FULLSTACK DEVELOPER TRAINING IN ANGULAR, ASP.NET, EF CORE AND MS-SQL

DATE: FEBURARY 2022 – MAY 2022

Internship/Project report submitted in partial fulfilment of the requirement for the degree of
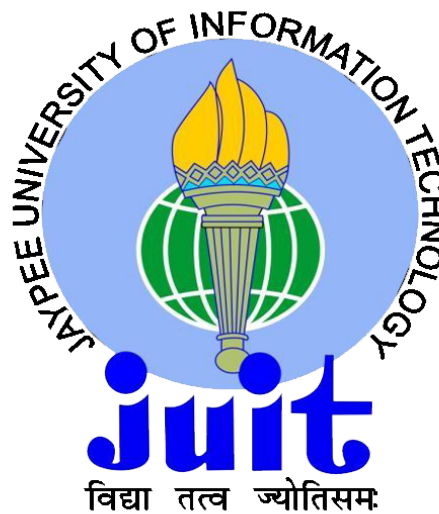
Bachelor of Technology

In

Computer Science and Engineering

<u>By: Akhil Sharma (181460)</u>

UNDER THE SUPERVISION OF

DR. SURJEET SINGH

Department of Computer Science & Engineering And

Information Technology

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY,

WAKNAGHAT, SOLAN,

HIMACHAL PRADESH – 173234

CERTIFICATE

This is to certify that the work which is being presented in the project report titled **"**Fullstack Developer training Angular, ASP.NET , Entity Framework Core and MS-SQL**"** in partial fulfilment of the requirements for the award of the degree of B.Tech in Computer Science And Engineering and submitted to the Department of Computer Science And Engineering, Jaypee University of Information Technology, Waknaghat is an authentic record of work carried out by **Akhil Sharma** during the said period;1st April 2022 – 10th May 2022, ensuring proper care towards the rules and regulations as specified by the Non-Disclosure Agreement signed between Akhil Sharma& Akhil Sharma and Infosys Ltd. dated 30.01.2022.

Akhil Sharma(181460)

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The above statement made is correct to the best of our knowledge.

(University Supervisor)

Dr. Surjeet Singh

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Company Supervisor

Rohini N

Senior Educator at Education, Training and Assessment,

Infosys Ltd.

(Digital signature unavailable, as per Confidentiality Policy)

ACKNOWLEDGEMENT

CANDIDATE'S DECLARATION

I hereby declare that the work presented in this report entitled "Full stack Developer training Angular, ASP.NET , Entity Framework Core and MS-SQL" in partial fulfilment of the requirements for the award of the degree of Bachelor of Technology in Computer Science and Engineering/Information Technology submitted in the department of Computer Science & Engineering and Information Technology, Jaypee University of Information Technology Waknaghat is an authentic record of my own work carried out over a period from February 2022 to May 2022 under the supervision of Mrs. Rohini N Senior Educator at Education, Training and Assessment, Infosys Ltd.(Company Supervisor) and Dr. Surjeet Singh , Assistant Professor(SG), Computer Science & Engineering and Information Technology

Jaypee University of Information Technology, Waknaghat(University Supervisor).

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

Akhil Sharma(181460)

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Senior Educator at Education, Training and Assessment,

Infosys Ltd.

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INTERNSHIP REPORT UNDERTAKING

I, Akhil Sharma, Roll No. 181460, Branch - Computer Science & Engineering pursuing my internship/project with Infosys from 14-02-22 to 10-05-2022.

As per procedure we have to submit my internship report to the university related to our work that we have done during this internship.

I have compiled my internship/project report, but due to COVID-19 situation and Work from Home procedure being followed, our mentor in the company is not able to sign this report and no digital signatures are allowed as part of the company's confidentiality policy.

So, we hereby declare that the internship/project report is fully designed/developed by us and no part of the work is borrowed or purchased from any agency.

Akhil Sharma(181460)

Jaypee University of Information Technology,

Waknaghat, Solan, H.P.

CERTIFICATE OF COMPLETION OF INTERNSHIP

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OF
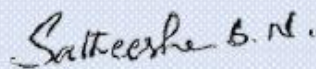## INTERNSHIP

This is to certify that

Akhil Sharma

of

Jaypee University of Information Technology, Jaypee University of Information Technology

has completed the internship program at Infosys Limited

from

February 2022 – May 2022

Satheesha B. N.

Satheesha B Nanjappa
Vice President and Head, Global Education Center

ABSTRACT

At Infosys, each selected intern is allotted a system engineer trainee domain with each domain having specific amount of training period varying from 12 weeks to 15 weeks. Internship includes various events such as educational workshops, webinars, Lex courses, Integrated Capability Test and group work assignments.

A large IT company based in the India, Infosys employees a large number of Indians, to be exactly about 3 lac employees. Infosys Corporation having set foot in more than 46 countries and also recruits and hires international workers from all around the globe. Infosys provides various services to a large number of clients in the IT industry. They also have ties with one of the fastest growing companies like Cisco, Amazon Web Services, Microsoft, McAfee, etc. Work culture in Infosys is just as professional as expected and it values ethical notes towards the progress of its employees and raises concern regarding physical and mental issues faced by its' employees.

We have been placed under the domain of system engineer trainee, where we were trained in Angular, .Net Core, EntityFrameworkCore and Microsoft SQL.

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INTRODUCTION

1.1 Introduction

1.1.1 About the company

Infosys is a multinational business enterprise that operates in a range of industries. The company is a world leader in digital carrier and consulting. Consultation, next-generation technology, and outsourcing offerings are the company's predominant business lines. Infosys is a world chief into digital purposes and consulting because of the subsequent generation. They aid clients of upstairs 50 worldwide places into navigating their digital transformation. They expertly information our purchasers thru their digital journey, having spent over three many years managing the structures and operations of world enterprises. They accomplish this by way of supplying the organisation with an AI-powered core that aids in the prioritization of exchange execution.

They additionally empathize with the enterprise through handing over extraordinary levels of overall performance and consumer satisfaction via agile digital at their non-stop enchantment through constructing and transferring digital skills, expertise, and ideas from innovation ecosystem. Their merchandise assists corporations improve deeper connections along stakeholders, rule continuous innovation yet accelerate increase among the digital world. The power their clients' boom into unexpectedly evolving areas kind of banking, digital marketing, interactive commerce, distributive trade, credit servicing, consumer service. The company offers various role like developer, designer, tester and manager in the company, but, before becoming the associate every person should complete the intern period and after the intern period there is one year of probation period in the company for the associate to join the company.

Infosys tagline is "Powered by Intellect, Driven by Values".

Established in 1981, Infosys was founded by a core team of seven members with a main lead of N.R Narayan Murthy and Nandan Nilekani.

Infosys is a NYSE listed global consulting and IT services organization with greater than 310k employees. From a capital of US$250, we have grown to become a US$ 16.31 billion (FY22 revenues) enterprise with a market capitalization of about US$ 104.71 billion.

1.1.2 Mission, Vision, Values and Objectives

1.1.2.1 Mission

The Infosys mission is to achieve objective under a set of ethics in an environment which has values like even-handedness, obeisance and righteousness toward its customer, people of Infosys, dealers and society.

In particular to its newly appointed employees is mandated to undergo internship. The internship is given to provide best information in order to train trainee with the best of their ability for their associate role. It spends an ample amount of time effort and money in training before introducing people to actual work in a real environment.

1.1.2.2 Vision

The Infosys vision is to be a respectable corporation all around the world and to provide best of class answers weather for business breakthrough or leveraging technologies which is delivered by best-in-class people.

In terms of training and internship Infosys vision is to provide an ideal education to all the trainee irrespective to college the person come from.

1.1.2.3 Values

The values of the organization are as follows:

1.1.2.3 Valuing People

Infosys believes so much its advancement is principally based about people They wish improve or hold high-quality, together excellent relationships along their clients, expert colleagues, referral sources, vendors, neighbourhood members, and each other if he honours human beings between the whole thing employee do.

1.1.2.4 Building Client Relationships

Infosys seeks in conformity with acquire long-term consumer loyalty by means of thriving a deep understanding concerning each client's commercial enterprise and personal goals, by demonstrating firm reliability and honour between their assignment and stability by performing namely an unbiased or objective guide after their clients.

1.1.2.5 Upholding Quality and Integrity

Infosys choice maintain surroundings where a dedication in imitation of quality, permanency, longevity, honesty, respect, fidelity then professional principle governs the moves yet selections regarding everyone inside the firm.

