



Online Examination System

CS346: Software Engineering Lab

Assignment 2:: Milestone 2 Final Project Submission

Group 6B:

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Introduction

The Online Examination System is a Visual Basic Forms application developed using Visual Studio. Its primary purpose is to facilitate online examinations for students under the supervision of an administrator. The system comprises several pages and features to manage exams effectively. This technical documentation provides an overview of the system's architecture, features, database design, code structure, deployment process, and future enhancements. We have used the waterfall model as software development life cycle.

Design and Data flow diagram are added in [this](#).

Features

Admin Features:

- Question Pool Management
- Admin Results Page
- Result Release and Test Evaluation
- User Authentication

Student Features:

- Student Exam Panel
- Student Results Page
- User Authentication

Other Features:

- Multi-Device Compatibility
- Error Handling and Restrictions
- Test Timer for Students
- Concurrent User Handling

Database Design

The database schema `onlineexaminationsystem` consists of tables: `admin`, `student`, `question_pool`, `results`, `student_answers`, `sections`. These tables store information related to users, questions, exams, results, and user selected answers.

Architecture

The system follows a client-server architecture:

Client Side

Visual Basic Forms application running on users' machines (admins and students).

Server Side

MySQL database hosted on an Apache server using phpMyAdmin. SQL queries from the client side handle database interactions.

Code Structure

The application's code is organized into different classes and forms:

Forms

Each form corresponds to a specific page in the application, such as login, admin, landing page , student landing page, etc.

Classes

Contains reusable code for database connectivity, user authentication, and other functionalities.

Code Behind

Handles events and interactions for each form.

Flow

The forms which would open for admin are:

If admin entered the first time: LandingPage => firstOpen => firstEdit => QuestionPool => AddQuestions

If admin entered again: otherOpen => LandingPage => QuestionPool or Results

If student entered for the first time => LandingPage => StudentLandingPage => ExamForm =>StudentLandingPage

If student entered after giving the exam => LandingPage => StudentLandingPage => Certificate

Functions and Subs Actions

LandingPage => This form includes authentication of student and admin. It also checks if the admin has entered for the first time or not (with database verification), thus appropriate actions are taken. If the user is student , StudentLandingpage is opened.

firstOpen => This form takes exam pattern information from admin and sets it for the entire duration of the application.Database changes are appropriately made for this change to reflect.

firstEdit => Here admin must enter all the questions manually, else some preset questions will be added to the database. We have randomly generated sample questions to be added to the database. Navigation to the questions are added by buttons which are arranged in a panel. Button click changes the text of the questions and the correct option

QuestionPool => Interface and button navigation is similar to firstEdit , but added with more features. Here other questions can be added by a button, any question can be deleted and edited.For delete functionality, First it was checked if the section has sufficient question from queries to database, then question id of all the questions more than the question id of the question being deleted are decreased by one, button display is also changed and the question is deleted from the database.

AddQuestions => Section where questions are to be added can be chosen. The entered question is then added to the database.

OtherOpen => This shows the options for results and questionPool

Results => Test is evaluated and percentile,grade,marks,rank are shown.Admin has the option to release the results.Appropriate subs are thus added.

StudentLandingPage => Has option to take exam or view results.Appropriately the buttons are enabled when required.

ExamForm => The exam interface with timer is added here.When timer resets the previous form would be opened automatically.

Certificate => The certificate with results will appear here.

Deployment

To install and run the Online Examination System from the Git repository, follow these steps:

Prerequisites:

- **Git** should be installed on your system.
- **Visual Studio 2010** or later should be installed to run the Visual Basic Forms application.
- Ensure that the **ODBC MySQL driver(32 bit)** is installed as mentioned in the readme of [git repo](#).

To connect to Database:

- The database is hosted on the **Xampp** server in a lab PC. So, you must connect to the intranet to access the database.
- Enter **172.16.114.214** to access our database server.
- The currently using database schema is **onlineexaminationsystem**. All tables created and manipulated are visible here.

