

Online Aptitude Test

Supervisor: *LÊ THANH NHÂN*

Semester: *III*

Batch No: *T1.2208.M2*

Group No: *5*

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Month: 12 Year: 2023

This is to certify that

Mr. VÕ MINH TIẾN

Mr. HUỖNH HỮU KHA

Mr. NGUYỄN MẠNH CHIẾN

Have successfully Designed & Developed

Online Aptitude Test

Submitted by:

Mr. LE THANH NHAN

Date Of Issue:

Authorized Signature:

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Acknowledge

In the process of graduation, we have received a lot of help, suggestions, and enthusiastic advice from our teachers, family and friends. We sincerely thank Aptech Education for bringing the experience as well as practical skills in the project that have brought our skills to a higher level.

We would like to extend our heartfelt thanks to Mr. Le Thanh Nhan, a teacher of FPT Aptech for always being dedicated and professional. His mentoring and technical expertise has Without the knowledge and experience of our superior that has guided us throughout the entire process, this project wouldn't have succeeded.

I, Vo Minh Tien, as the group leader, am immensely grateful to the entire team for their hard work and dedication. Each team member's unique contributions have collectively led to the realisation of our goals. Your collaborative spirit and tireless efforts have made this project a truly rewarding experience.

And we sincerely thank the families and friends of our team members for their great enthusiasm and support during the project and providing us with time and space to focus on our Project.

Thank you all for being an integral part of this journey. Your contributions have made this project a success, and I am truly grateful for the collaborative effort that has brought our project to life.

Synopsis

The Objective of this program is to give a sample project to work on real life projects. These applications help you build a larger more robust application.

The objective is not to teach you the software's but to provide you with a real life scenario and help you create basic applications using the tools.

You can revise the topics before you start with the project.

These programs should be done in the Lab sessions with assistance of the faculty if required.

It is very essential that a student has a clear understanding of the subject.

Kindly get back to eProjects Team in case of any doubts regarding the application or its objectives.

Review 01

Design Plan: Online Aptitude Test	Document Name: Problem Definition	SWD/Form No.01/PD/Ver1.0
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Problem Definition

INTRODUCTION

The Webster organisation is one of the leading organisations in the world of Oil-Gas companies. They have various branches throughout the world. It has various bonds with different multinational companies. The company wants an application to be built for the jobseeker where the entire candidate as per the criteria will appear for the online test and based on the result of this the candidate will go for further rounds.

They have requested us to create a web application using the latest technology that is .NET 8, C# language, using ASP.NET Core MVC. The Database we will use SSMS for local use and deployed using Azure. Team will be using Github and Azure Devops to manage the development.

As part of the company's recruitment process, there is a need to implement an efficient and user-friendly Online Aptitude Test for evaluating the skills and capabilities of prospective candidates. The current manual assessment process is time-consuming, prone to errors, and lacks scalability, hindering the seamless identification of top-tier talent.

Client has forwarded all the data that they have required in the application, which is stated below:

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Design Plan: Online Aptitude Test	Document Name: Problem Definition	SWD/Form No.01/PD/Ver1.0
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The application should perform the following functions:

URL should be <https://websterapplicantexam.com>.

Page requirements:

- Main page (Login page)
- Applicant:
 - Dashboard
 - Exam page
 - Result page
 - Logout
- Manager:
 - Dashboard
 - View Applicant
 - Create/Edit Applicant
 - View Report
 - View Questions
 - Add/Edit Questions

1. Login page should contain 2 types of logins: one for Applicant, one for Manager.
2. Applicant dashboard should contain 3 links to exam, only first one is available and accessible.

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3. Applicant exam should start at the scheduled time, containing 5 questions randomized from the Manager's question list and automatically submitted when time runs out, else they can choose to submit early and move on to the next Exam.
4. Results screen should show when they are done with all 3 Exams, calculating the total score from all the answered questions and pop-up "You have passed this round, next is the HR round" if the score is satisfactory. Then logout out of the session.
5. Manager dashboard should show all functions of the Manager such as: View Applicants, View Questions, Add/Edit Applicants, Add/Edit Questions, View Report.
6. View Applicants should show the list of Applicants, filterable by Name, other Details, or score if necessary. Allow Manager to click on Applicant to go into edit page or click on "Submit New Applicant" to go to Add Applicant page.
7. View Questions should show the list of Questions, Exam Type of question, links to Add and Edit / Delete Questions.
8. Add/Edit Applicants should show input boxes for all Applicant Details and a button to Save.
9. Add/Edit Questions should show input boxes for all Applicant Details and a button to Save.
10. Applicant and Manager navigation bar should show link to Logout

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Design Plan: Online Aptitude Test	Document Name: Customer Requirements Specifications	SWD/Form No.02/CRS/Ver1.0
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Customer Requirements Specifications

- **MANAGER:**

Input:

- Enter the details of the candidates appearing for the interview. Details to be maintained are Education details, Personal details, Work Experience
- Allocate the Username and Password for the candidates.
- Edit, update, add, save, delete the test Questions
- Filtering info such as Reports, passed Candidates, question types

Process:

- Handle saving Candidate, Questions
- Handle setting Candidate Usernames and Passwords
- Handling setting and saving Questions
- Generating Report based on user input filters

Output:

- View the list of all the candidates who are or have appeared along with the result (if achieved).

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Design Plan: Online Aptitude Test	Document Name: Customer Requirements Specifications	SWD/Form No.02/CRS/Ver1.0
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- View info of specific Candidates
- View report statistics. Report section must be added for viewing the generalised data which can be filtered by date, week or month.
- View info of Questions used in the Exam.

● **CANDIDATE:**

Input:

- Each candidate will have their login details provided to them by the Manager. These details must be entered in the candidate's login section.
- Clicking on the first Exam in the Dashboard
- Answering the Questions
- Submitting the Exam
- Logging out after finishing the Exam

Process:

- Calculate the Exam score
- Handle time limit for the Exams
- Handle validation to prevent Candidates from going back to finished Exams.
- If the candidate passes the test, then their names are transferred for the next (HR) round, their data transferring to a new table to be referred to by concerned persons
- Handle logout after finishing the test and showing Results.

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Output:

- Viewing List of Exams
- Viewing List of Questions
- Viewing Results Page

Hardware / software requirement

1.	System	Windows 10 or above
2.	Software	Visual Studio 2019 or later, SQL Server 2000 (or later)
3.	Web Browser	Later versions of Edge, Chrome, Firefox, etc...
4.	Fonts	Standard fonts such as Unicode: Arial, Tahoma, Lucida Console, Times New Roman, etc...
5.	Other requirements	A working internet connection.