1.1.2.6 Key to Success

- Complete the work with honesty.
- Complete the action on time.
- Complete the gauging.
- Complete the assignment in schedule time.
- Try to reach out learn and research.
- Open mind to learn new things.

1.1.2.7 Objective

The Infosys mission is to achieve objective under a set of ethics in an environment which has values like even-handedness, obeisance and righteousness toward its customer, people of Infosys, dealers and society.

Moreover, the overarching objective is to instruct the performance of the company toward its specialised services and to become a national leader in this niche.

As well as to grow the business at a pace that would be both difficult and manageable, while providing the industry with innovation and adaptability.

1.1.3 Work from home procedures

Due to the COVID-19 disease outbreak, the entire internship is planned to be done from home. To achieve results, Infosys has teamed up with Microsoft Office to expand its online business. Aside from that, Infosys provides laptops to its staff with proper EDR, MDR, and XDR policies, making it less vulnerable to zero-day attacks.

Infosys has proposed that interns should use personal laptops during the internship's training and learn period. Infosys has created a special portal for staff members and interns to access software plug-ins and access new applications, for various functional applications such as technical support, Human resource support, project plans, assignment details, leave approvals, and so on. The portal is self-sufficient to provide all the feature to make trainee undergo training smoothly as the virtual machines provided are powerful enough to support trainees throughout the training. The company provide with a temporary email to access these functionalities.

The above entrance portal for users is developed in collaboration with Microsoft to provide a better security as the portal works on the internal server of Infosys only accessible to the one associated or connected with the company. So, the security is much more required so a collaborated effort is needed to provide a higher end security.
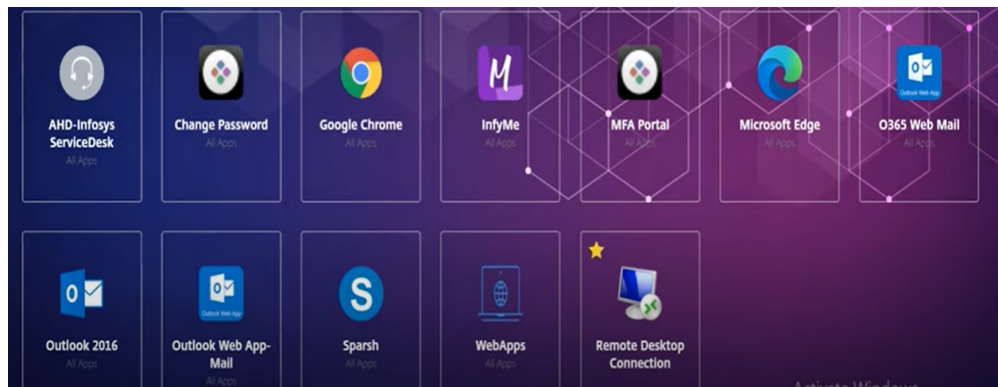
The above image depicts the landing or home page of portal which contains only the applications which are important or marked favorite by the trainee. The portal has two sections one is home page and the other is applications. The Infosys uses Microsoft application as well for official employee mail the company uses outlook. The portal is designed in a way that all the applications stated in the portal are accessed a virtual machine deployed at the Infosys.
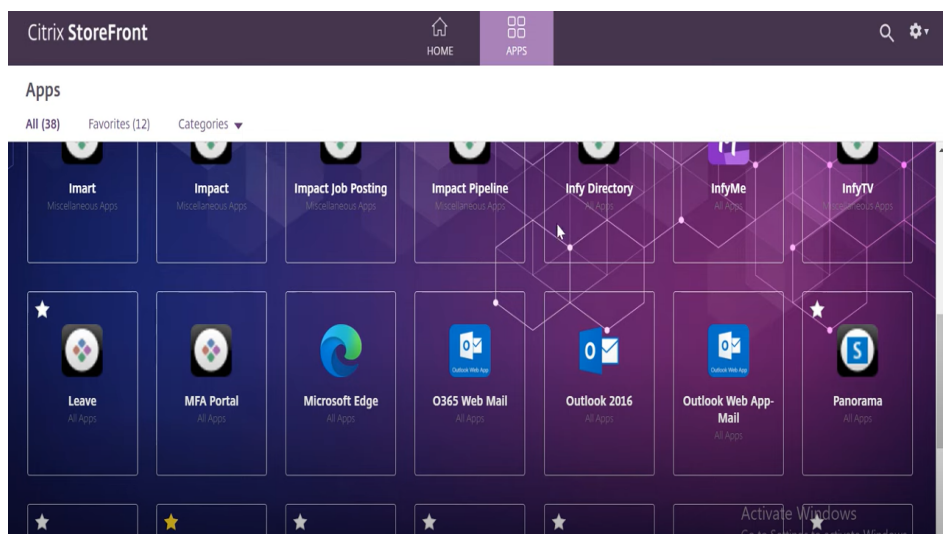
The portal provides all the functionalities from applying for leave

to personal information access and edit also. The portal comprises of various web applications even a virtual machine access portal is also made accessible via remote access. Infosys has created a special portal for staff members and interns to access software plug-ins and access new applications, for various functional applications such as technical support, Human resource support, project plans, assignment details, leave approvals, and so on.

1.1.4 About the internship

Our internship at Infosys was conducted in online mode due to covid situation. The internship started on 7th February 2022. For the first two weeks i.e., from 7th -18th February 2022 we had webinars and orientation with our HRs about the company, Mysore Development Center (DC), all the location of other Development Center, salary accounts and interaction sessions. From 21st – 25th February we were given introduction to topics and in which order we were going to learn them. Also, we learned about that after covering few topics we were going to have their hand written exams for evaluation. The topics were **Basic C sharp Programming, Microsoft SQL, Entity Framework Core, Developing Service Layer using ASP.NET Web API, HTML, CSS** and **Angular for .NET Developers.** Now for the next two weeks i.e., from 28th February to 11th March we were taught about **Basic C Sharp Programming**, about its fundamentals, data types and basic object-oriented programming. Also, the assignments were given so that we can get familiar with the language. Then from 14th March to 19th March we were taught about **Microsoft SQL.** In this topic we were basically taught about stored procedures and functions like how to create them and how to use them. Then from 21st March to 25th March we studied about **Entity Framework Core (EF Core).** The basic functionality of EF Core is to use CRUD operations on the stored procedures and functions created in the database, connect them to API. Then from 28th March to 1st April we studied about **Developing Service Layer using ASP.NET Web API** which helped us to create web services or

Restful API so that we can create client services. Then from 1ˢᵗ April to 7ᵗʰ April we studied about **HTML, CSS and Angular for .NET Developers** which helped us to create the presentation layer or the front end of application/websites. The details about these topics are discussed in literature survey. Then from 8ᵗʰ April to 10ᵗʰ May we got a team of 6 people and were given a capstone project by the name 'Question Generator App' where we needed to create a working project from the scratch with the all the topics we learned till now and we were evaluated after every sprint. The sprint duration was 10 days. We needed to decide the user stories for this project and then positively start work upon them.

1.2 Problem statement of capstone project

In these covid times the exams are shifting more and more towards online medium and objective examination is the new trend so one needs an app to search questions on any certain topics and create a question paper out of it. Question generator app can be used by a teacher to test his students or a student can generate set of questions for himself to test his/her skills with easy. The Question Generator application will generate question along with multiple options for given set of code snippet. The user can save or discard the questions as per their requirement. The question must be saved in library if the user saves the question. Also, the user should be able to download the question as PDF whenever needed.

1.3 Objectives of capstone project

The objective of Question Generator application is that the user can create his or her own question bank with the available set of questions available as well as the question they want to add to question bank to the library, can preview the questions the want to save from the library, can delete the question they don't want to save from the library and later they can download the set of questions in the form of PDF.

1.4 Methodology of capstone project

For the Question Generator system, the front-end technology is Angular. The data access tier is built with EntityFrameworkCore and services are built with ASP.NET Web API Core backed by C# in order to leverage the benefits of object-oriented programing such as platform independence and robustness. The UML diagrams are used for the class design.

At the back-end Microsoft SQL Server 2019 database is used for persistent storage of data. The tables are designed in such a way that high performance is ensured when any operation is performed in the database.