Installation Steps:

- Open a terminal or command prompt.
- Clone the repository:

```
git clone https://github.com/Sai-004/online-examination-system.git
```

Running the Application:

1. Open Visual Studio.
2. Navigate to the directory where you cloned the repository.
3. Open the solution file (**.sln**) in Visual Studio.
4. Build the solution to ensure all dependencies are resolved.
5. Run the application by clicking on the **Start** button or pressing **F5**.
6. Ensure that the MySQL database is running and accessible as per the configuration mentioned in the readme.
7. Perform necessary user authentication and proceed to use the application.

User Guide

Some major instructions

You must follow the below steps, any deviation could result in application failure. Logging Out must be done else you won't be able to enter the application again. In Examform you must either submit the exam or wait until the timer is finished. It should be clear that admin will enter the application at least once, before the exam can be taken by any student.

Input-Output Restrictions and Edge Cases

1. If two users log in with the same credentials simultaneously, an error message will be shown for the latest user and the previous user will be allowed to continue.
2. Only one Admin is present and cannot be added/modified later.
3. Admin must enter a minimum number of questions, before finalizing the pattern of the exam.
4. Admin cannot delete questions beyond a certain limit, as the test pattern is preset and a sufficient number of questions must be present all the time.
5. The number of sections cannot be changed by admin once specified and marks allotted to questions in each section cannot be changed. The total test score is also fixed after specified by admin at the start.
6. Test results won't be released until the admin allows. So, if a student cannot access the results before the admin allows it, then he may have to restart the software.
7. If the admin tries to check results or release tests, when no student has given the exam an appropriate response message will be shown to the admin.
8. A timer will be set for each student when he starts the exam and the exam will be stopped once time exceeds.
9. When the student quits, before the timer exceeds appropriate actions will be taken. He cannot restart the exam again with the same timer.

Landing Page

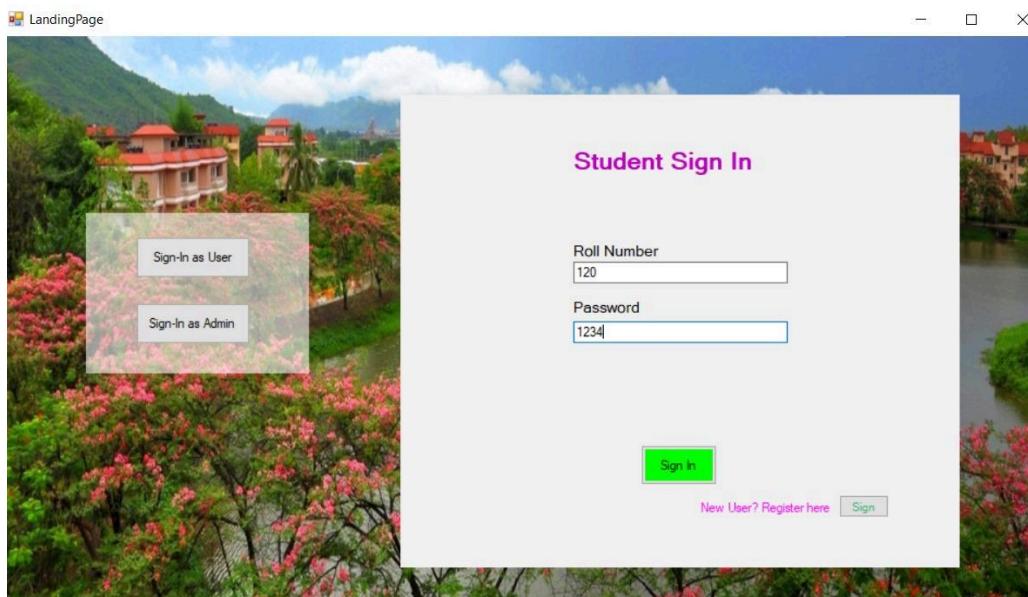
This Landing Page accepts two types of users, to log in as a **student** or as an **admin**.



If the user is a student, the option for signup will also be made available. This module is connected with the database using ODBC to authenticate the user.