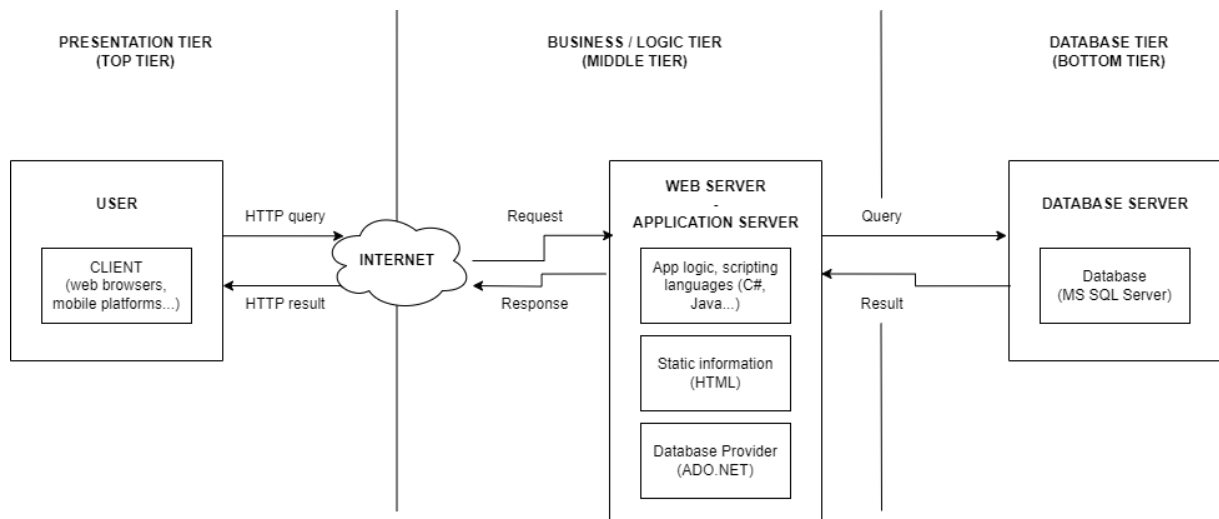
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Review 02

Design Plan: Online Aptitude Test	Document Name: Architecture and Design of the Project	SWD/Form No.03/ARD/Ver1.0
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Architecture and Design of the Project

We will be using 3-tier architecture for this project:



The User will interact with the Front-end of the webpage, then the user Input will be sent as a request to the Web Server containing the App logic, Database and File System. It will handle all the required tasks and will return to the User the expected output on the View. An explanation for all three tiers are below:

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Design Plan: Online Aptitude Test	Document Name: Architecture and Design of the Project	SWD/Form No.03/ARD/Ver1.0
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Presentation tier:

This is the topmost level of the application. It is a layer that users can access directly (such as a web page, or an app's GUI). This is the Front-end of our project where the user can view and interact with the web app.

Business / Logic tier:

The business tier is pulled out from the presentation tier and controls an application's functionality by performing detailed processing. Through the web server, the request from the user will be handled by the app logic and will return to the presentation tier where the results are displayed to the end-user.

Database tier:

The database tier includes the data mechanisms (database servers, file shares, etc.) and the data access layer that encapsulates the data mechanisms and exposes the data for processing. The data access layer should provide an API to the application tier that helps manage and process the data. This is the Database of our application where we will get the data to handle tasks in the business tier.

We will be using ASP.NET Core MVC for this Application, it is explained as below:

1. Model:

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- The Model represents the core business logic and data of the application.
In the case of the aptitude test application, the Model would handle tasks such as:

- Storing and managing candidate data.
- Defining the structure of the aptitude tests, including questions, answers, and correct solutions.
- Handling scoring and result calculations.
- Managing communication with the database for persistent data storage.

2. **View:**

- The View is responsible for presenting the user interface to the applicants and displaying information from the Model. For the aptitude test application, the View would include:
 - UI for Applicants to take the aptitude test.
 - Feedback on test results.
 - UI for Managers to view reports and analytics.

3. **Controller:**

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Design Plan: Online Aptitude Test	Document Name: Architecture and Design of the Project	SWD/Form No.03/ARD/Ver1.0
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- The Controller acts as an intermediary between the Model and the View.

It receives user inputs from the View, processes them, and updates the Model accordingly. The Controller handles:

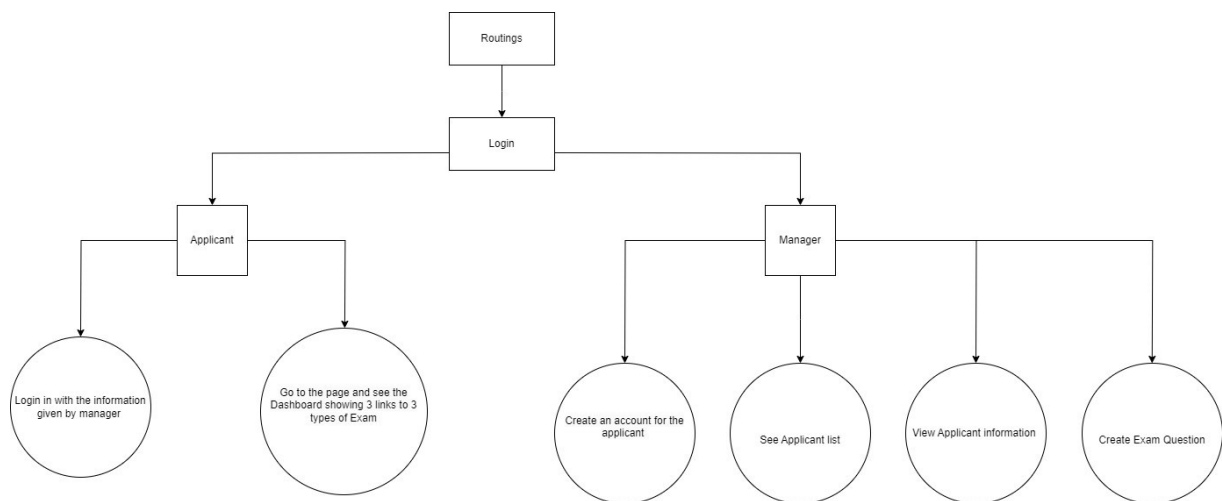
- Handling user interactions during the test, such as submitting answers or navigating through questions.
- Initiating actions based on user inputs, like starting or ending a test.
- Updating the Model with the results of the aptitude test.
- Managing the flow of the application and controlling the navigation between different views.