CHAPTER 02:
LITERATURE SURVEY

For Creating this Project, we have used the technology and concepts that were taught to us during our Internship through the Company's Education Platform named as **Lex.** Below mentioned links of the courses that match closely towards the ideology which has been used to create this Project: -

1. Basic CSharp Programming

CSharp is an attractive and type-safe object-oriented language that allows developers to create a wide range of secure and robust.NET Framework applications. CSharp can be used to construct Windows client applications, XML Web services, distributed components, client-server applications, database applications, and many other things. In the course that was provided to us by our educator we learned about CSharp fundamentals like syntax, data types and basic concepts of object-oriented programming.

2. Microsoft SQL Server

Microsoft SQL Server is an RDBMS (relational database management system). This product is designed to perform the basic task of storing and retrieving data for use by other applications. It can run on the same computer or on a networked machine. This course covers various fundamental and complex SQL Server principles, such as how to generate and recover data, create logins and backups, assign rights, and so on. In the course basically we were taught how to create stored procedures, scalar functions and table valued function and how to execute them. In SQL, a stored procedure is a collection of SQL statements that are saved in a database together. It can perform one or more DML operations like select, insert, delete, update, etc. on the database and return a value, depending on the statements in the procedure and the arguments you pass. As a result, it enables reusability by allowing you to pass

the same statements many times. A scalar function returns only a single value that might not be related to table present in the database. A tabled-valued function returns your specified columns for rows in your table meeting your selection criteria.

3. Entity Framework Core

Entity Framework Core is an open-source, lightweight, extensible, and cross-platform version of the Entity Framework data access technology which us used to access data from database. Using scaffold-dB context, create an entity model from a legacy database and run it. The CRUD (Create, Read, Update, and Delete) operations are used to create, read, update, and delete data. Through migrations, create a database and conduct CRUD operations using entities and the data model. Objects such as stored procedures and functions can be created and executed in SQL Server. Migrations can be used to change the schema of an existing database. In the course we learned about how to use CURD operation by fetching data from database which is the business logic of any application and then those operation acts as the intermediate between database and API.

4.Developing Services using ASP.NET Core Web API

Web applications developed using a specific technology may not reach to all the end users who are using diversified set of devices ranging from desktop browsers, mobiles to notebooks, wearable gadgets etc. All these devices use their own applications developed in various technologies. To reach all types of end users, one should have an API that is compatible with all these client devices. Web API provides you with this compatibility. By the end of this course, you will be able to create service-based applications using Web API Core that exposes data for the client applications to consume it and perform CRUD operations with them.

5. Creating UI for Web using HTML 5

Simple HTML elements are used to create a simple webpage. Using HTML tags and properties, create webpages with specified styles and formats. Create a webpage with a form that accepts a variety of inputs. Use hyperlinks to connect to other websites. Add audio, video, and photographs to your website. For a specific requirement, format the text with HTML elements.

6. Styling Web pages using CSS3

Style webpages based on a given requirement Apply uniform style to group of webpages using external CSS Selectively style webpages for different devices using media query Enhance the user experience of a webpage using CSS box model

7. Angular for .NET Developers

Create a component-based application using Angular components Enhance the functionality of components using Angular directives Create Angular forms and bind them with model data using data binding Validate forms using Angular built-in or custom validators Format the rendered data using Angular built-in or custom pipes Communicate with remote server using Angular Http class with RxJS Observables Build a single page application by using routing.

CHAPTER 03

System Development/Implementation

System Architecture

3.1 Logical Architecture

The following diagram shows the big picture of the Question Generator Architecture.
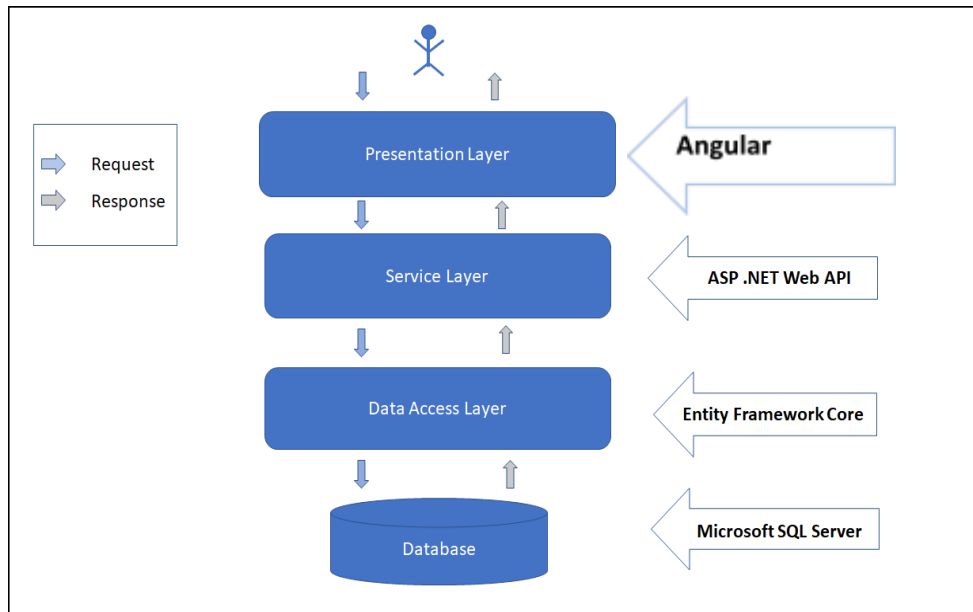
Figure 2.1 Question Generator Architecture

3.2 Physical Architecture

Type	Configuration	Installed Software
Web server	IIS Server	IIS 12.0
Database server	MS SQL Server 2019	MS SQL Server 2019
Frontend development environment	Angular	Angular CLI, Node Js

3.3 Application Architecture

3.3.1 Subsystems

Register

Reset Password

Login

View Questions

Search Questions

Save Selected Questions

Modify Questions

Preview

Delete from Preview

Download Questions

Feedback

Logout

3.3.2   Use case Diagram
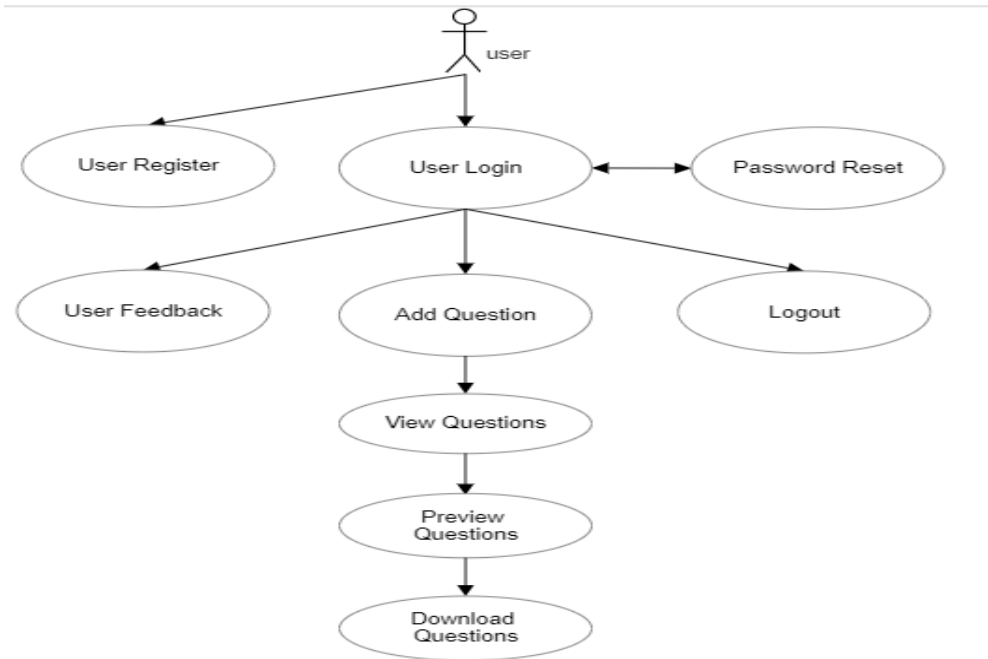
Figure 2.3.2 Use Case Diagram

3.3.3 Modelling

Based on the use case model defined in the requirement engineering face. The following models need to be developed:

Object Model.

Deployment Model.

3.3.4 Layering and Partitioning

This application follows three-tiered architectural approach.

The architectural followed has 3 layers:

Front end or Presentation Layer

Service Layer

Data Access Layer

Following are the functionalities implemented in each of these layers:

Presentation Layer: Responsible for displaying the data and interacting with the end user.

Service Layer: Responsible for designing and implementation of the user-defined APIs.

Data access Layer: Responsible for reading/writing data from/to database.