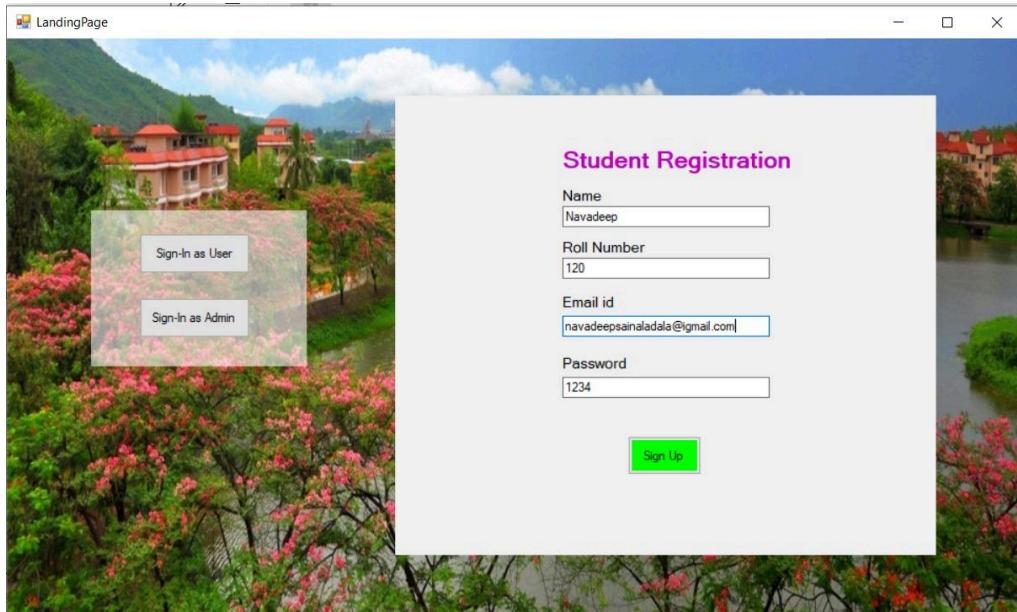
Student

Student SignIn



Enter your roll number and password if you have already signed

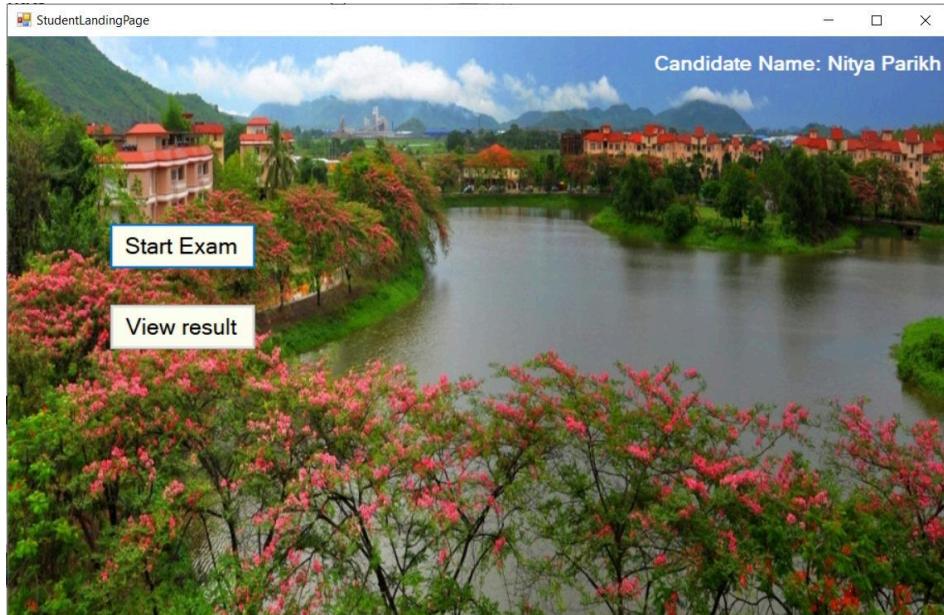
Student SignUp



Enter your Name, Roll number, Email id and Password for signup .