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Design Plan: Online Aptitude Test	Document Name: Data Flow Diagram	SWD/Form No.04/DFD/Ver1.0
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Data Flow Diagram

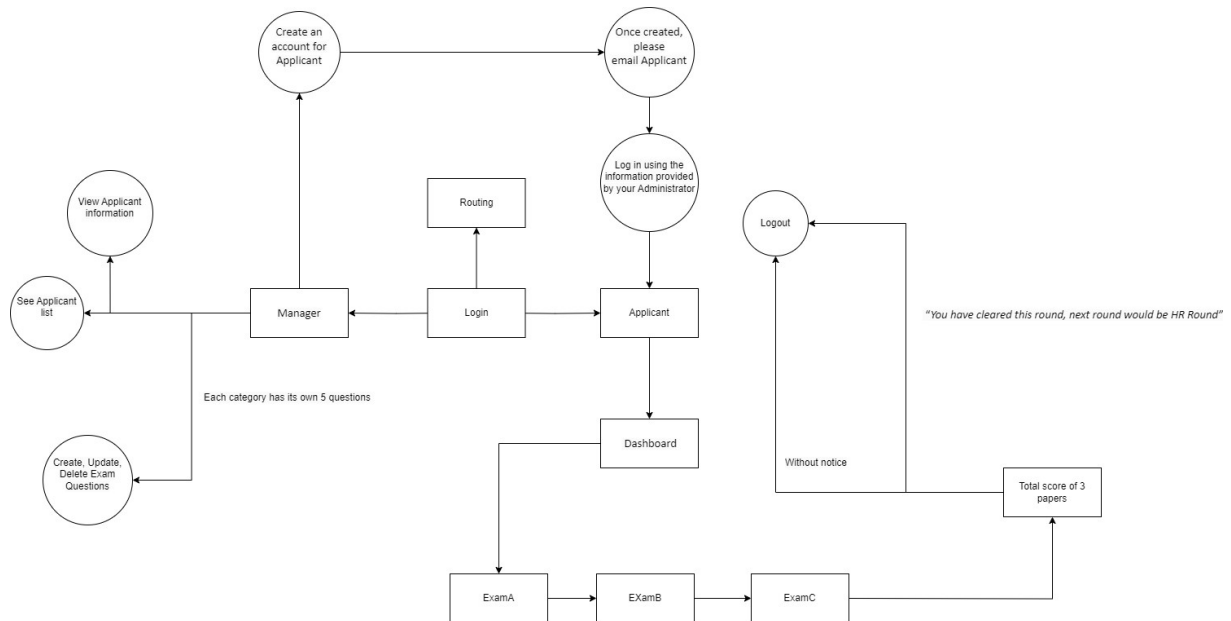
DFD Level 0:



DFD Level 1:

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Design Plan: Online Aptitude Test	Document Name: Data Flow Diagram	SWD/Form No.04/DFD/Ver1.0
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Design Plan: Online Aptitude Test	Document Name: Table Design	SWD/Form No.06/TAB/Ver1.0
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A. Table Design

The Table Design is defined below:

1. ApplicantCompanies

ApplicantCompanies				
	Field name	Data type	Key/Constraint	Description
1	ApplicantCompanyId	int	PK	Stores the id of the Applicant Companies
2	ApplicantId	uniqueidentifier	FK	Stores the Applicant Id
3	CompanyName	nvarchar(255)		Stores the Company Name
4	Description	nvarchar(255)		Stores the Description
5	Notes	nvarchar(3000)		Stores the Notes
6	StartDate	datetime2(7)		Stores the Start Date of the Applicant's tenure here
7	EndDate	datetime2(7)		Stores the End Date of the Applicant's tenure here

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Design Plan: Online Aptitude Test	Document Name: Table Design	SWD/Form No.06/TAB/Ver1.0
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2. ApplicantEducations

ApplicantEducations				
	Field name	Data type	Key/Constraint	Description
1	ApplicantEducationId	int	PK	Stores the id of the
2	ApplicantId	uniqueidentifier	FK	Stores the ApplicantId
3	COEName	nvarchar(255)		Stores the name of the Center of Education
4	Description	nvarchar(2000)		Stores the Description
5	Notes	nvarchar(3000)		Stores the Notes
6	StartDate	datetime2(7)		Stores the Start Date of the Applicant's tenure here
7	EndDate	datetime2(7)		Stores the End Date of the Applicant's tenure here

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3. ApplicantExams

ApplicantExams

ApplicantExams				
	Field name	Data type	Key/Constraint	Description
1	ApplicantExamId	int	PK	Stores the id of the ApplicantExam
2	ApplicantId	uniqueidentifier	FK	Stores the ApplicantId
3	ApplicantScore	int		Stores the Applicant Score
4	CurrentExamTypeId	int		Stores the Current Exam Type
5	ExamId	int	FK	Stores the current in progress Exam

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4. Applicants

Applicants				
	Field name	Data type	Key/Constraint	Description
1	ApplicantId	uniqueidentifier	PK	Stores the id of the
2	FirstName	nvarchar(255)		Stores the Applicant's First Name
3	LastName	nvarchar(255)		Stores the Applicant's Last Name
4	Age	int		Stores the Applicant's Age
5	HasPassedExam	bit		Stores the Applicant's HasPassedExam
6	Address	nvarchar(255)		Stores the Applicant's Address
7	Email	nvarchar(255)		Stores the Applicant's Email
8	City	nvarchar(255)		Stores the Applicant's City
9	Notes	nvarchar(3000)		Stores the Applicant's Notes
10	ImagePath	nvarchar(MAX)		Stores the Applicant's ImagePath
11	Username	nvarchar(512)		Stores the Applicant's Username
12	Password	nvarchar(512)		Stores the Applicant's Password
13	PhoneNumber	nvarchar(255)		Stores the

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5. ExamQuestions

ExamQuestions				
	Field name	Data type	Key/Constraint	Description
1	QuestionId	int	PK	Stores the id of the Question
2	QuestionScore	int		Stores the Question Score
3	QuestionText	nvarchar(3000)		Stores the Question Text
4	QuestionA	nvarchar(512)		Stores Question number 1
5	QuestionB	nvarchar(512)		Stores Question number 2
6	QuestionC	nvarchar(512)		Stores Question number 3
7	QuestionD	nvarchar(512)		Stores Question number 4
8	CorrectQuestion	nvarchar(512)		Stores the Correct Question
9	ExamId	int	FK	Stores the Exam using these Questions
10	ExamTypeId	int	FK	Stores the Exam Type of these questions

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6. Exams

Exams				
	Field name	Data type	Key/Constraint	Description
1	ExamId	int	PK	Stores the id of the Exam
2	StartTime	datetime2(7)		Stores the Start Time of the exam
3	ExamTypeId	int	FK	Stores the Exam Type
4	IsActive	bit		Stores the Activeness of the Exam