3.3.5   Coding and UI Standards

Coding standard of Question Generator development is also based on the dotnet coding standards.

3.3.6   Development Environment

For the development of the Question Generator system of the following specification are used:

RAM: 8 GB

HDD: 100 GB

Network: Above 1 MBps

Operating system: Windows 10

3.3.7   Software

Visual Studio 2019 IDE

.NET Core

Microsoft SQL Server 2019

3.3.8   Deployment

For the deployment of the Question Generator system of the following specification are used:

RAM: 8 GB

HDD: 100 GB

Network: Above 1 MBps

Operating system: Windows 10

3.4 User Stories

USER STORY ID	#1	PRIORITY	Must Have
User Story Description			
As a user, I want to register the user first, so that I can use the services provided by the app.			
Acceptance Criteria			
1.Password: 8-15 characters 2.Email must be valid 3.Username must be unique. 4. First and last name are required.			
Any Other Information			
< Can include screenshots or links >			

USER STORY ID	#2	PRIORITY	Must Have

User Story Description
As a user, I want to login at all times, so that I can access my saved work.

Acceptance Criteria
For login user must be registered.

Any Other Information
< Can include screenshots or links >

USER STORY ID	#3	**PRIORITY**	Must Have

User Story Description
As a user, I want to enter a code snippet or sample question, so that I can generate a similar question based on text.

Acceptance Criteria
1.User must be logged in. 2. If no relative keyword is found data not found must be returned.

Any Other Information
< Can include screenshots or links >

USER STORY ID	#4	PRIORITY	Must Have

User Story Description

As a user, I want to save the question, so that I can preview the question when needed.

Acceptance Criteria

1. At least one question must be displayed for save to happen.

Any Other Information

< Can include screenshots or links >

USER STORY ID	#5	PRIORITY	Must Have

User Story Description

As a user, I want to preview all the questions I have saved, so that I can make the necessary changes if required.

Acceptance Criteria

1. At least one question must be saved for preview to happen.

Any Other Information			

< Can include screenshots or links >

USER STORY ID	#6	**PRIORITY**	Must Have
User Story Description			

As a user, I want to rearrange or edit all the questions, so that I can have questions as per my choice.

Acceptance Criteria			

1. To rearrange the question order at least 2 questions should be selected and for editing the question even one is enough.

Any Other Information			

< Can include screenshots or links >

USER STORY ID	#7	**PRIORITY**	Must Have
User Story Description			

As a user, I want to discard any questions from the previewed question paper, so that I can have my desirable set of questions.

Acceptance Criteria			
1. At least one question must be in preview to be discarded.			
Any Other Information			
< Can include screenshots or links >			

USER STORY ID	#8	**PRIORITY**	Must Have
User Story Description			
As a user, I want to download the previewed set of questions, so that I can access it on my local machine.			
Acceptance Criteria			
1.There must be one question so that it can be downloaded.			
Any Other Information			
< Can include screenshots or links >			

USER STORY ID	#9	PRIORITY	Must Have

User Story Description

As a user, I want to save the data, so that I can avoid data loss.

Acceptance Criteria

1.The data must be saved every 20 minutes.

Any Other Information

< Can include screenshots or links >

USER STORY ID	#10	PRIORITY	Must Have

User Story Description

As a user, I want to logout from my profile, so that no one can access my profile without my consent.

Acceptance Criteria

1.The User must be logged in to logout.

2.The user is inactive for more than 1 hour and the user will be automatically logged out.

Any Other Information
< Can include screenshots or links >

USER STORY ID	#11	**PRIORITY**	Must Have
User Story Description			
As a user, I want to reset my password, so that I am able to login with my new password.			
Acceptance Criteria			
1.User must be registered			
Any Other Information			
< Can include screenshots or links >			

USER STORY ID	#12	**PRIORITY**	Must Have
User Story Description			
As a user, I should be able to give feedback, so that changes could be made and issues could be brought in notice.			

Acceptance Criteria	
1.User must be logged in.	
Any Other Information	
< Can include screenshots or links >	

3.5 Component Architecture

The component architecture of the system has been captured using object model and deployment model. The details of these models are captured in the subsequent sub sections.

3.6 Class Design Specification

3.6.1 Data Access Layer

Class Name	QuestionDBRepo
Class Description	It contains the DAL logic and acts as an intermediate between the database and the service layer.
Class Inheritance	NA
Classes Referenced	Models.Feedback,Models.History,Models.Paper,Models.PapaerId,Models.Quest,Models.Question,Models.ResetPassword,Models.User,Models.questionDB1Context.
Sub-system	NA
Class Type	Complete

3.6.2 Methods

Method	public bool AddUser(string firstname, string lastname, string email, string password)
Purpose	To register user details using stored procedure from database.
Returns	Status indicating if the logic is executed successfully or not.

Method	public bool LoginUser(string email, string password)
Purpose	To Login User using scalar-valued function from database.
Returns	Status indicating if the logic is executed successfully or not.

Method	public bool ResetPassword(string email, string oldpassword, string newpassword)
Purpose	To Update the user password in the database using stored procedure.
Returns	Status indicating if the logic is executed successfully or not.

Method	public List<Question> GetQuestion()
Purpose	To view all questions from database.
Returns	questionList of all stored questions.

Method	public List<Question> FetchQuestions(string search)
Purpose	To search questions according to the categories stored in database.
Returns	Question with question if the logic is executed successfully and null if not executed .

Method	public int SaveQuestion(string emailid, string questionid)
Purpose	To store user selected questions.
Returns	result indicating if the logic is executed successfully or not.

Method	public int DeleteQuestions(string emailid, string questionid)
Purpose	To delete selected questions from preview.
Returns	Result indicating if the logic is executed successfully or not.

Method	public List<Question> PreviewQuestion(string emailid)
Purpose	To show user selected questions in preview.
Returns	previewquestions indicating if the logic is executed successfully and null if not executed.

Method	public bool AddNewQuestion(string category, string question, string option1, string option2, string option3, string option4, string answer)
Purpose	To give user functionality of adding questions according to their choice.
Returns	Status indicating if the logic is executed successfully or not.

3.6.3 Service Layer

3.6.3.1 Class Identification

Class Name	UsersController
Class Description	It contains the APIs and acts as an intermediate between the Data Access Layer and the Presentation Layer.

Class Inheritance	NA
Classes Referenced	QuestionDBRepo, Models.class, Models.Delete, Models.Feedback, Models.History, Models.Paper, Models.Paperid, Models.Quest, Models.Question, Models.ResetPassword, Models.User, Models.ValidateUser.
Sub-system	NA
Class Type	Complete

3.6.3.2 Methods

Method	public bool AddUsers (QuestionWebApi.Models.User user)
Purpose	To register the new user by invoking the DAL method.
Returns	Message indicating (true if yes and false if error is there).

Method	public bool Login (QuestionWebApi.Models.User user)
Purpose	To validate the credentials prompted by the user during login by invoking the DAL method.
Returns	Status indicating (true if yes and false if error is there).

Method	public bool ResetPass(QuestionWebApi.Models.ResetPassword obj)
Purpose	To validate the credentials prompted by the user and updating the new password by invoking the DAL method.
Returns	Status indicating (true if yes and false if error is there).

Method	public bool SaveQuestions(QuestionWebApi.Models.Class c)

Purpose	To save user selected questions by invoking the DAL method.
Returns	Message indicating (true if yes and false if error is there).

Method	public bool DeleteQuestion(QuestionWebApi.Models.Delete delete)
Purpose	To deleted user saved questions by invoking the DAL method.
Returns	Message indicating (true if yes and false if error is there).

Method	public JsonResult GetQuestion()
Purpose	To view all questions by invoking the DAL method.
Returns	Return questions in JSON format.

Method	public JsonResult FetchQuestions(string search)
Purpose	To search specific questions by invoking the DAL method.
Returns	Return fetchQuestions in JSON format.

Method	public bool SaveFeedback(QuestionWebApi.Models.Feedback feedback)
Purpose	To save user feedback by invoking the DAL method.
Returns	Message indicating (if successful true else false if any error occurs).

Method	public JsonResult PreviewQuestions(string emailid)
Purpose	To show previews of user selected questions by invoking the DAL method.
Returns	Fetchquestion in JSON format.

3.6.4 Presentation Layer

3.6.4.1　　　Components
3.6.4.1.1 User Components

- User Registration.

Method	addUser(firstName: string, lastName: string, emailId: string, password: string):Observable<boolean>
Purpose	To register the user details provided by the user using the User Service method.
Returns	Success redirects to login and error gives alert.

