

Online Examination System

CS346: Software Engineering Lab

Assignment 2 :: Milestone 1 Requirement analysis and overall structure of the problem

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Design Goals

We need to provide software that resembles an online examination system. The modules should include

- Login system secured by password
- Making questions pool and generating random questions while taking the test
- Switching to different questions as well as sections while attempting a test
- Saving answers given by the candidate along with the question
- Test evaluation and grade calculation
- Normalising scores and generation of certificate
- Admin panel

Models and their structure (Planning and Requirement Analysis)

All modules and their interdependencies are planned to be as below

Login System / Panel

This form accepts two inputs,

- to log in as a student
- to log in as an admin

If the user is a student, the option for signup will also be made available. This module should connect with the database using ODBC to authenticate the user. If invalid, then stop the process with an error message being displayed.

After login, depending on the user, appropriate forms are opened. Such conditions will be contained in this module.

Admin panel

When the admin enters for the first time, the details of the exam will be taken, which can't be altered later (an appropriate boolean variable can be set accordingly).

Number of sections, Number of questions in each section, and Marks of each section will be taken as input from admin.

This module would be connected to the question pool module, where question alteration can be done.

Admin also can release the results and check the relative scores, and ranking of all students.

Question Pool

This Module should have options to add, edit, and delete questions (functions/subs in Visual Basic) for the admin, who can only access this module in the first place using his credentials. Ability to store the questions in the connected database using ODBC upon the add request of admin.

One can only delete up to a Minimum level set first by admin. Appropriate conditions will be set to stop the user from doing otherwise.

Test Interface with all questions and options

This Module will be accessible after the student logs in by using his credentials and only if he has not given the test before and after the admin has finalised the test pattern. Random questions will be generated for each user from the question pool. So, a module for generating questions from the database should be created for each user when requested.

Questions can have options like save next, clear, previous. Answers from each student will be stored accordingly in the database along with the question_id and user_id. Switching between different sections and questions also will be made available using different buttons. Sample UI is provided below.

Test evaluation, grade calculation, rank calculation

This module contains an algorithm that calculates all users' evaluations, if available and not calculated. The test results are shown (in the users panel) only after the admin's approval, which would be taken from the admin panel.

This module will only be accessible from the admin panel.