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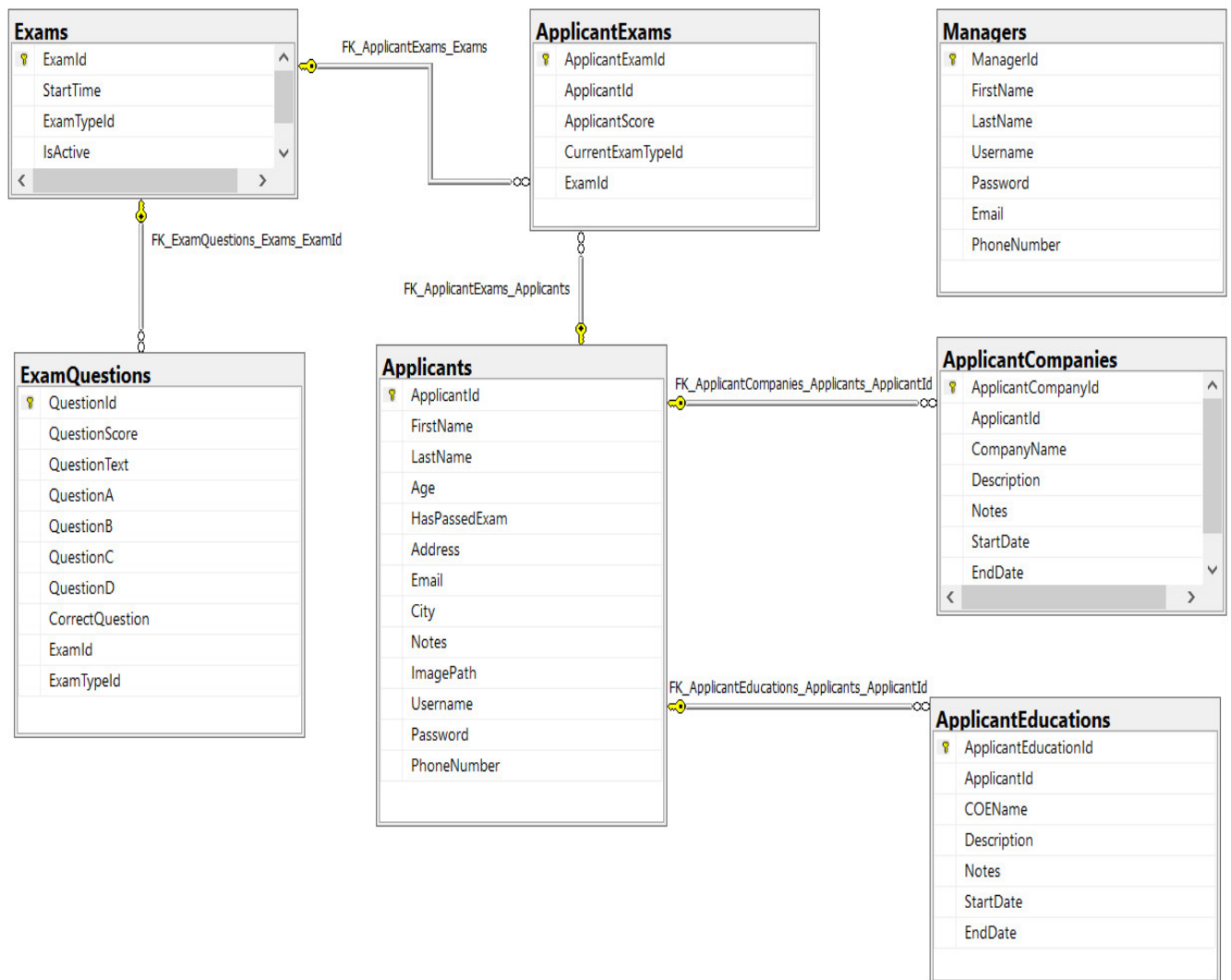
7. Managers

Managers				
	Field name	Data type	Key/Constraint	Description
1	ManagerId	uniqueidentifier	PK	Stores the Manager Id
2	FirstName	nvarchar(255)		Stores the FirstName of the Manager
3	LastName	nvarchar(255)		Stores the LastName of the Manager
4	Username	nvarchar(512)		Stores the Username of the Manager
5	Password	nvarchar(512)		Stores the Password of the Manager
6	Email	nvarchar(255)		Stores the Email of the Manager
7	PhoneNumber	nvarchar(255)		Stores the FirstName of the Manager

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Design Plan: Online Aptitude Test	Document Name: Relationship Diagram	SWD/Form No.07/RD/Ver1.0
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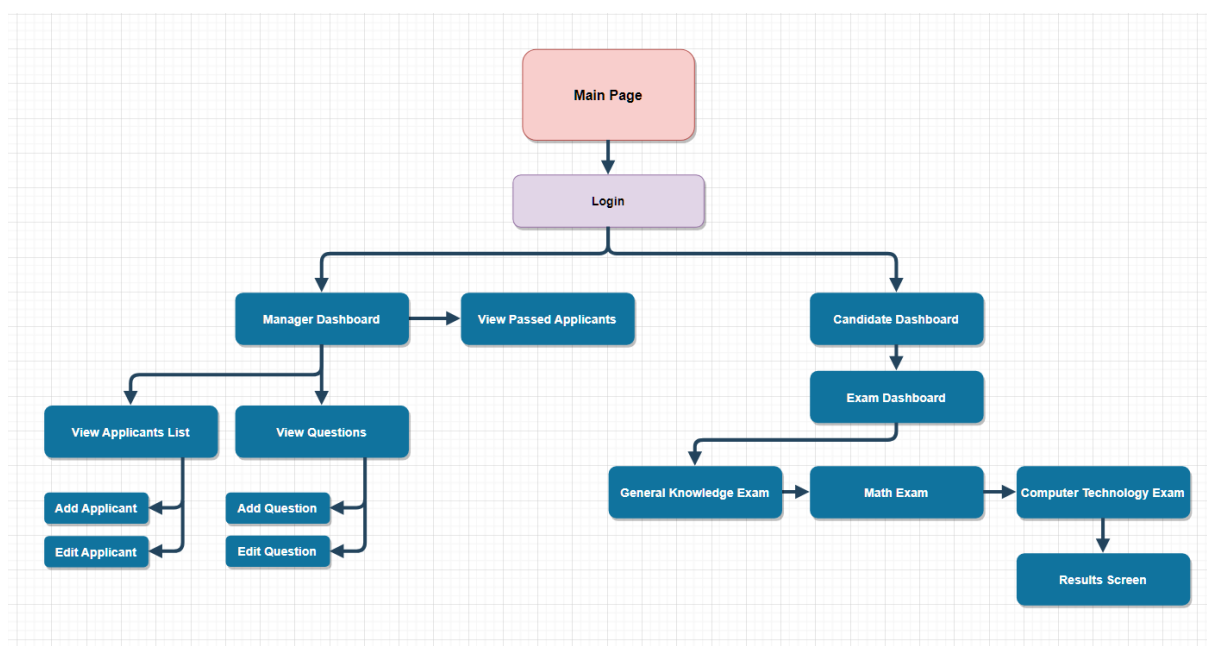
B. Relationship Diagram