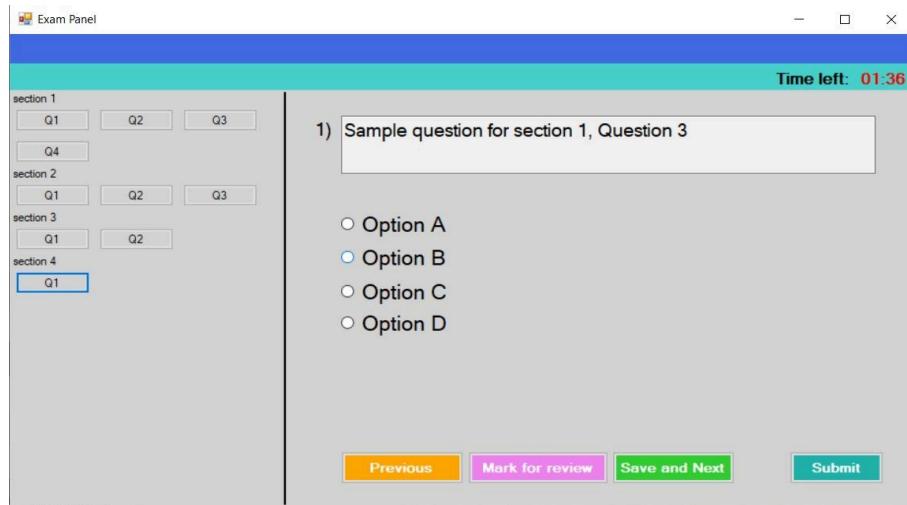
Student Home Page

Once logged in, users will have 2 options, first to start the exam and other to view exam results. Before giving the exam, the View result button will be disabled. After giving the exam, the Start exam button will be disabled, and the view result button will not be enabled till the admin validates results and gives grades.



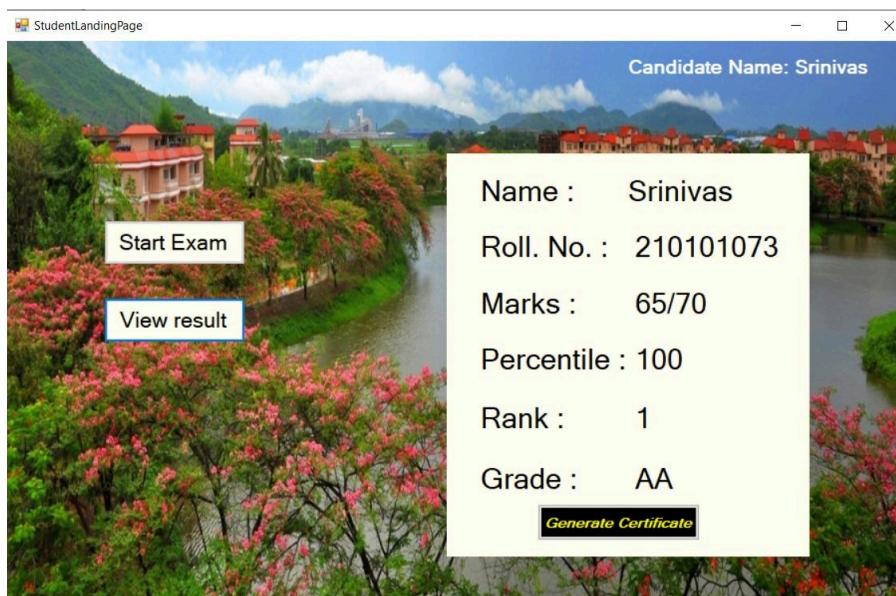
Exam Interface

The Exam will start by clicking the start exam button on the student landing page. Once the exam starts, students have to complete a set of questions in the time limit set by the admin.



Also students can view any question for any section by clicking it in the sidebar. There are also options for previous and next questions. Answers will only be saved if a student clicks on save and next button. The paper will be submitted and stored in the database if the student clicks the Submit button or the time runs out. After finishing the test, students will be redirected to the student landing page.

Student result page



Students can see their result here by clicking the view results button if the admin has already approved grades. Students will also have the option to download the certificate. If admin hasn't evaluated and released the grades yet, then student can't access his results.