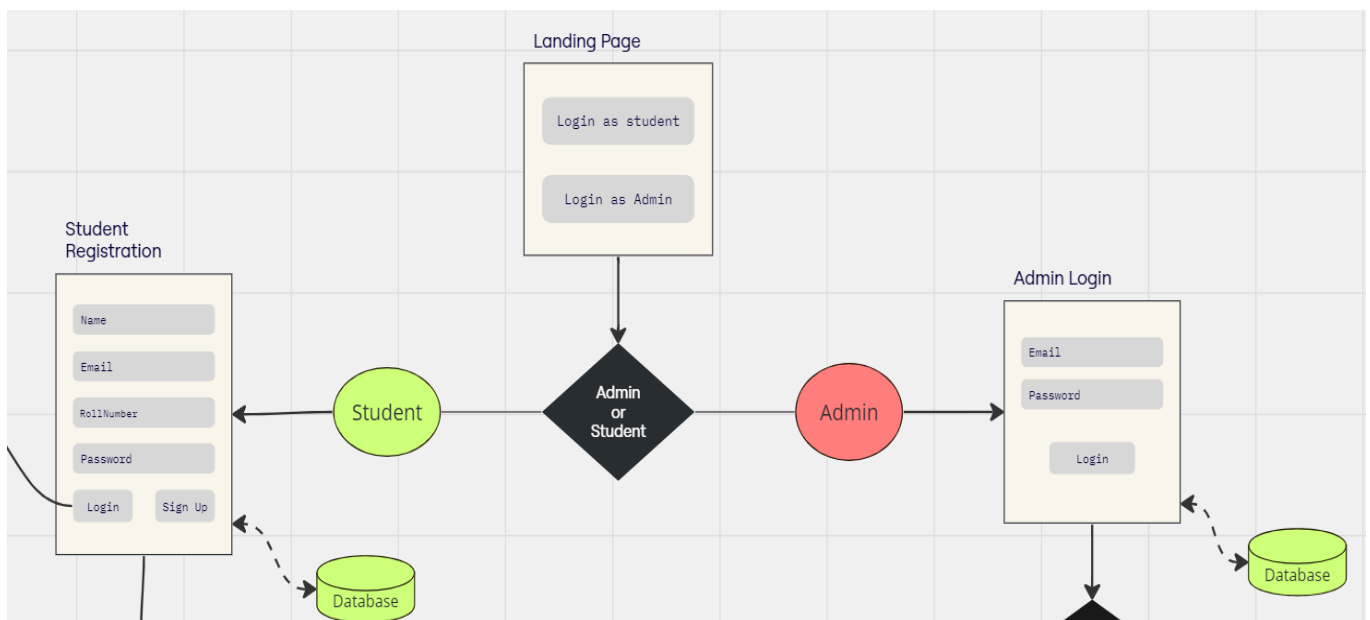
Certificate generation

This module should allow the student after giving the test and admin's approval to generate a certificate that contains his/her name, grade calculated, score obtained, and relative rank.