- User Login.

Method	login(emailId:string,password:string):Observable<string>
Purpose	To login the userby the credentials provided by the user using the User Service method.
Returns	Success redirects to View questions in app and error gives alert.

- Save Question.

Method	SaveQuestion(emailId: string,quesId: string): Observable<boolean>
Purpose	To save the selected questions of user using the User Service method.
Returns	Success gives an success alert and error gives error alert.

- Reset Password.

Method	resetPassword(email: string, oldPassword: string, newPassword: string): Observable<boolean>
Purpose	To change password of the user using the User Service method.

Returns	Success redirects to login and error gives error alert.

- Delete Selected Questions from Preview.

Method	deleteCartProduct(quesId: string, emailId: string): Observable<boolean>
Purpose	To delete the user selected questions from preview by user using the User Service method.
Returns	Success gives alert and error gives error alert.

- Feedback

Method	Feedback (feedback: string): Observable<boolean>
Purpose	To store the feedback provided by the user using the User Service method.
Returns	Success redirects to ViewQuestions and error gives error alert.

- Error Handler

Method	errorHandler(error: HttpErrorResponse)
Purpose	To handle any error, occur to the user while using application using the User Service method.
Returns	Error gives error alert.

3.6.4.1.2 Preview Components

- Get Questions

Method	getQuestions(): Observable<any>
Purpose	To get all questions from the database using the Preview Service method.
Returns	Return tempVar.

- Preview Questions

Method	previewQuestions(emailId: string): Observable<any>
Purpose	To get all questions from the database using the Preview Service method.
Returns	Return tempVar.

- Set Questions

Method	previewQuestions(emailId: string): Observable<any>
Purpose	To get all questions from the database using the Preview Service method.
Returns	Return tempVar.

- Save Preview

Method	view(question: any)
Purpose	To get all user saved questions from the database using the Preview Service method.
Returns	Return preview list of questions.

- Remove Preview Item

Method	removePreviewItem(question: any)
Purpose	To delete user saved questions from the preview using the Preview Service method.
Returns	Return preview list of questions.

- Error Handler

Method	errorHandler(error: HttpErrorResponse)
Purpose	To handle any error, occur to the user while using application using the User Service method.

Returns	Error gives error alert.

3.6.4.1.3 API Components

- Get Questions

Method	getQuestions(): Observable<IQuestion[]>
Purpose	To view all questions from the database using the API Service method.
Returns	Return tempVar.

- Fetch Questions

Method	getQuestions(): Observable<IQuestion[]>
Purpose	To view specific searched questions from the database using the API Service method.
Returns	Return IQuestion array.

- Error Handler

Method	errorHandler(error: HttpErrorResponse)
Purpose	To handle any error, occur to the user while using application using the User Service method.
Returns	Error gives error alert.

3.7 Design of Algorithms

This system is using standard algorithms for functionalities including searching, sorting, retrieving the data, deleting the data, adding the data. There is no special critical algorithm used in Question Generator.

3.8 Database Design

3.8.1 Overview of tables

a. Dbo.users

Table used to store user's data for profile and login.

b. Dbo.questions

Table to store questions along with their category, options and answers.

c. Dbo.paper

Table to store userId with their unique paperId.

d. Dbo.Quest

Table to store user selected questions for their question paper.

e. Dbo.Feedback

Table to store user's feedback.

3.8.2 Overview of stored procedures and functions

3.8.2.1   Stored Procedures

a. Dbo.uspAddUser

Procedure that adds user registration data to dbo.users table.

b. Dbo.resetPass

Procedure that updates the user passwords in dbo.user table.

c. Dbo.AddNewQuestion

Procedure to store user added questions to dbo.question table.

d. Dbo.DeleteQuestion

Procedure to delete user selected questions for question paper from dbo.Quest table.

e. Dbo.SaveQuestion

Procedure to save user selected questions to dbo.Quest table.

3.8.2.2   Functions

a. Dbo.ChkEmailId

Function to validate if email is correctly specified or not and storing it in table dbo.users.

b. Dbo.ufn_ValidateUserCredentials

Function to validate user credentials.

c. Dbo.ID

Function to store QuesPaperId for every new row inserted in dbo.paper table.

d. Dbo.quesID1

Function to store QuesId for every new row inserted in dbo.questions table.

e. Dbo.userID2

Function to store UserId for every new row inserted in dbo.users table.

3.8.3 Database Objects

3.8.3.1   Tables

3.8.3.1.1 Users

Description	This table contains the details of the users of the system

#.	Primary Key	Column Name	Data Type	Size	Nulls	Unique	Default	Check Constraint
1.	Y	UserID	CHAR	4	N		Y	
2.		FirstName	VARCHAR	20	N			
3.		LastName	VARCHAR	20	N			
4.		EmailId	VARCHAR	30	N	Y		chk_email
5.		Passwd	VARCHAR	5	N			

3.8.3.1.2 Questions

Description	This table contains questions their options categories and answers of the system

#.	Primary Key	Column Name	Data Type	Size	Nulls	Unique	Default	Check Constraint
1.	Y	QuesID	CHAR	4	N		Y	
2.		Category	VARCHAR	30	N			
3.		Ques	VARCHAR	4000	N	Y		
4.		Option1	VARCHAR	500	N			
5.		Option2	VARCHAR	500	N			
6.		Option3	VARCHAR	500	N			
7.		Option4	VARCHAR	500	N			
8.		Answer	VARCHAR	500	N			

3.8.3.1.3 Paper

Description	This table unique paperid and userid of the user

#.	Primary Key	Column Name	Data Type	Size	Nulls	Unique	Default	Check Constraint
1.	Y	QuesPaperID	CHAR	4	N		Y	
2.		UserId	CHAR	4	N			Foreign key Users(userId)

3.8.3.1.4 Quest

Description	This table unique paperid and question id of the user selected questions.

#.	Primary Key	Column Name	Data Type	Size	Nulls	Unique	Default	Check Constraint
1.		QuesID	CHAR	4	N			Foreign key Questions(QuesId)
2.		PaperId	CHAR	4	N			Foreign key paper(QuesPaperId)

3.8.3.1.5 Feedback

Description	This table unique paperid and question id of the user selected questions.
Identity Column	Serial_No

#.	Primary Key	Column Name	Data Type	Size	Nulls	Unique	Default	Check Constraint
1.	Y	Serial_No	INT		N			
2.		Feedback	Varchar	1500	N			

3.8.3.2 Stored Procedures

3.8.3.2.1 Dbo.uspAddUser

Referenced tables	Users
Input Parameters	EmailId, Password, FirstName, LastName
Output Parameters	NA
Return Values	1 – Success 0 - failure 0- exception
Description	This procedure is used to add the details of user in the system.
Procedures/Functions Invoked	Dbo.ChkEmailId

3.8.3.2.2 Dbo.resetPass

Referenced tables	Users
Input Parameters	EmailId, Previouspass, Password
Output Parameters	NA

Return Values	1– Success
	0 - failure
	0-exception
Description	This procedure is used to update the password in the system.
Procedures/Functions Invoked	NA

3.8.3.2.3   Dbo.SaveQuestions

Referenced tables	Users, Paper,Quest
Input Parameters	PaperId, result,userId
Output Parameters	NA
Return Values	1– Success
	0- failure
Description	Save user selected questions.
Procedures/Functions Invoked	NA

3.8.3.2.4   Dbo.DeleteQuestion

Referenced tables	Users,Paper,Quest
Input Parameters	PaperId, result,userId
Output Parameters	NA

Return Values	1– Success
	0- exception
Description	delete user selected questions.
Procedures/Functions Invoked	NA

3.8.3.2.5 Dbo.AddNewQuestion

Referenced tables	Questions
Input Parameters	Category, Ques, option1, option2, option3, option4, answer
Output Parameters	NA
Return Values	1 – Success
	-1 - category is null
	-2 - - Ques is null
	-3 - if question already exists
	-99 – Exception
Description	delete user selected questions.
Procedures/Functions Invoked	NA

3.8.3.3   Functions

3.8.3.3.1   Dbo.ChkEmailId

Referenced Tables	Users

Input Parameters	Email
Return Values	email
Description	This function validates the email and store it user table.

3.8.3.3.2 Dbo.ID

Referenced Tables	paper
Input Parameters	Id
Return Values	Id
Description	This function generates and stores the uespaperid in paper table.

3.8.3.3.3 Dbo.userID2

Referenced Tables	Users
Input Parameters	Id2
Return Values	Id2
Description	This function generates and stores the userid user table.