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SiteMap



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Algorithm

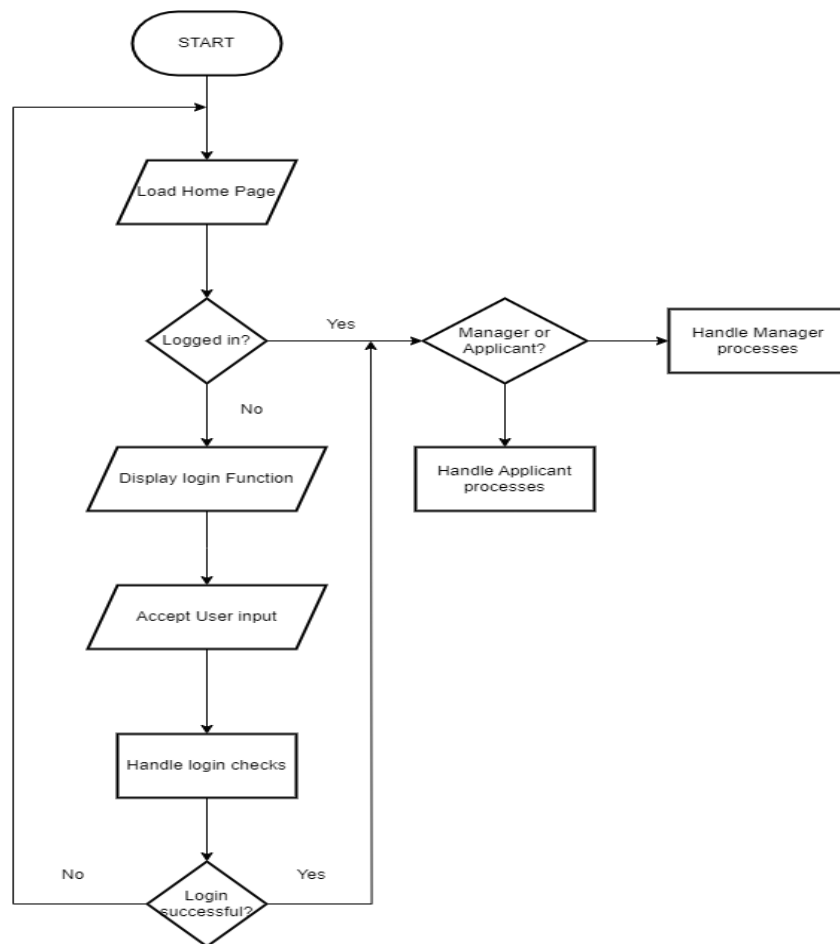


Figure 1. Flowchart showing processes of Main Page

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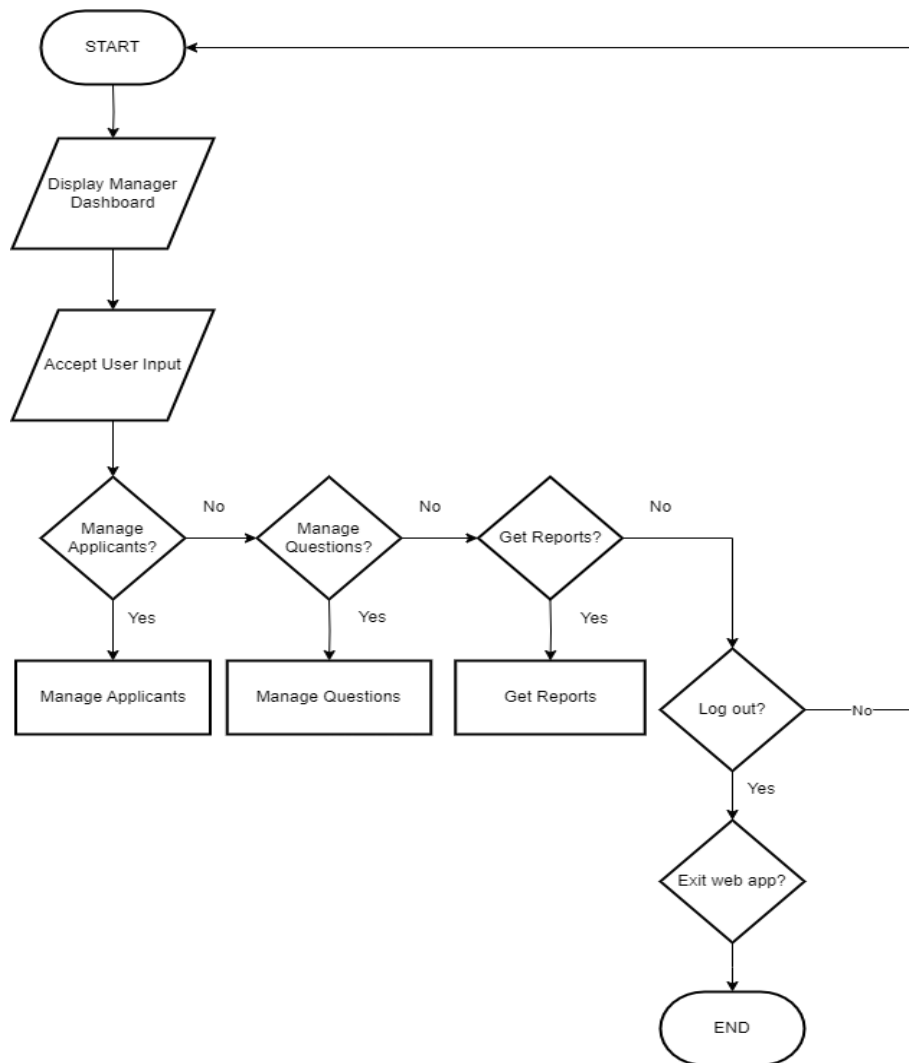


