent.putExtra("tillnow","vq");}
        startActivity(indexIntent);}});}
@Override
public void onBackPressed() {
Log.d("CDA", "onBackPressed Called");
Intent indexIntent=new Intent(QTestStart.this,MainActivity.class);
startActivity(indexIntent);                    }
```

12.3 Timeline



12.3: Project Timeline

13. RESULTS AND OBSERVATIONS

13.1 Observations

The following things were observed over the course of development of the application:

- The application was developed according to the problem definition and most of the requirements are satisfied by the application
- The online cloud database was deployed in the perfect fashion and works even with large number of users and devices accessing the application
- The application can be successfully scaled with advanced versions with much improved functionality and use
- The following are the typical configurations demanded by the app:

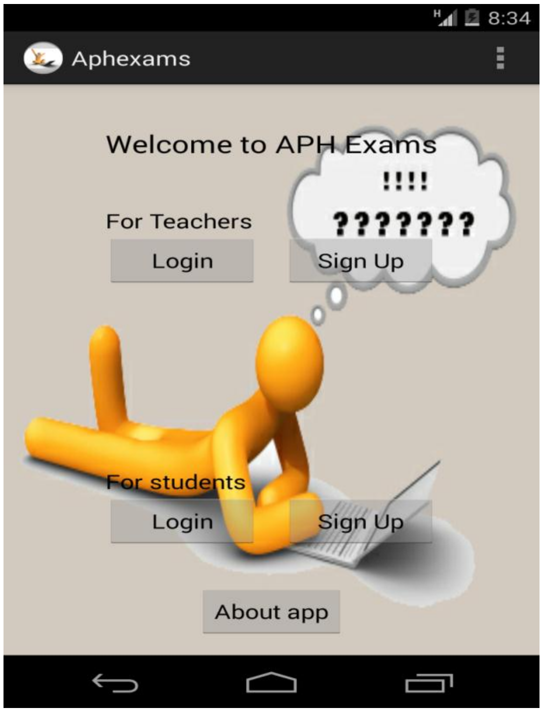
  The minimum configuration required for running the application:

Device	Android Smartphone with version Éclair and above
Processor	> 500 MHz speed
RAM	> 278 MB
Memory	> 512 MB

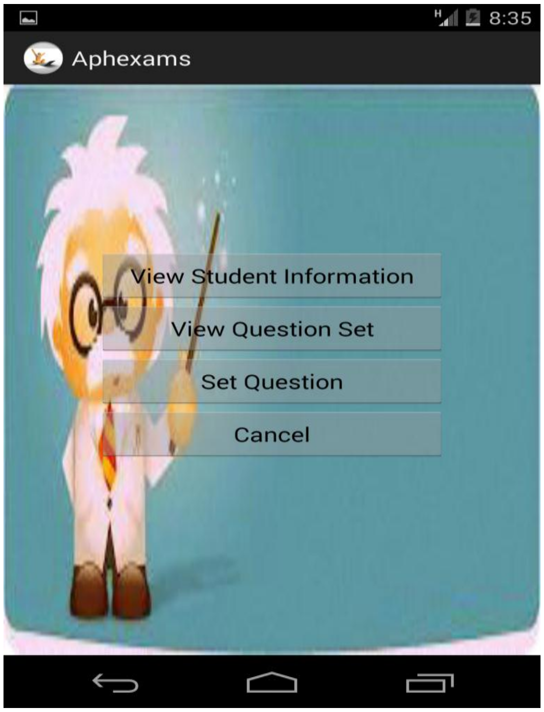
The optimal configuration required for running the application:

Device	Smartphone LG Nexus 4
Processor	1.5 GHz Krait Adreno 320
RAM	2 GB
Memory	16 GB

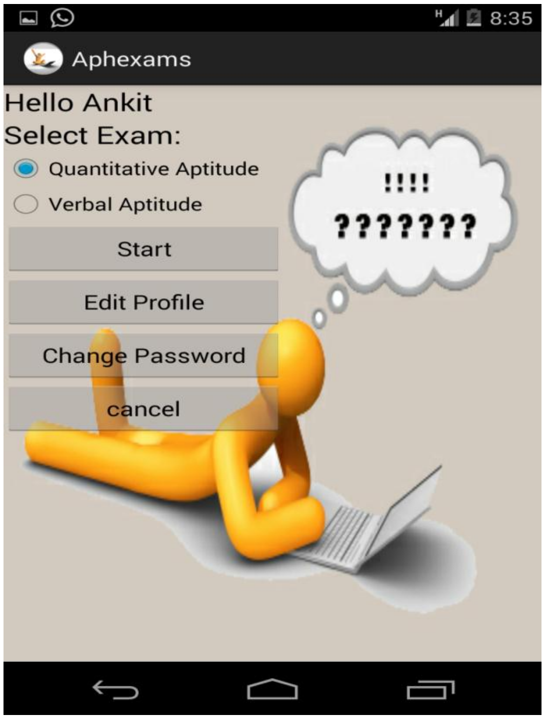
13.2 Screenshots



13.2.1: Home Page



13.2.2: Admin View

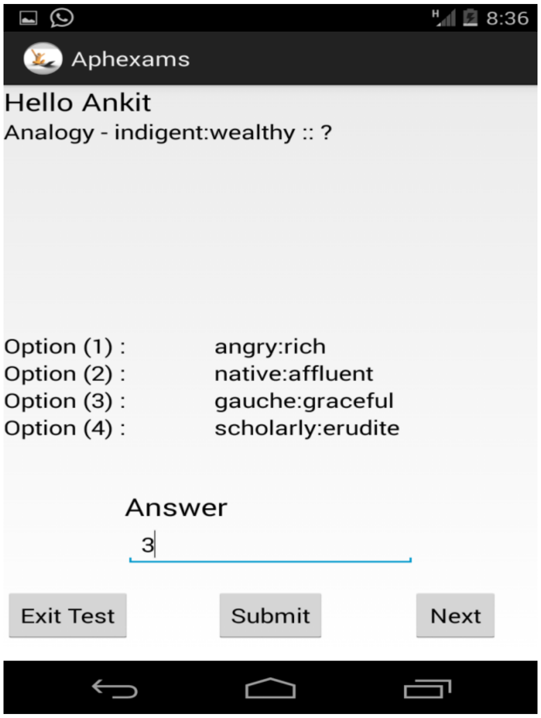

Hello Ankit

Select Exam:

● Quantitative Aptitude

○ Verbal Aptitude

13.2.3: Student Home


Hello Ankit

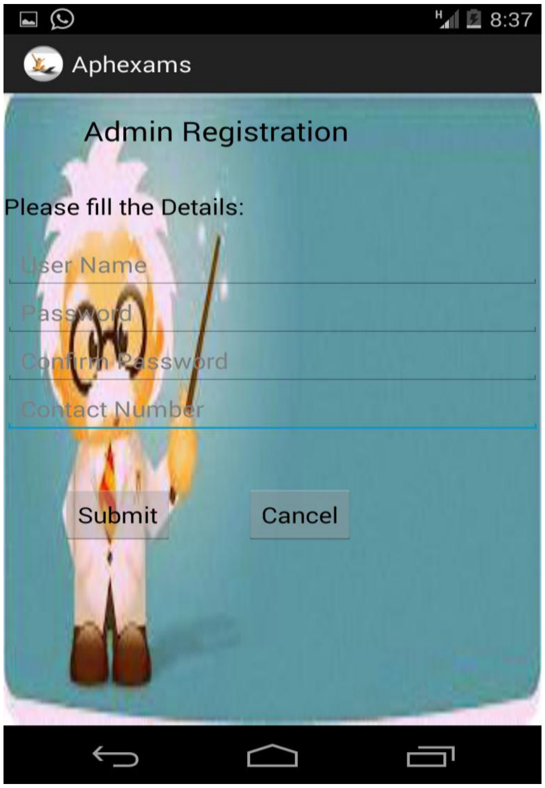
Analogy - indigent:wealthy :: ?