3.8.3.3.4 Dbo.quesID1

Referenced Tables	Questions
Input Parameters	Id1
Return Values	Id1
Description	This function generates and stores the QuesId in uestions table.

3.9 Optimization of algorithms and data access

The following techniques are used to optimize the database implementation:

Proper usage of index

All the tables are normalized not more than 3 NF.

3.10 Error Messages

Appropriate and consistent error messages should be given.

Declarative as well as structured error handling must be used.

Try catch blocks must be used wherever required.

Error message is displayed on the screen must be consistent with

respect to font position etc., across all the forms of the website.

3.11 Assumptions

In order to use the system, the user must register and sign in.

User must select the questions to download and preview.

For deletion from preview there must be 1 selected question.

User can also add questions if he/she wants specific questions of

their wants.

3.12 Images Of Working Project:

A)Registration:

i)Layout

Register

First Name   LastName

Email address

Password

Submit

Figure 3.9.1 Layout of Registration

ii)Registration with conditions(If Fields are left empty):

Register

First Name   LastName

Email address

Password

Submit

Figure 3.9.2 Unsuccessful Registration

iii)If all conditions are satisfied:
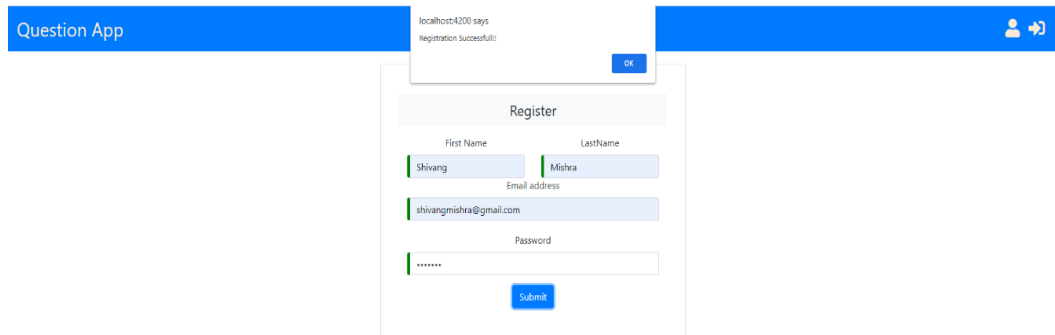
Figure 3.9.3 Successful Registration

B)Login:

i)Layout:
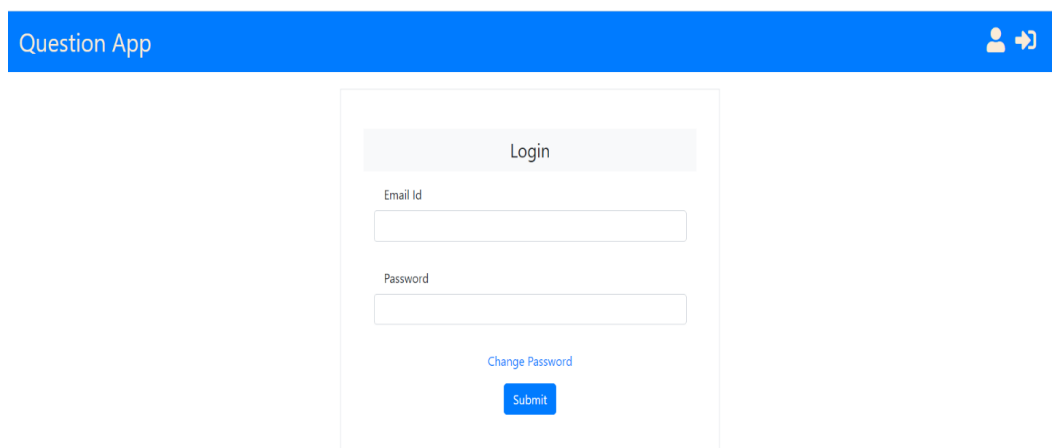
Figure 3.9.4 Layout of Login

ii)When conditions are not satisfied:
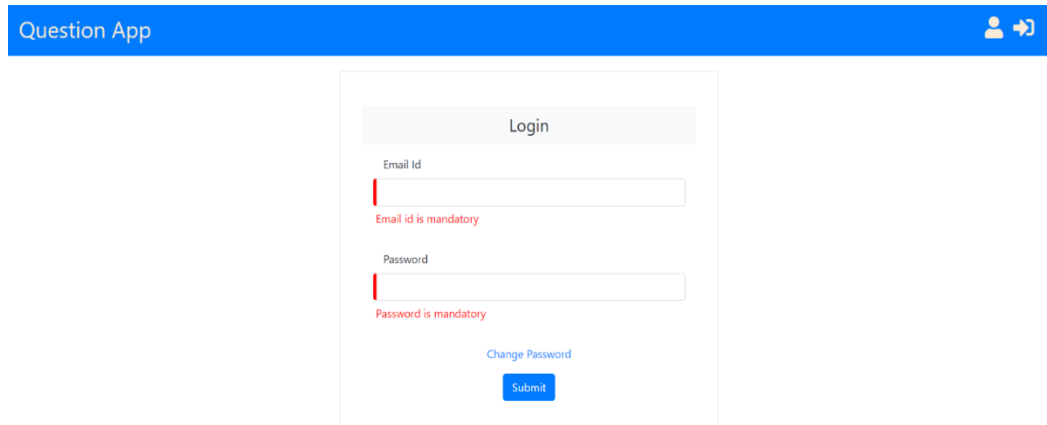
Figure 3.9.5 Unsuccessful Login

iii)When conditions are satisfied:
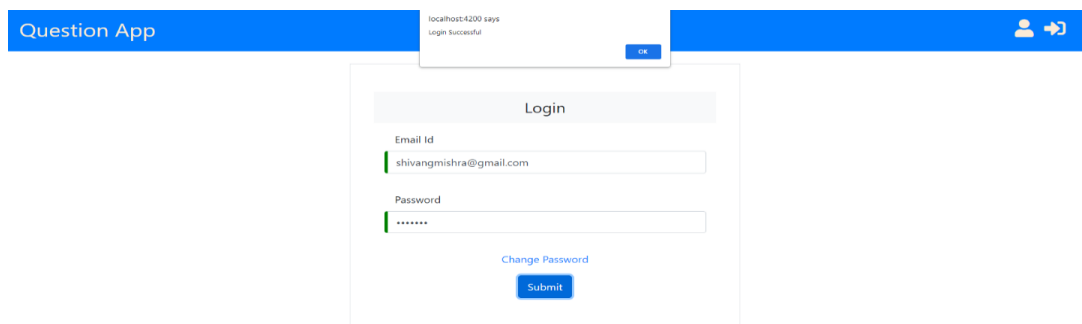
Figure 3.9.6 Successful Login

C)Change Password:

i)Layout:
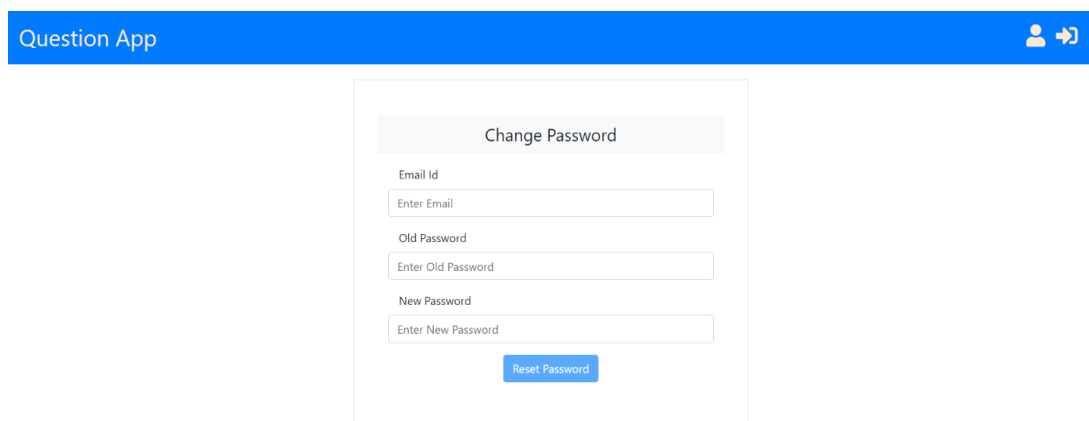
Figure 3.9.7 Layout Of Change Password