Figure 2. Flowchart for Manager activities

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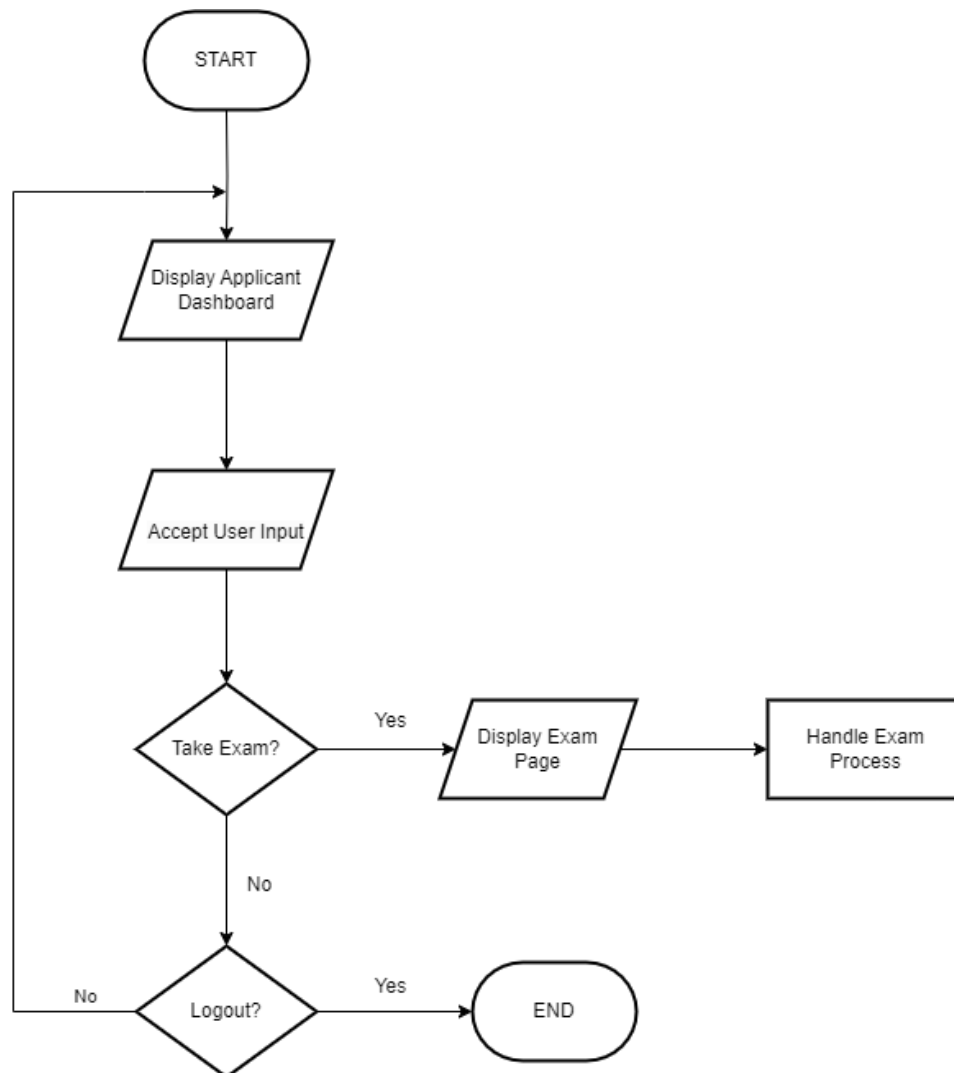


Figure 3. Flowchart for basic Applicant activities

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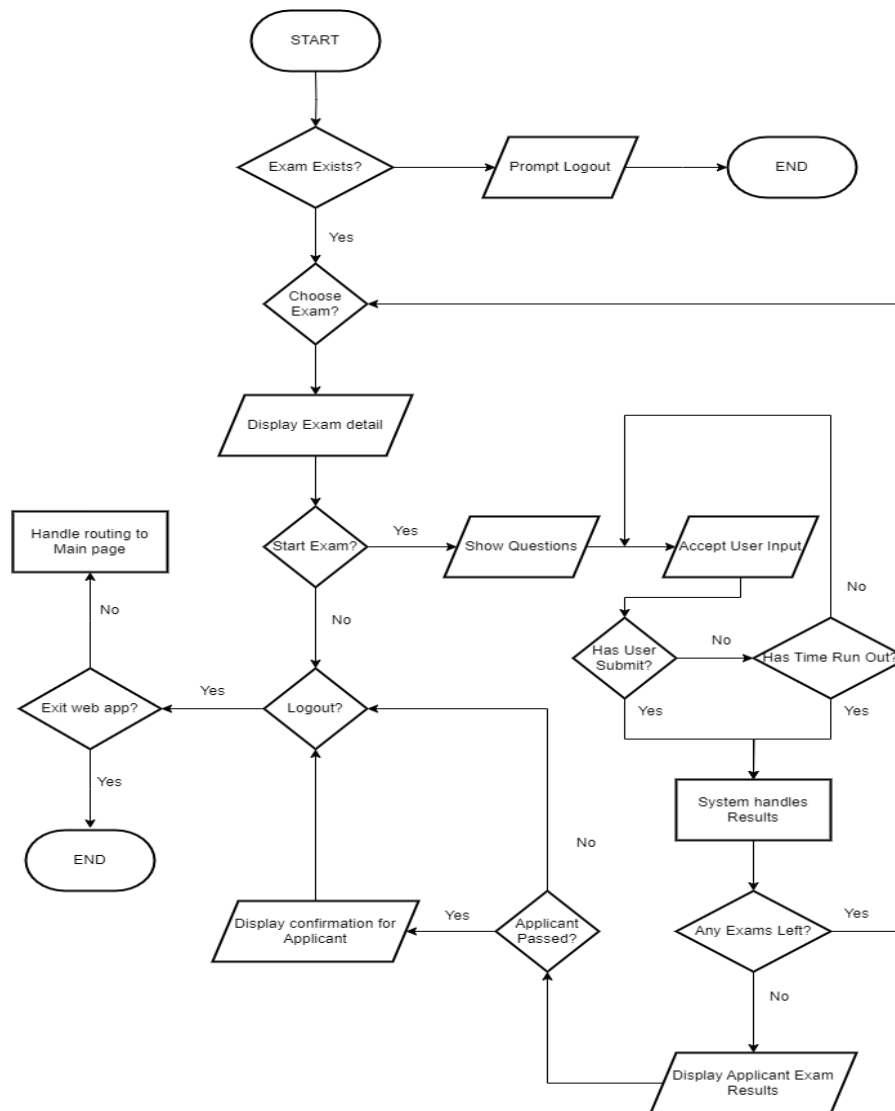


Figure 4. Flowchart for Exam functionality

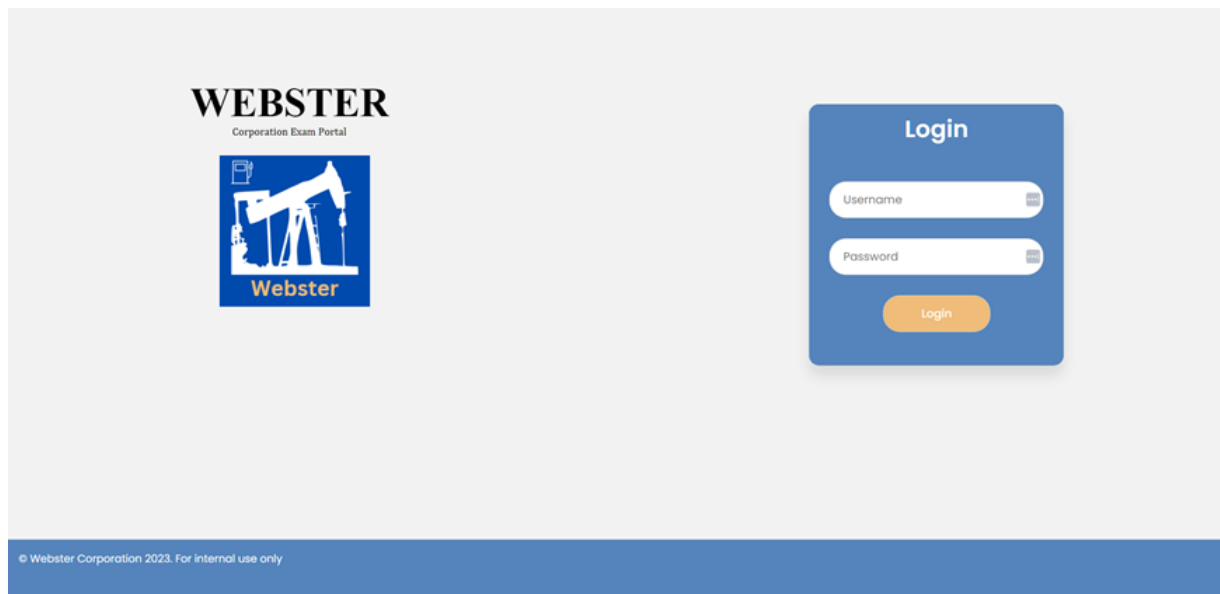
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Review 03