Option (1) : angry:rich
Option (2) : native:affluent
Option (3) : gauche:graceful
Option (4) : scholarly:erudite

Answer

3

13.2.4: Verbal



Admin Registration

Please fill the Details:

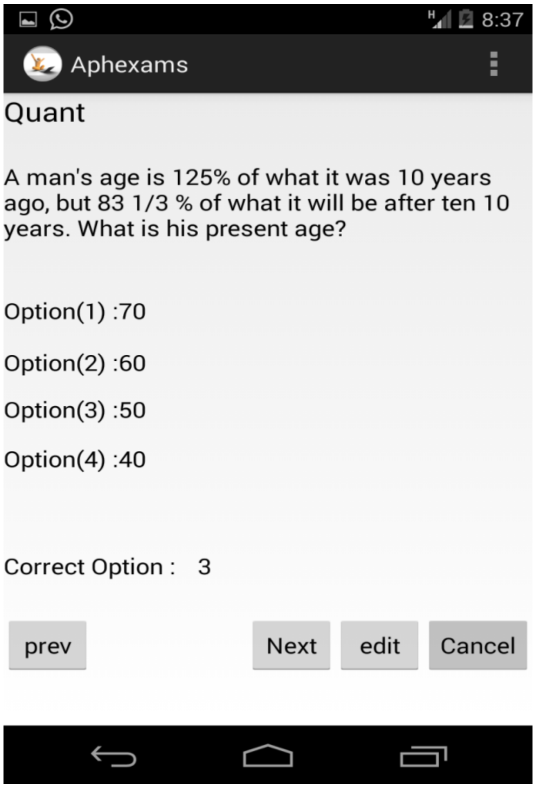
User Name

Password

Confirm Password

Contact Number

13.2.5: Admin Registration



Quant

A man's age is 125% of what it was 10 years ago, but 83 1/3 % of what it will be after ten 10 years. What is his present age?

Option(1) :70

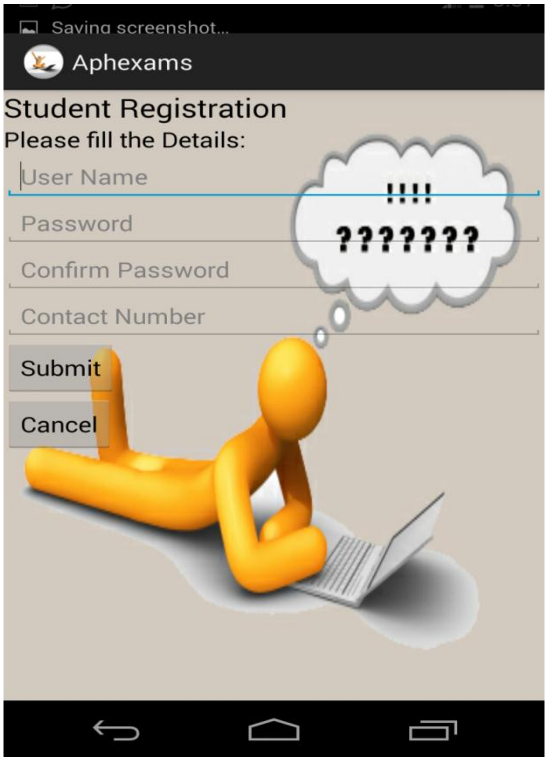
Option(2) :60

Option(3) :50

Option(4) :40

Correct Option : 3

13.2.6: Quant



Student Registration

Please fill the Details:

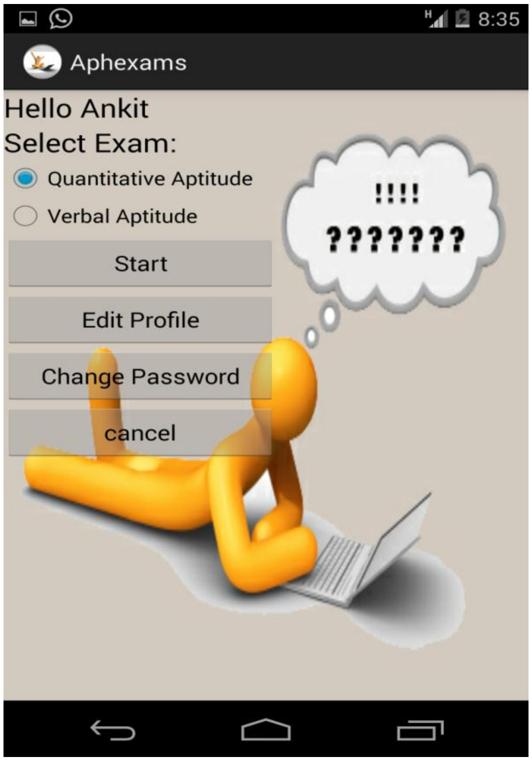
User Name

Password

Confirm Password

Contact Number

13.2.7: Student Registration



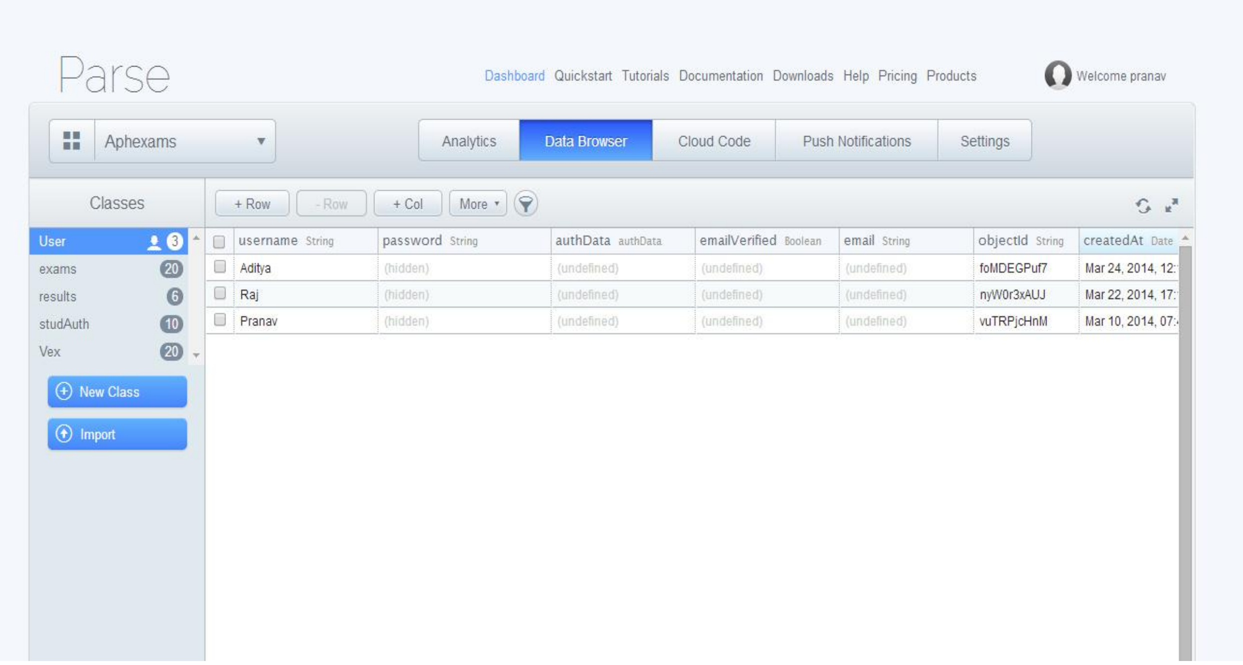
Hello Ankit

Select Exam:

● Quantitative Aptitude

○ Verbal Aptitude

13.2.8: About



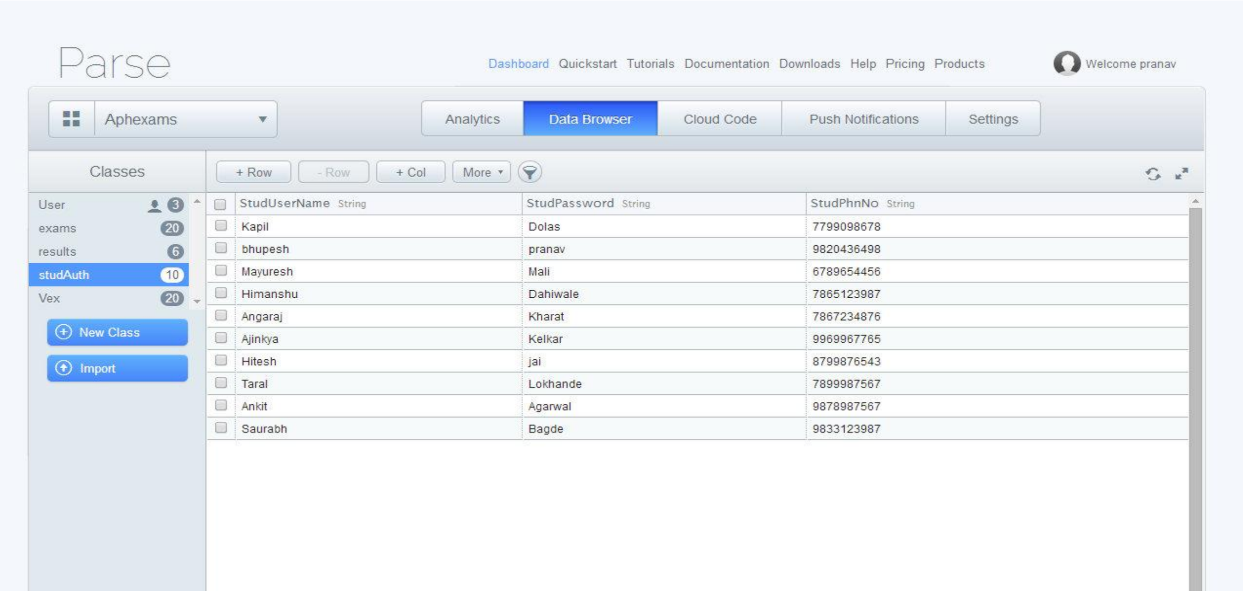
username String	password String	authData authData	emailVerified Boolean	email String	objectId String	createdAt Date
Aditya	(hidden)	(undefined)	(undefined)	(undefined)	foMDEGPuf7	Mar 24, 2014, 12:
Raj	(hidden)	(undefined)	(undefined)	(undefined)	nyW0r3xAUJ	Mar 22, 2014, 17:
Pranav	(hidden)	(undefined)	(undefined)	(undefined)	vuTRPjcHnM	Mar 10, 2014, 07:

13.2.9: User

The above table includes Admin database. The default User of parse.com is assigned to Admin in our application. By default the password field in this table is invisible for security purpose. It has following attributes:

username – Username of the Admin

password – Password of Admin



StudUserName String	StudPassword String	StudPhnNo String
Kapil	Dolas	7799098678
bhupesh	pranav	9820436498
Mayuresh	Mali	6789654456
Himanshu	Dahiwale	7865123987
Angaraj	Kharat	7867234876
Ajinkya	Kelkar	9969967765
Hitesh	jai	8799876543
Taral	Lokhande	7899987567
Ankit	Agarwal	9878987567
Saurabh	Bagde	9833123987

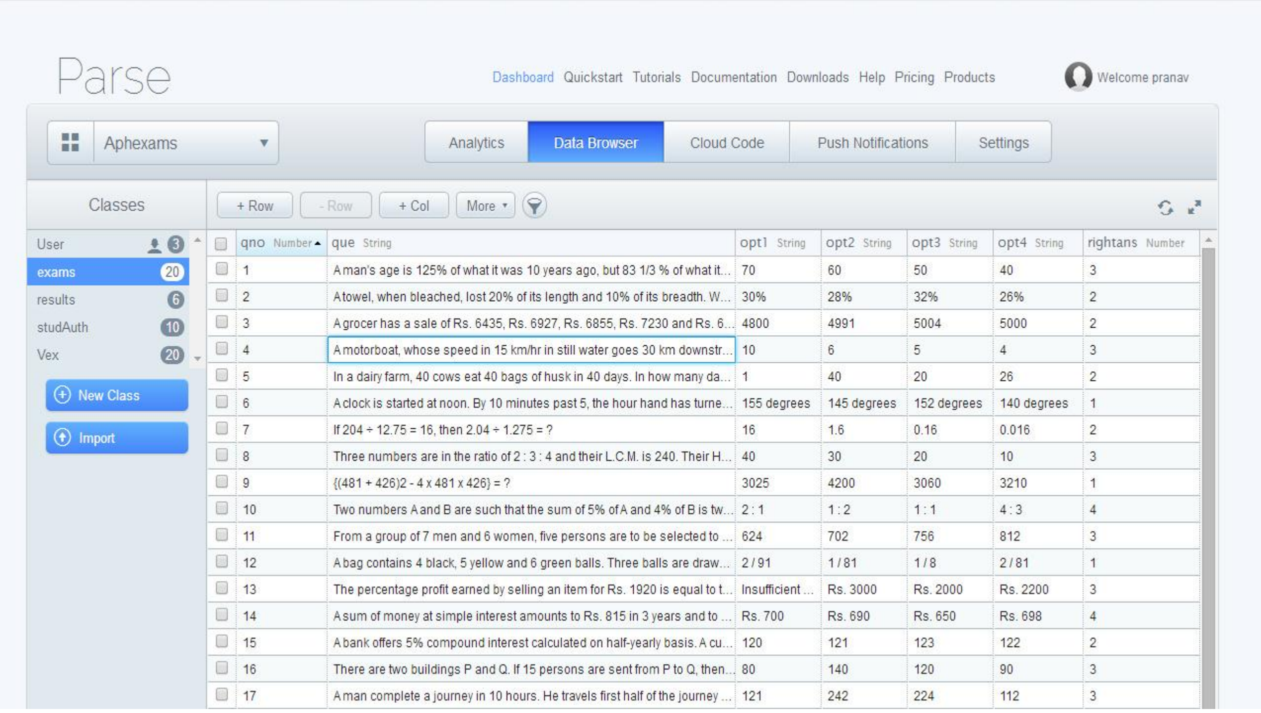
13.2.10: studAuth

The above table includes database of Students who have registered for online examination. It has following attributes:

StudUserName – Name of registered students

StudPassword – Password of registered students

StudPhnNo – Contact number of registered student



qno Number	que String	opt1 String	opt2 String	opt3 String	opt4 String	rightans Number
1	A man's age is 125% of what it was 10 years ago, but 83 1/3 % of what it...	70	60	50	40	3
2	A towel, when bleached, lost 20% of its length and 10% of its breadth. W...	30%	28%	32%	26%	2
3	A grocer has a sale of Rs. 6435, Rs. 6927, Rs. 6855, Rs. 7230 and Rs. 6...	4800	4991	5004	5000	2
4	A motorboat, whose speed in 15 km/hr in still water goes 30 km downstr...	10	6	5	4	3
5	In a dairy farm, 40 cows eat 40 bags of husk in 40 days. In how many da...	1	40	20	26	2
6	A clock is started at noon. By 10 minutes past 5, the hour hand has turne...	155 degrees	145 degrees	152 degrees	140 degrees	1
7	If 204 ÷ 12.75 = 16, then 2.04 ÷ 1.275 = ?	16	1.6	0.16	0.016	2