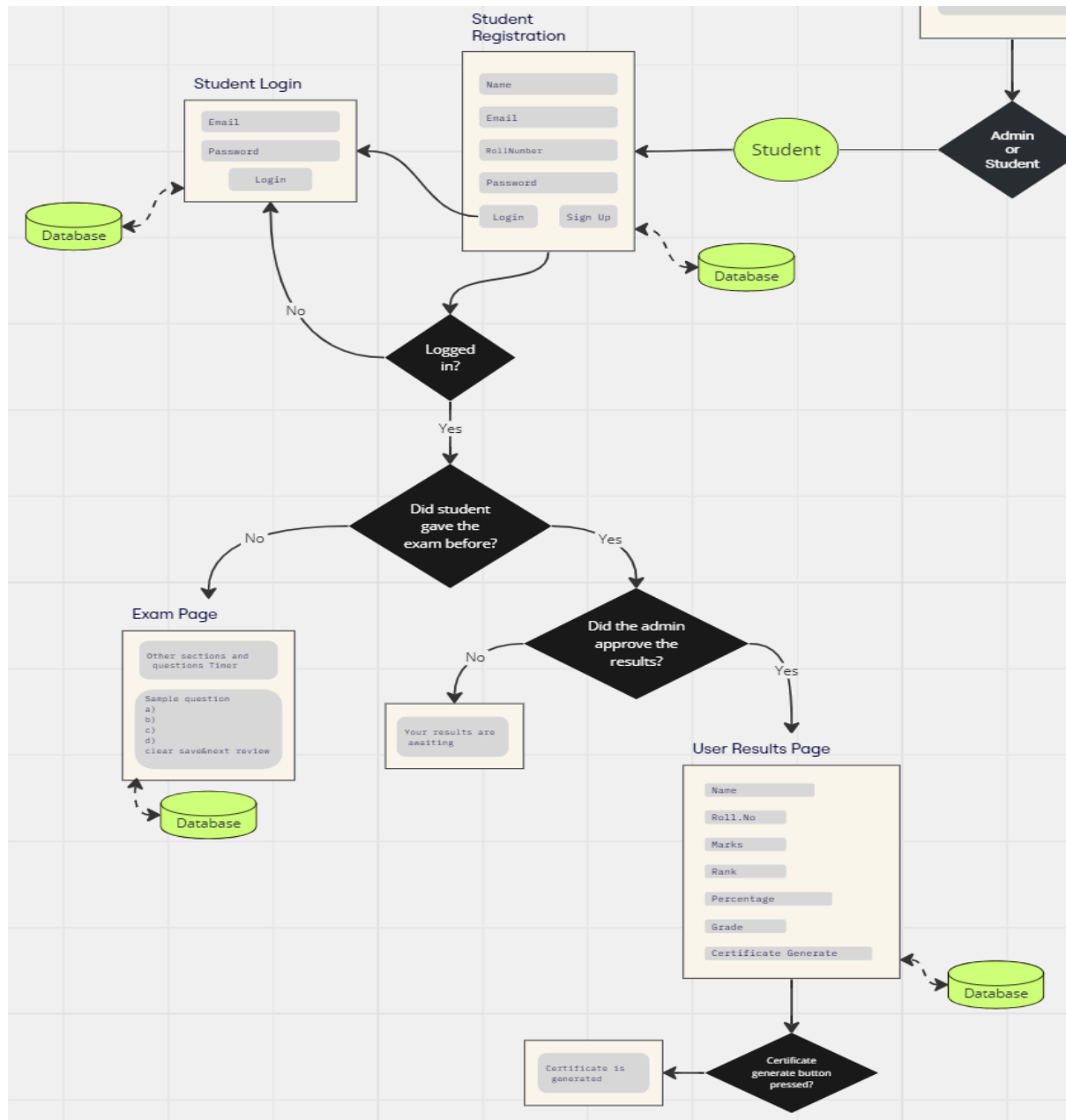
Data Flow Diagram

Link:: [Complete data flow diagram](#)

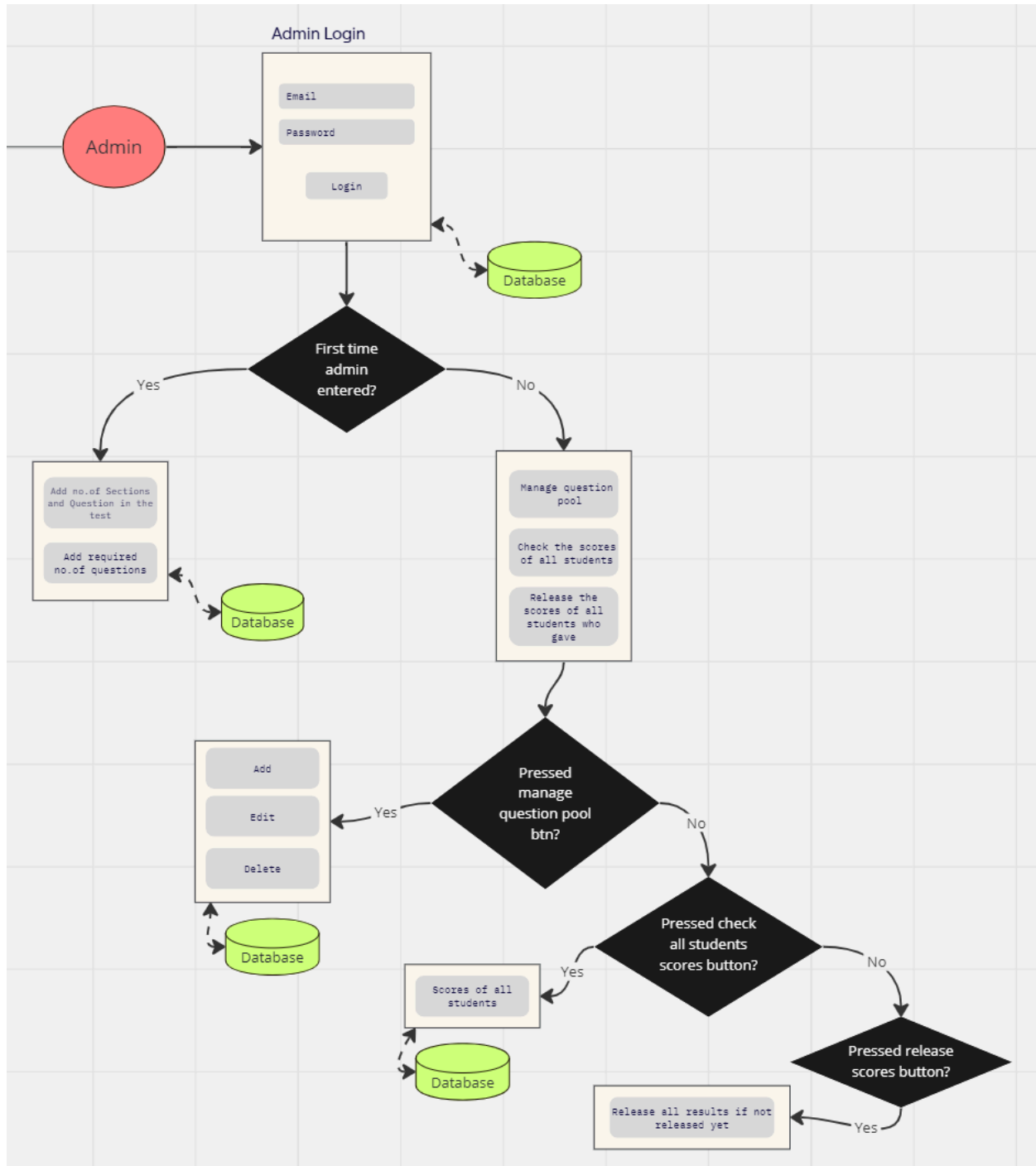
I. Login page:



II. Student page:



III. Admin page:



Implementation and coding

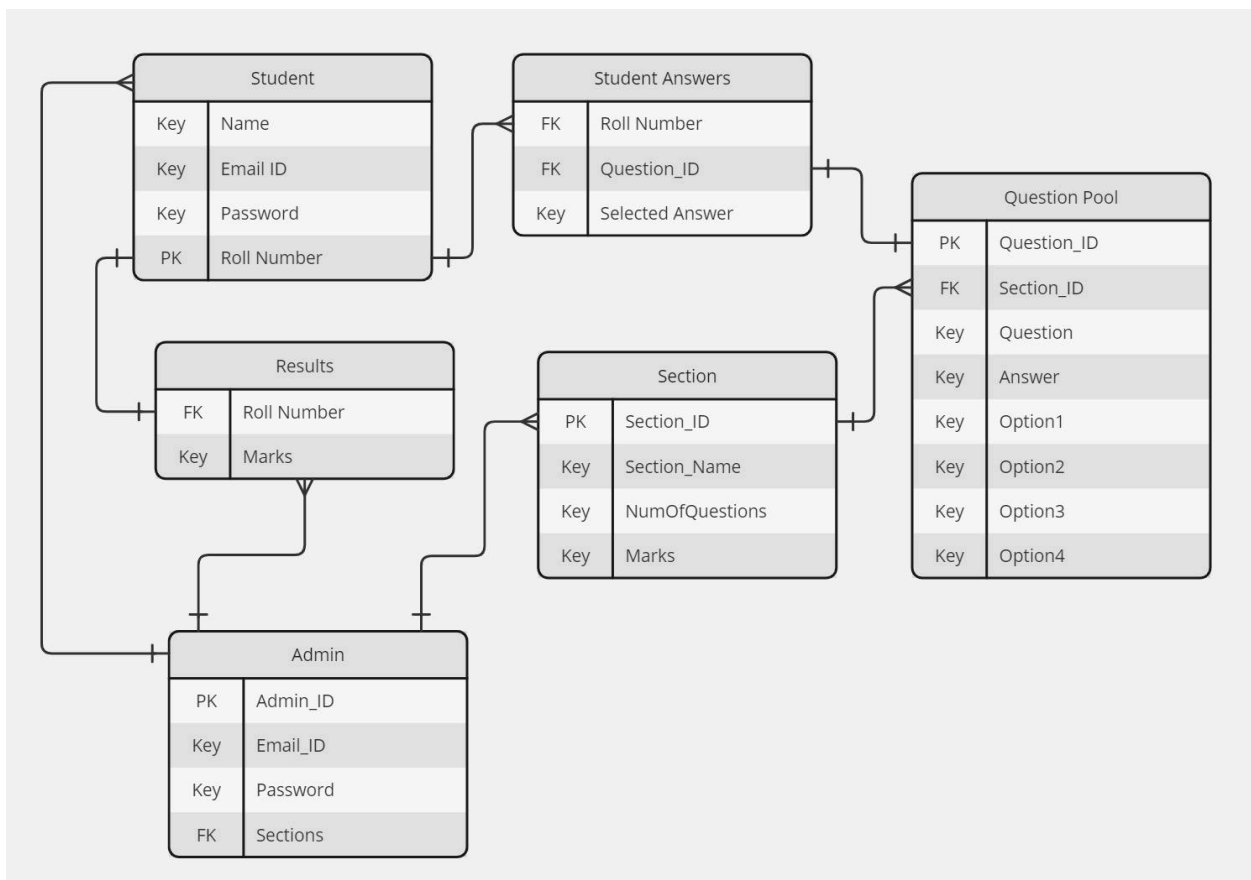
Visual Basic and **Windows Forms Application** will be used for development. **ODBC** will be used for connectivity with the database.