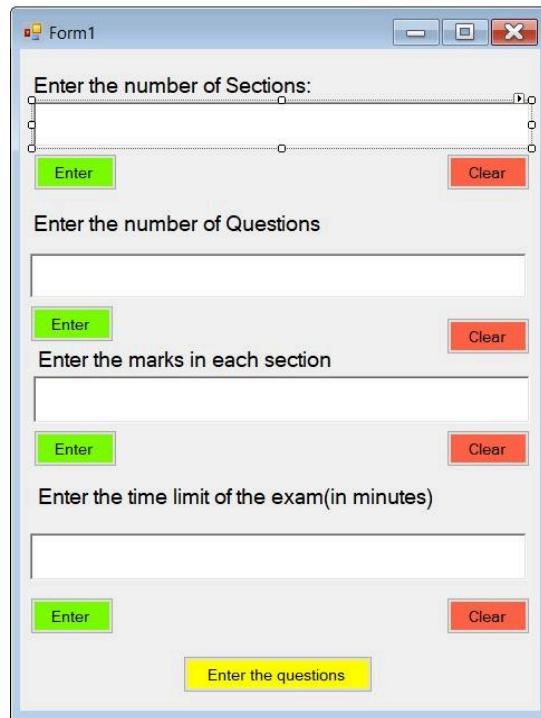
Sample Certificate



Admin

FirstOpen

When admin enters for the first time, the following page would be shown. Here he must set the exam pattern, any error or wrong input mentioned will exit the application.



FirstEdit

Here the admin must enter a minimum number of questions. Else random questions would be generated.

Question Pool

section 1	1.1	1.2	1.3
	1.4	1.5	
section 2	2.1	2.2	2.3
section 3	3.1	3.2	
section 4	4.1		

Question:
Sample question for section 1, Question 4

Option A: Option A

Option B: Option B

Option C: Option C

Option D: Option D

Choose Correct Option: A B C D

Buttons: LogOut Add Question Edit Question Delete Question

QuestionPool

The questions editing and deletions are done here. The saved options would also be visible when that question button is clicked.

The screenshot shows a window titled "Question Pool". On the left, there is a navigation tree with sections 1 through 4, each containing numbered items. Section 1 has items 1.1, 1.2, 1.3, and 1.4 (which is selected). Section 2 has items 2.1, 2.2, and 2.3. Section 3 has items 3.1 and 3.2. Section 4 has item 4.1. To the right of the navigation tree, a question is displayed: "What is the capital city of Canada?". Below the question, four options are listed: Option A: Ottawa, Option B: Philadelphia, Option C: Vancouver, and Option D: Montreal. At the bottom of the screen, there are three buttons: "Add Question" (green), "Edit Question" (blue), and "Delete Question" (red).

Add Questions

Here questions can be added to the question pool.

ADD QUESTION

Enter the section

Question:
What is the capital city of Canada?

Option A:

Option B:

Option C:

Option D:

Choose Correct Option: A B C D

Save Question

OtherOpen

This form opens if the admin enters again. Here the exam pattern would be shown.

Form2

Number of Sections: 4

Section	Questions	Marks
1	4	4
2	3	3
3	2	2
4	1	1
*		

Time Limit: 4

Results

Relative ranking of all the students is visible here. Admin can release the results when he wants.

The screenshot shows a Windows application window titled "Results". The main title bar is green with the text "Results Page". The window contains a table with the following data:

Name	RollNumber	Marks	Percentage	Grade	Percentile	Rank
Srinivas	70	7	23.33	E	100	1
navadeep	11	4	13.33	E	50	2
**						

At the bottom left is a red "LogOut" button, and at the bottom right is a blue "Release the results" button.

Future Enhancements

Potential enhancements include:

- Adding more advanced features for exam customization.
- Improving user interface and experience.
- Implementing additional security measures.
- Enhancing result analytics and reporting.

Conclusion

The Online Examination System provides a robust platform for conducting online exams efficiently. With features tailored for both administrators and students, the system ensures seamless exam management and a user-friendly experience. Further enhancements can be made to extend its capabilities and improve user satisfaction.