8	Three numbers are in the ratio of 2 : 3 : 4 and their L.C.M. is 240. Their H...	40	30	20	10	3
9	{(481 + 426)2 - 4 x 481 x 426} = ?	3025	4200	3060	3210	1
10	Two numbers A and B are such that the sum of 5% of A and 4% of B is tw...	2 : 1	1 : 2	1 : 1	4 : 3	4
11	From a group of 7 men and 6 women, five persons are to be selected to ...	624	702	756	812	3
12	A bag contains 4 black, 5 yellow and 6 green balls. Three balls are draw...	2 / 91	1 / 81	1 / 8	2 / 81	1
13	The percentage profit earned by selling an item for Rs. 1920 is equal to t...	Insufficient ...	Rs. 3000	Rs. 2000	Rs. 2200	3
14	A sum of money at simple interest amounts to Rs. 815 in 3 years and to ...	Rs. 700	Rs. 690	Rs. 650	Rs. 698	4
15	A bank offers 5% compound interest calculated on half-yearly basis. A cu...	120	121	123	122	2
16	There are two buildings P and Q. If 15 persons are sent from P to Q, then...	80	140	120	90	3
17	A man complete a journey in 10 hours. He travels first half of the journey ...	121	242	224	112	3

13.2.11: Exams

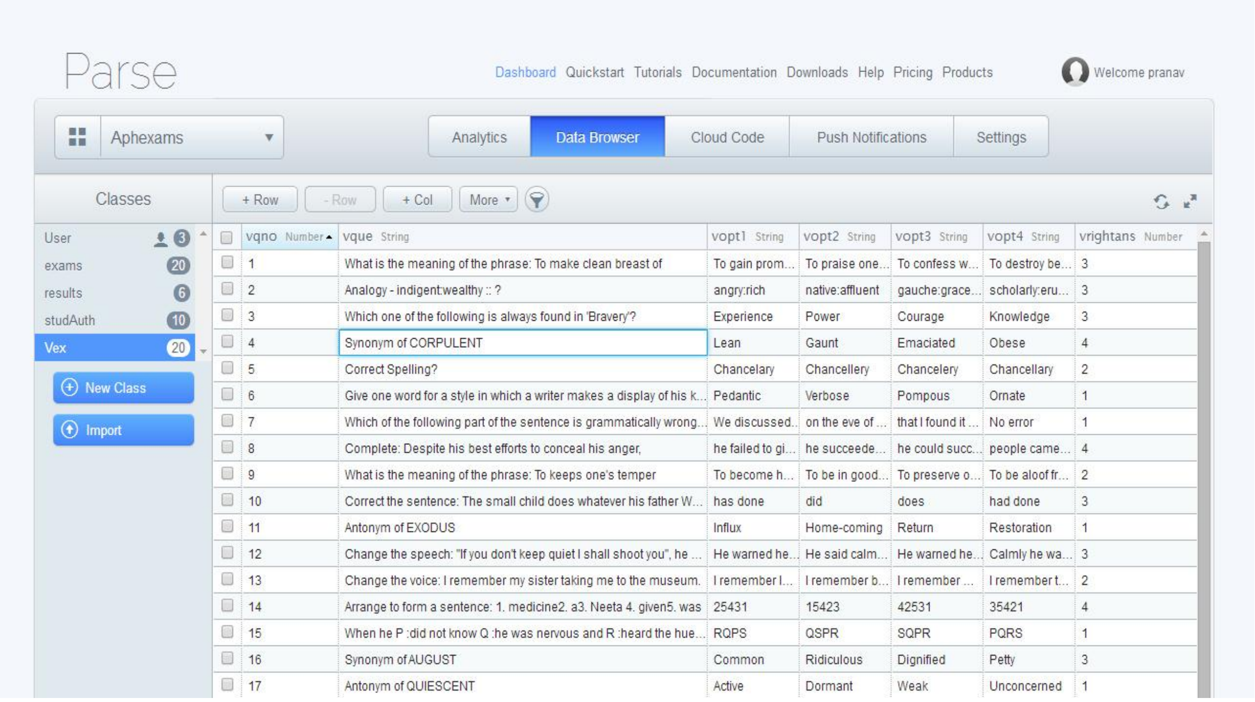
The above table includes database of Quantitative ability questions, their answer choices and correct answer for the respective questions. It has following attributes:

qno – It tells about question number.

que – It is actual question.

opt1, opt2, opt3, opt4 – These are four attributes of four answer choices for particular question.

rightans – It is right answer of the question.



vqno Number	vque String	vopt1 String	vopt2 String	vopt3 String	vopt4 String	vrightans Number