Applications can be run on **multiple devices** for different users to write the test simultaneously (but not the same user, mentioned in edge cases).

Entity Relationship Model:

Entities being used in the database are:

- Admin
- Student
- Question Pool
- Sections
- Student Answers
- Results




Example UI Design

Test Interface planned:

Section 1
Section 2
Section 3

Time Left
00:24:45


Nagapuri Vanitha
210101071

Question no.10
Which of the following classes of macromolecules have been found to have members capable of catalysis?
☐ A. RNA
☒ B. DNA
☐ C. Carbohydrates
☐ D. Proteins

Accepted
Visited and not marked
Not Visited
Marked for review

Section 2

1 2 3 4 5
6 7 8 9 10
11 12 13 14 15

Clear
Mark for review
Save & Next

Or

Exam 1


Name_XXXXX
Time: 15:07

Section 1
1 2 3 4
5 6

Section 2
1 2 3 4

Section 3
1 2 3 4

☒ Answered
☐ Not Answered
☐ Not Visited

Question 6
Who is the Prime Minister of India?
☐ Shubhankit Acharya
☒ Narendra Modi
☐ Dhruv Patel
☐ Rahul Gandhi

Previous
Clear Response
Save & Next

Submit

Student Registration and Login pages:

Create new Account

Already Registered? [Login](#)

Please enter your name

Please enter Email

Please enter password

[SIGN UP](#)

Login

[Sign in to continue](#)