Design Plan:	Document Name: Screen shots	SWD/Form No. 09/SS/Ver1.0
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Screen shots

1. Home / Login



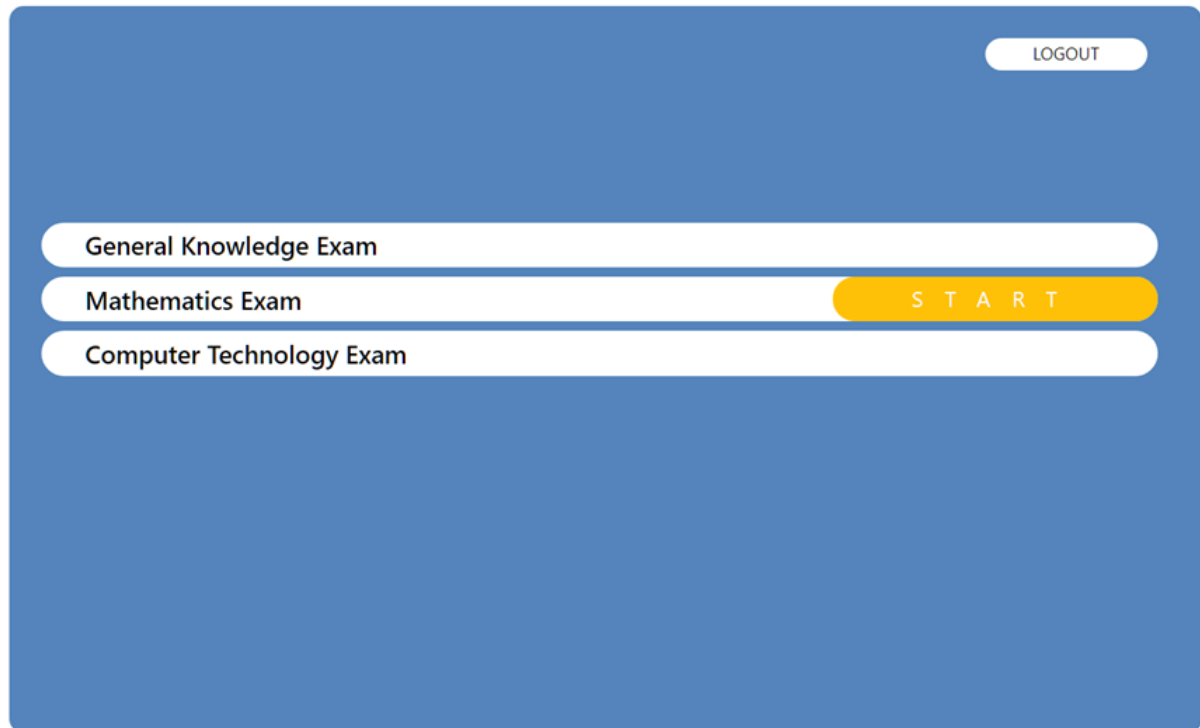
Description: Login / Main page, used to login into the System

Navigation: Go into the Applicant Dashboard if logged in as Applicant, Manager Dashboard if logged in as Manager

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2. Applicant Exam Dashboard



Description: Applicant Exam Dashboard, showing 3 links to the exams, only General Knowledge exam is enabled at start

Navigation: Exam Detail, Logout, Exams

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3. Result

Exam Results

Exam	Score
General Knowledge	4 / 5
Mathematics	5 / 5
Computer Technology	5 / 5
Total Score	14 / 15

[LOGOUT](#)

Description: Result Screen displaying the results of the 3 exams

Navigation: Applicant Dashboard, Logout

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4. Exam Detail Page

4.1. General Knowledge Exam

Time Remaining: 02:57

General Knowledge
LOGOUT

Question 1 : What is the largest planet in our solar system?

- ☐ Earth
- ☐ Saturn
- ☐ Mars
- ☐ Jupiter

Question 2 : Who painted the Mona Lisa?

- ☐ Vincent van Gogh
- ☐ Pablo Picasso
- ☐ Leonardo da Vinci
- ☐ Michelangelo

Question 3 : What is the capital city of Australia?

- ☐ Sydney
- ☐ Canberra
- ☐ Melbourne
- ☐ Brisbane

Question 4 : What is the currency of Japan?

Description: Exam Page for Applicant (General Exam page)

Navigation: Logout, Math exam

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4.2. Mathematics Exam

Time Remaining: 01:19

Mathematics
LOGOUT

Question 1 : What is the value of π (pi) to two decimal places?

- ☐ 3.14
- ☐ 3.1415
- ☐ 3.141
- ☐ 3.13

Question 2 : If a rectangle has a length of 10 units and a width of 5 units, what is its area?

- ☐ 15 square units
- ☐ 50 square units
- ☐ 25 square units
- ☐ 30 square units

Question 3 : If a shirt costs \$25 and is on sale for 20% off, what is the discounted price?

- ☐ \$18
- ☐ \$20
- ☐ \$22

Description: Exam Page for Applicant (Mathematics page)

Navigation: Logout, Computer Technology Exam

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4.3. Computer Technology Exam

Time Remaining: 02:57

Computer Technology
LOGOUT

Question 1 : What is the purpose of a firewall in computer security?

- ☐ To block unauthorized access
- ☐ To enhance internet speed
- ☐ To increase computer storage
- ☐ To improve graphics performance

Question 2 : What is the function of a GPU?

- ☐ Graphics processing
- ☐ Central processing
- ☐ Memory storage
- ☐ Network communication

Question 3 : What does the acronym URL stand for?