1	What is the meaning of the phrase: To make clean breast of	To gain prom...	To praise one...	To confess w...	To destroy be...	3
2	Analogy - indigent:wealthy :: ?	angry:rich	native:affluent	gauche:grace...	scholarly:eru...	3
3	Which one of the following is always found in 'Bravery'?	Experience	Power	Courage	Knowledge	3
4	Synonym of CORPULENT	Lean	Gaunt	Emaciated	Obese	4
5	Correct Spelling?	Chancelary	Chancellery	Chancelery	Chancellary	2
6	Give one word for a style in which a writer makes a display of his k...	Pedantic	Verbose	Pompous	Ornate	1
7	Which of the following part of the sentence is grammatically wrong...	We discussed...	on the eve of ...	that I found it ...	No error	1
8	Complete: Despite his best efforts to conceal his anger,	he failed to gi...	he succeede...	he could succ...	people came...	4
9	What is the meaning of the phrase: To keeps one's temper	To become h...	To be in good...	To preserve o...	To be aloof fr...	2
10	Correct the sentence: The small child does whatever his father W...	has done	did	does	had done	3
11	Antonym of EXODUS	Influx	Home-coming	Return	Restoration	1
12	Change the speech: "If you don't keep quiet I shall shoot you", he ...	He warned he...	He said calm...	He warned he...	Calmly he wa...	3
13	Change the voice: I remember my sister taking me to the museum.	I remember l...	I remember b...	I remember ...	I remember t...	2
14	Arrange to form a sentence: 1. medicine2. a3. Neeta 4. given5. was	25431	15423	42531	35421	4
15	When he P :did not know Q :he was nervous and R :heard the hue...	RQPS	QSPR	SQPR	PQRS	1