Please enter Email

Please enter password

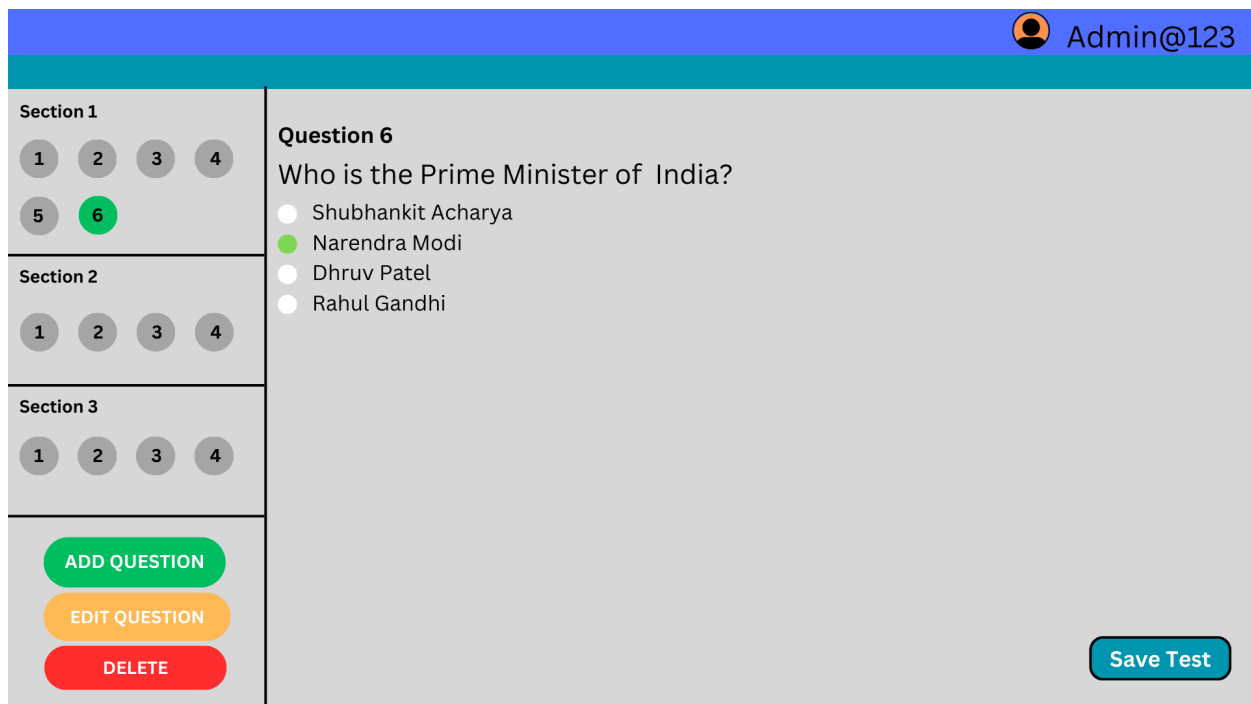
[LOGIN](#)

Sample certificate:



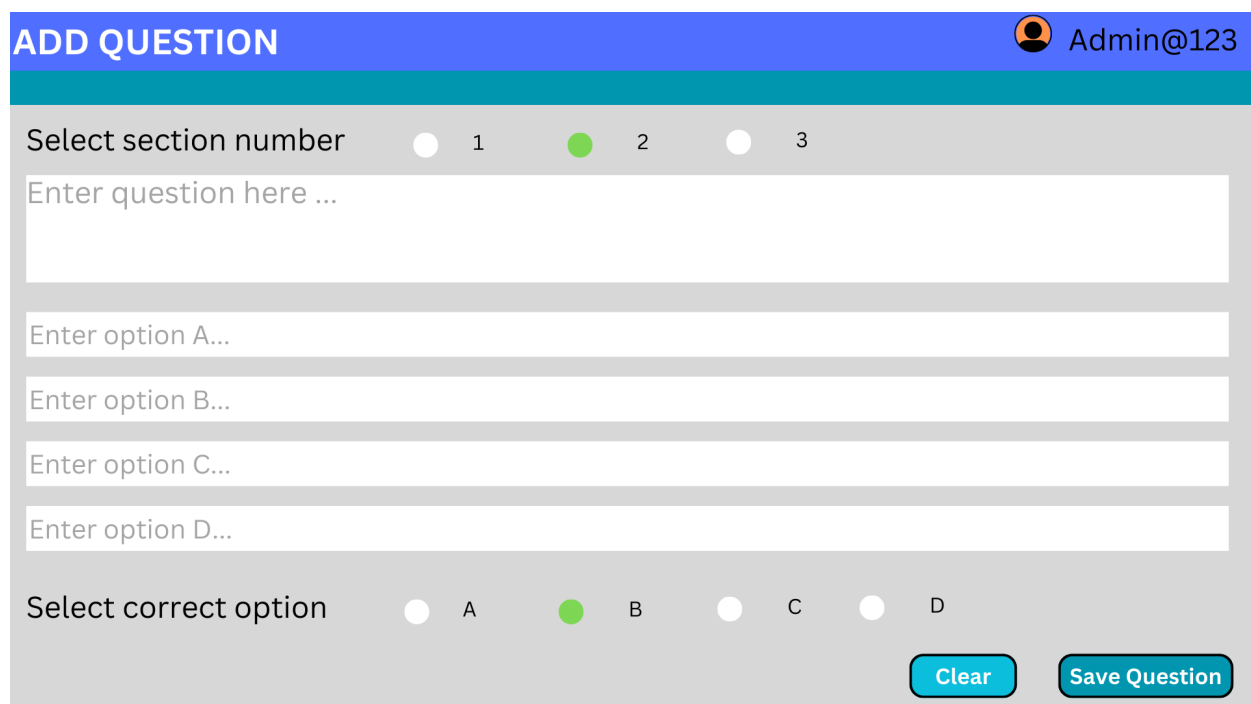
Question Pool from the Admin Panel:

- Question Pool Interface:



The screenshot shows the 'Question Pool Interface' for 'Admin@123'. On the left, there are three sections: Section 1 (with buttons 1-6, where 6 is highlighted), Section 2 (with buttons 1-4), and Section 3 (with buttons 1-4). Below these are three buttons: 'ADD QUESTION' (green), 'EDIT QUESTION' (orange), and 'DELETE' (red). The main area displays 'Question 6' with the text 'Who is the Prime Minister of India?' and four radio button options: Shubhankit Acharya, Narendra Modi (selected), Dhruv Patel, and Rahul Gandhi. A 'Save Test' button is in the bottom right corner.

- Add Question Interface:



The screenshot shows the 'ADD QUESTION' interface for 'Admin@123'. At the top, it says 'Select section number' with three radio buttons: 1, 2 (selected), and 3. Below this is a text input field labeled 'Enter question here ...'. Then there are four text input fields labeled 'Enter option A...', 'Enter option B...', 'Enter option C...', and 'Enter option D...'. At the bottom, it says 'Select correct option' with four radio buttons: A, B (selected), C, and D. There are 'Clear' and 'Save Question' buttons in the bottom right corner.

- Edit Question Interface:

EDIT QUESTION

Admin@123

Section 1

1

2

3

4

5

6

Section 2

1

2

3

4

Section 3

1

2

3

4

Question 6

Who is the Prime Minister of India?

Shubhankit Acharya

Narendra Modi

Dhruv Patel

Rahul Gandhi

Select correct option

☐ A
 ☒ B
 ☐ C
 ☐ D

Save Question

- Delete Question Interface:

Admin@123

Section 1

1

2

3

4

5

Section 2

1

2

3

4

Section 3

1

2

3

4

ADD QUESTION

EDIT QUESTION

DELETE

Question 1

Who is the Cheif Minister of Assam?

☐ Arvind Kejriwal
 ☒ Himanta Biswa Sarma
 ☐ A. Revanth Reddy
 ☐ Conrad Sangma

Save Test

(*Question 6 has been deleted after the delete button is pressed)

Grading page accessed from admin panel:


GRADING PAGE

Logout

No.	Roll Number	Name	Email	Marks	Percentage	Grade
1	210101073	Nitya Parik	nitya123@gmail.com	65	93%	AA
2	210101070	M Sai Srinivas	srinivas070@gmail.com	63	90%	AB
3						
4						
5						
6						
7						

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. Until the Admin finalises the test pattern and questions, students cannot access the test. If he tries to access the test, an appropriate error message will be shown and he may have to restart the software.
4. Admin must enter a minimum number of questions, before finalising the pattern of the exam.
5. 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.
6. 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.

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7. 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.
 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.