- ☐ Uniform Resource Locator
- ☐ Universes Resource Location
- ☐ Universal Resource Locator
- ☐ Unified Resource Locator

Question 4 : Which of the following is an example of an

Description: Exam Page for Applicant (General Exam page)

Navigation: Logout, Results Screen

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Design Plan:	Document Name: Screen shots	SWD/Form No. 09/SS/Ver1.0
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5. View Applicants

View Applicant

Search... [Search](#) [Create New](#)

First Name	Last Name	Age	Address	Email	City	Phone Number	Notes
Tien	Vo	19	Lo E Tecco Town, Nguyen Cuu Phu	votien.2332004@gmail.com	TP. HCM	0922121242	good employee Edit

1

Description: View Applicants for Manager

Navigation: Add/Edit Applicant, View Questions, Logout

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6. View Questions

View Question

Search... [Search](#) [Create New Question](#)

Id	Question Text	Exam Type		
2	What is the capital city of Australia?	General Knowledge	Edit	Delete
3	What is the largest planet in our solar system?	General Knowledge	Edit	Delete
4	What is the currency of Japan?	General Knowledge	Edit	Delete
5	Who wrote the play "Romeo and Juliet"?	General Knowledge	Edit	Delete
6	Who painted the Mona Lisa?	General Knowledge	Edit	Delete
7	What is the largest ocean on Earth?	General Knowledge	Edit	Delete
8	If a rectangle has a length of 10 units and a width of 5 units, what is its area?	Mathematics	Edit	Delete
9	What is the value of π (pi) to two decimal places?	Mathematics	Edit	Delete
10	If $x = 4$ and $y = 7$, what is the value of $2x + y$?	Mathematics	Edit	Delete
11	If a shirt costs \$25 and is on sale for 20% off, what is the discounted price?	Mathematics	Edit	Delete

1 2 Next Last

Description: View Questions for Manager

Navigation: Add/Edit Questions, View Applicants, Logout

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7. Add / Edit Applicant

Add Applicant

Applicant

First Name

Last Name

Age

Address

Email

City

PhoneNumber

Notes

User Name

Password

Applicant Education

COEName

Description

Notes

StartDate

EndDate

Applicant Companies

Company Name

Description

Notes

StartDate

EndDate

Submit

Description: Add / Edit Applicant

Navigation: View Applicants, View Questions, Logout

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8. Add / Edit Question

Edit Question Submit

Pick the exam type for this question

GENERIC KNOWLEDGE MATHEMATICS COMPUTER TECHNOLOGY

Question Text:

What is the capital city of Australia?

Answer A:

Sydney

Answer B:

Canberra

Answer C:

Melbourne

Answer D:

Brisbane

Correct Answer:

Answer B

Description: Add / Edit Question

Navigation: View Applicants, View Questions, Logout

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Design Plan:	Document Name: Checklist of Validations	SWD/Form No.10/CLV/Ver1.0
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Checklist of Validations

Option	Validated
Are all the questions answered before allowing Applicant to submit prematurely?	Yes
Does the manager have the right to add/edit all Applicants?	Yes
Are all the records properly fed into the appropriate database?	Yes
Are all the program codes working?	Yes
Have all the modules been properly integrated and are completely functional?	Yes
Have all the Design and Coding Standards been followed and implemented?	Yes
Is the GUI design consistent all over?	Yes
Is the navigation sequence correct through all the forms/ screens in the application?	Yes

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Design Plan:	Document Name: Checklist of Validations	SWD/Form No.10/CLV/Ver1.0
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Is exception handling mechanism implemented in all the screens?	Yes
---	-----

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Design Plan:	Document Name: Submission Checklist	SWD/Form No.11/SCL/Ver1.0
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Submission Checklist

Sr. No.	Particulars	Yes	No	N A	Comments
1.	Are all users able to search for a particular record?	Yes			
2.	Are all old records properly saved and retrieved when required?	Yes			
3.	Have all modules been properly integrated and are completely functional?	Yes			
4.	Are GUI contents devoid of spelling mistakes?	Yes			
5.	Is the application user-friendly?	Yes			
6.	Is the project published properly into a setup file?	Yes			

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Design Plan:	Document Name: Task Sheet	SWD/Form No.12/TS/Ver1.0
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No	Member	Task	Subtask	Activity Plan	Date of Preparation of Activity Plan		
				Planned Start Date	Actual Start Date	Actual Days	Status
1	Võ Minh Tiến	DB	Create DbContext for Web App	11/12/2023	21/12/2023	1	OK
2		Exam	Create Exam Questions model	11/12/2023	22/12/2023	1	OK

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Design Plan:	Document Name: Task Sheet	SWD/Form No.12/TS/Ver1.0
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3			Create Exam Page	12/12/2023	23/12/2023	1	OK
4			Create random Answer sheet for every Exam type	13/12/2023	24/12/2023	1.5	OK
5			Create timer for Exam	14/12/2023	26/12/2023	0.5	OK
6		Session	Create Session handler to save Applicant data and check Completed Exam types	15/12/2023	28/12/2023	1.5	OK
7		Questions	Create Question dashboard page	16/12/2023	30/12/2023	0.5	OK

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Design Plan:	Document Name: Task Sheet	SWD/Form No.12/TS/Ver1.0
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8		Applicant	Create Applicant models	17/12/2023	31/12/2023	0.5	OK
9		s	Create Password hasher	18/12/2023	1/1/2024	1	OK
10		Result	Create Result data import to Report page data	19/12/2023	2/1/2024	1.5	OK
11		Report	Create Export to Excel data in Report	20/12/2023	4/1/2024	1.5	OK
12	Huỳnh Hữu Kha	Manager	Create Manager model	11/12/2023	21/12/2023	1	OK
13			Create Manager login system	11/12/2023	22/12/2023	1	OK

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Design Plan:	Document Name: Task Sheet	SWD/Form No.12/TS/Ver1.0
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14			Create Manager Dashboard	12/12/2023	23/12/2023	0.5	OK
15		Exam	Create Exam dashboard page	13/12/2023	24/12/2023	0.5	OK
16			Create Exam cheating checker	14/12/2023	26/12/2023	1	OK
17		Login	Create Login page	15/12/2023	28/12/2023	1	OK
18			Create Login functionality	16/12/2023	30/12/2023	1.5	OK
19		Applicant	Creating Applicant Dashboard	17/12/2023	1/1/2024	1	OK

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Design Plan:	Document Name: Task Sheet	SWD/Form No.12/TS/Ver1.0
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20		s	Create Applicant Add/Edit page	18/12/2023	3/1/2024	1.5	OK
21		Main	Create nav-bar	19/12/2023	5/1/2024	0.5	OK
22	Nguyễn Mạnh Chiến	Database	Create Exam models	11/12/2023	21/12/2023	1.5	OK
23			Create ApplicantExam model	11/12/2023	23/12/2023	1.5	OK
24		Questions	Create Question Dashboard	12/12/2023	25/12/2023	1	OK
25			Create Add Questions page	13/12/2023	26/12/2023	1	OK

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Design Plan:	Document Name: Task Sheet	SWD/Form No.12/TS/Ver1.0
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26			Create Edit Questions page	14/12/2023	28/12/2023	1.5	OK
27		Result	Create Result page	15/12/2023	30/12/2023	1	OK
28			Create Result Calculator	16/12/2023	1/1/2024	1	OK
29		Exam	Create Exam routing	17/12/2023	2/1/2024	1	OK
30		Report	Create Report Page	18/12/2023	4/1/2024	1	OK

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Date		