16	Synonym of AUGUST	Common	Ridiculous	Dignified	Petty	3
17	Antonym of QUIESCENT	Active	Dormant	Weak	Unconcerned	1

13.2.12: Vex

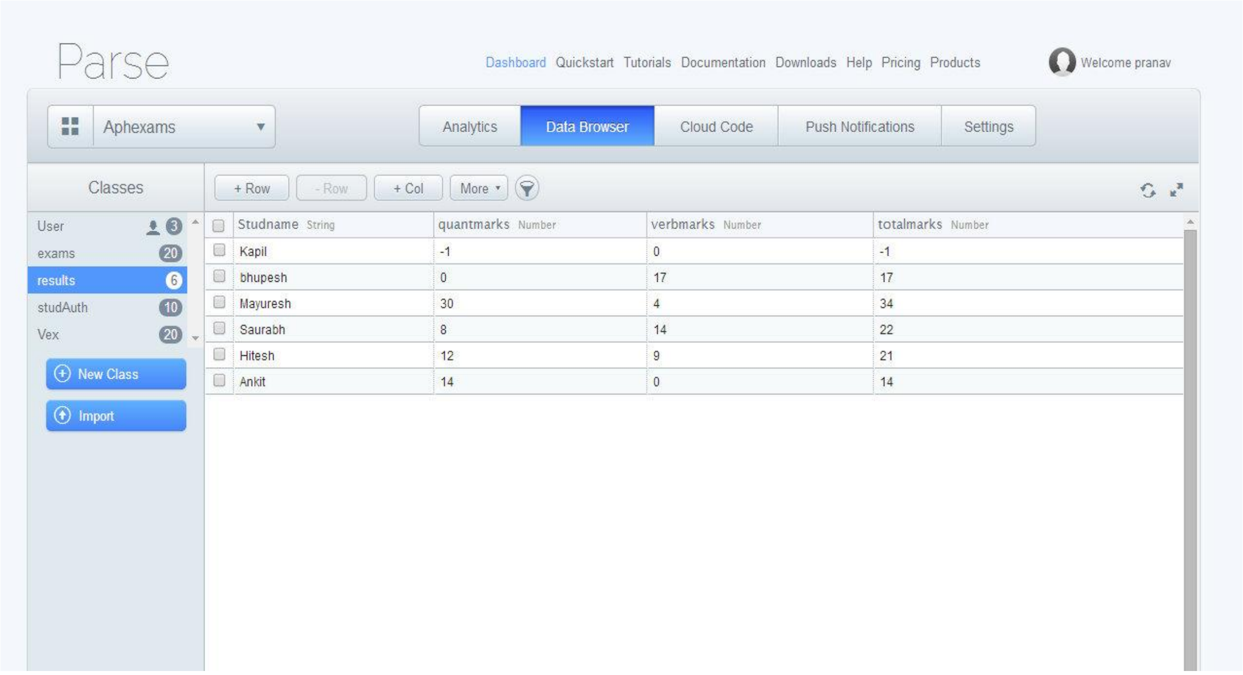
The above table includes database of Verbal ability questions, their answer choices and correct answer for the respective questions. Each question has been specifically designed and extracted taking into consideration the requirements for exams conducted for aptitude analysis. It has following attributes:

vqno – It tells about question number.

vque – It is actual question.

vopt1, vopt2, vopt3, vopt4 – These are four attributes of four answer choices for particular question.

vrightans – It is right answer of the question.



Studname String	quantmarks Number	verbmarks Number	totalmarks Number
Kapil	-1	0	-1
bhupesh	0	17	17
Mayuresh	30	4	34
Saurabh	8	14	22
Hitesh	12	9	21
Ankit	14	0	14

13.2.13: Results

The above table includes Results of the students who have successfully completes the test. It includes following attributes:

Studname – Name of the student.

Quantmarks – Marks obtained in Quantitative ability test.

Verbmarks – Marks obtained in Quantitative ability test.

Totalmarks – Total marks obtained in both test.

14. CONCLUSION AND FUTURE SCOPE

For project of development of android based ‘Online Test System’, it was a very fine experience. The system did fulfil preliminary goals such as android application development through which students can give test from their handheld device easily, thus adding to our experience. We have tried our best to implement the system efficiently. It may find its effective usage in aptitude tests or other objective tests. It is proving to be one of the efficient and agile methodologies regarding online testing experience.

14.1 Limitations of System

Present system carries certain drawbacks and limitations as listed below

1. Current system provides only multiple choices but single correct answer selection. Faculty may wish to provide multiple choices multiple selection responses.
2. In case questions and/or answers need to be in graphics, current system has no provision.
3. Security logs though not implemented in this system would be well available through the respective database management system and web server software.
4. Application is compatible with only the smartphone or tablets having android OS.
5. Supervision for test is necessary.

14.2 Future Scope

In future we will look forward to provide some updates to our system. Those may include the support for questions or answers in graphics, the provision for having multiple choice questions with multiple answers correct. We may add some security parameters regarding authentication of student through more advanced security tools like face recognition, fingerprint scanning, voice password system and so on.

Finally we would like to express our thanks to all those who have been associated with the project.

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