ii)When change password is successful:
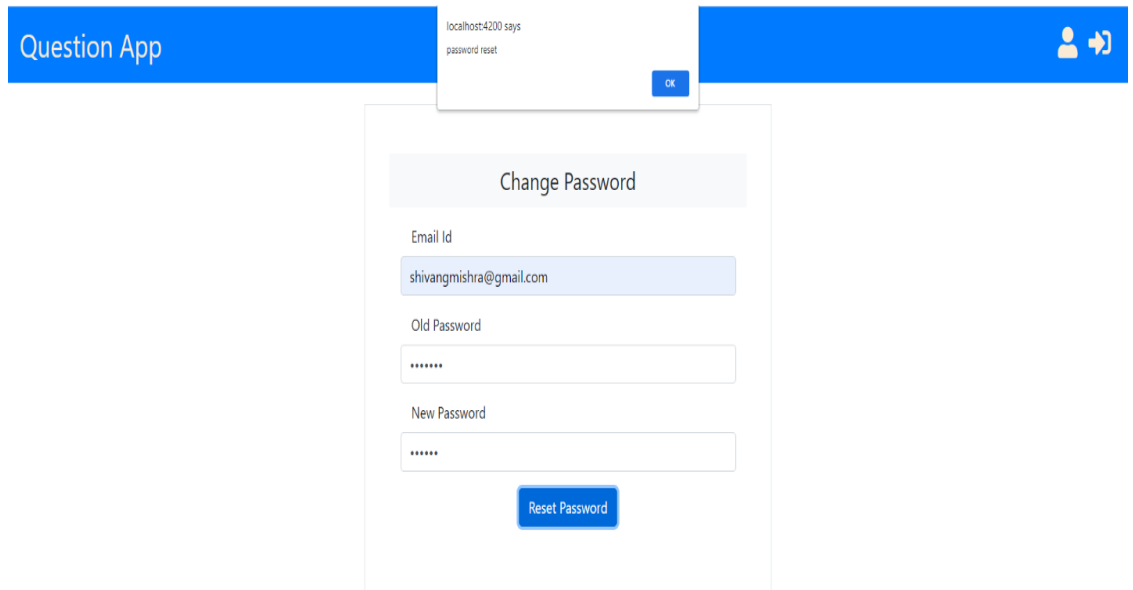
Figure 3.9.8 Successful Password Changed

D)Add/Modify question:

i)Layout:

Figure 3.9.9 Layout of Add/Modify Question

ii)When Addition/modification of question is successful:

Figure 3.9.10 Successful Addition/Modification of question

E) View Questions:

i)Layout:

Figure 3.9.11 View Question Layout

F)Search Question:

i)Searching for string category:

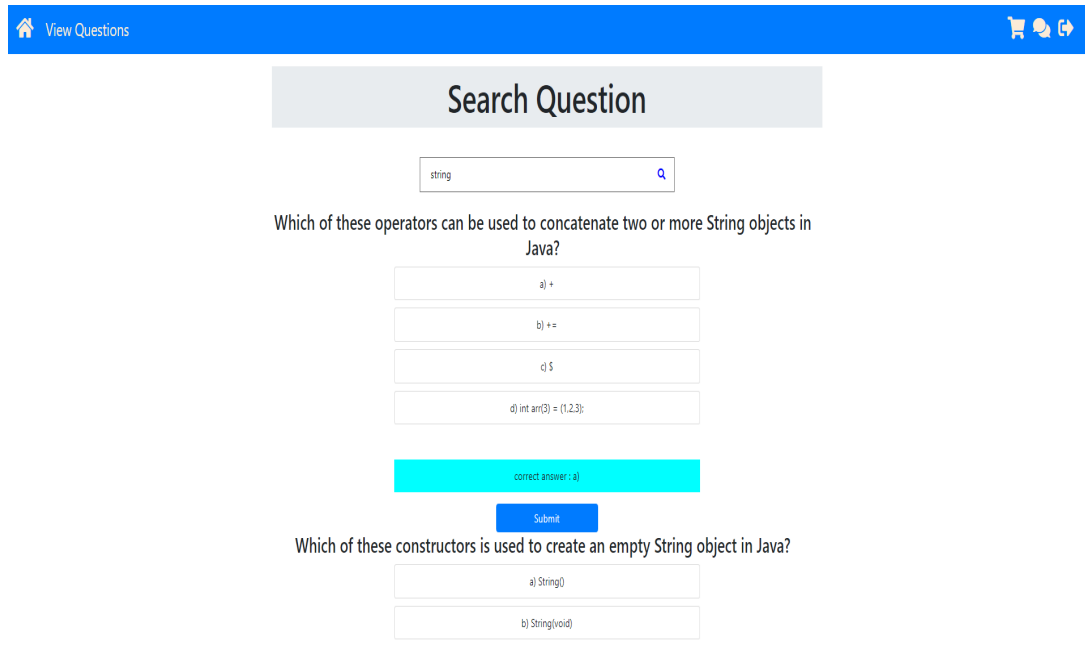All the questions in string category will show up.

Figure 3.9.12 Search Question

G) Adding question to preview:

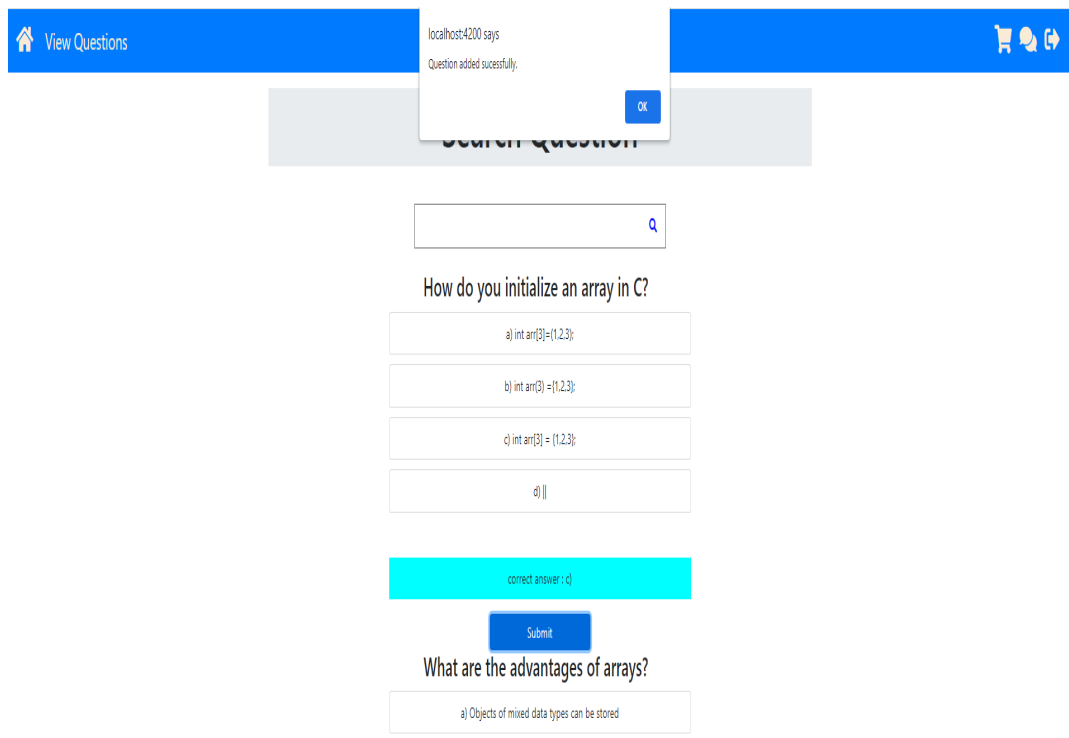i) When question is not added to preview it will not give any error:

Figure 3.9.13 Question added to preview

ii)When question is already added to preview it will give question already added:
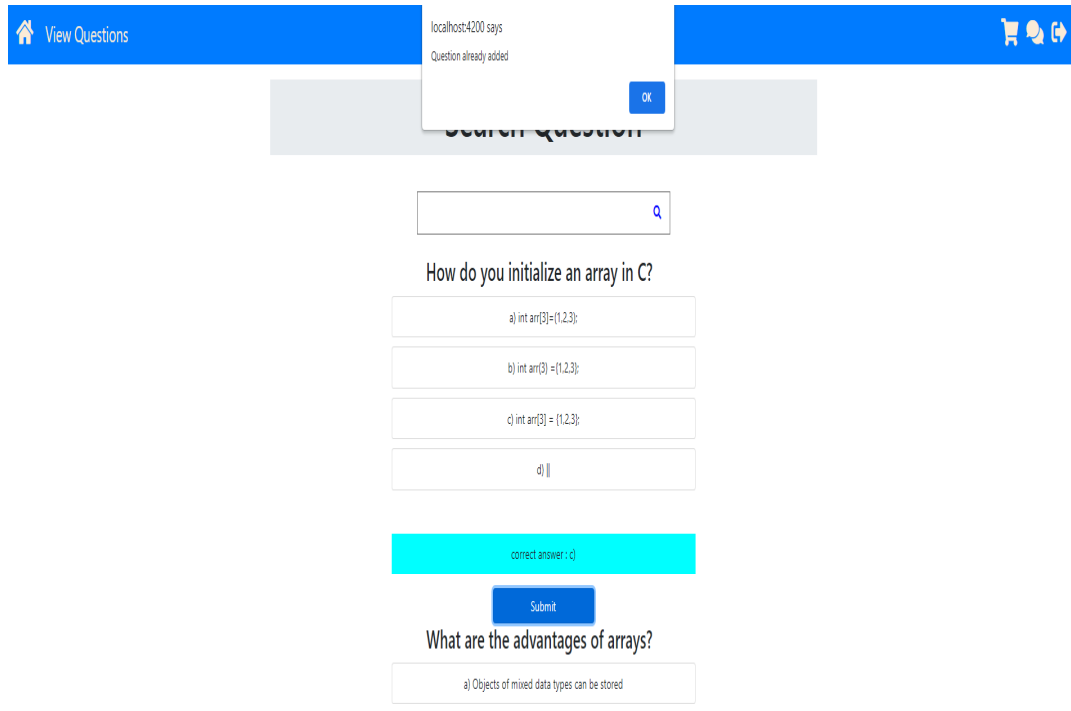
localhost:4200 says

Question already added

OK

Search Question

How do you initialize an array in C?

a) int arr[3]=(1,2,3);

b) int arr(3) =(1,2,3);

c) int arr[3] = {1,2,3};

d) ||

correct answer : c)

Submit

What are the advantages of arrays?

a) Objects of mixed data types can be stored

Figure 3.9.14 Question already exists in preview

H) Preview Questions:

i) Layout:

How do you initialize an array in C?

a) int arr[3]=(1,2,3);

b) int arr(3) =(1,2,3);

c) int arr[3] = {1,2,3};

d) ||

Delete
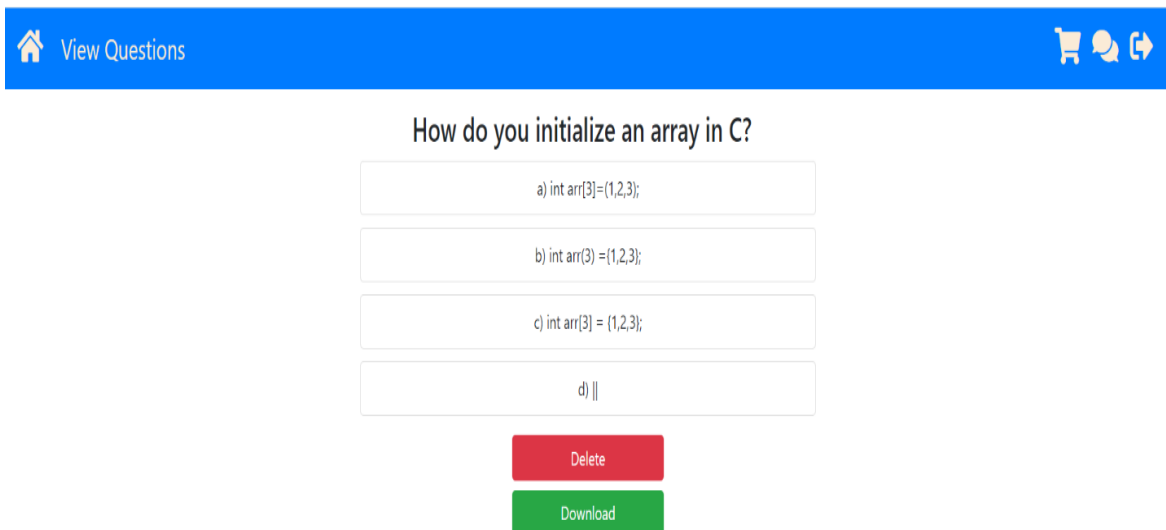
Download

I) Delete Question from the preview
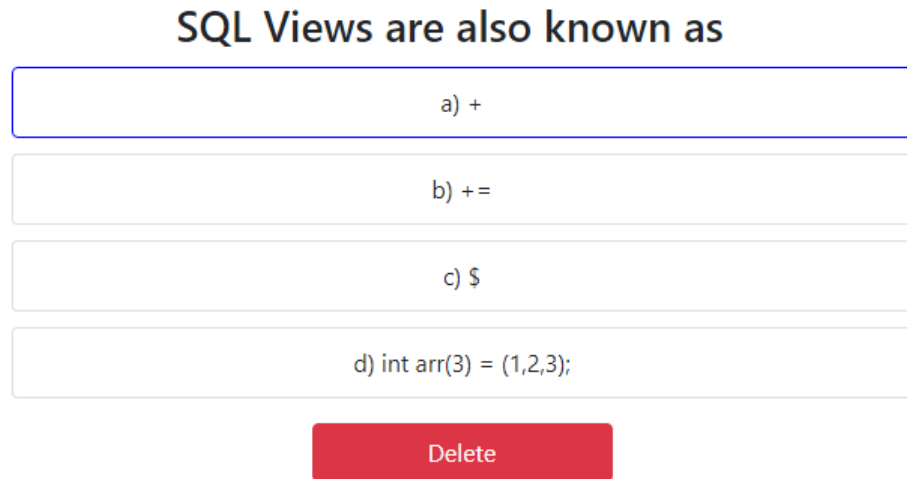
i) If the user has added question to preview.

Figure 3.9.16 Question that is going to be deleted
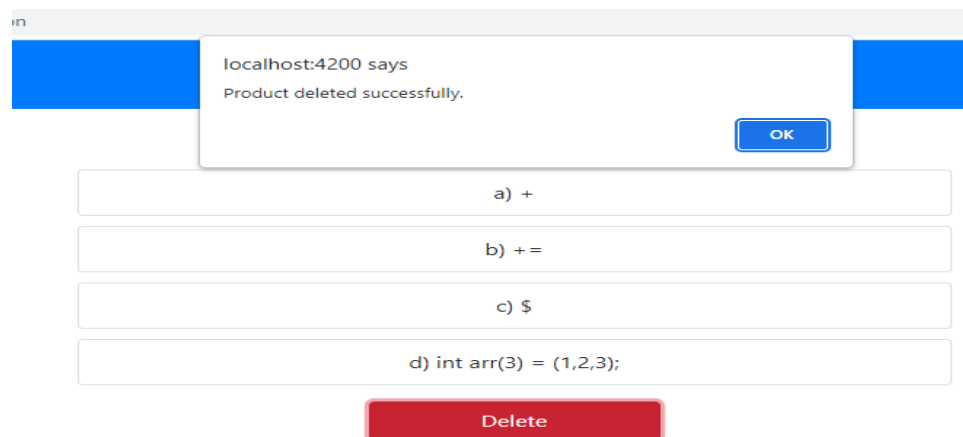
Figure 3.9.17 Question deleted successfully

ii) If the user has nothing to preview thus nothing to delete.
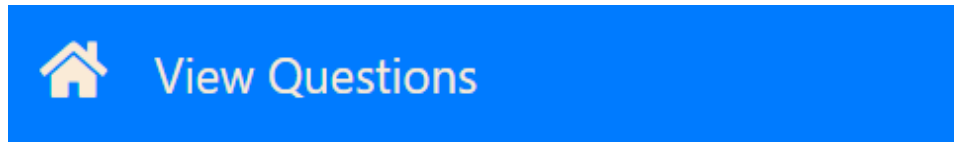
nothing to Preview!

Figure 3.9.18 Nothing to Preview

J)Download Questions from Preview

i)   If the user has added some questions to preview.

Which is the subset of sql commands,used to manipulate oracle database structures,including tables

a) strinit()

b) strnset()

c) strset()

d) strcset()

Delete

Download

Figure 3.9.19 Question to be downloaded

c) strset()

d) strcset()

Delete

question (2).pdf   ∧

Figure 3.9.20 Question Downloaded

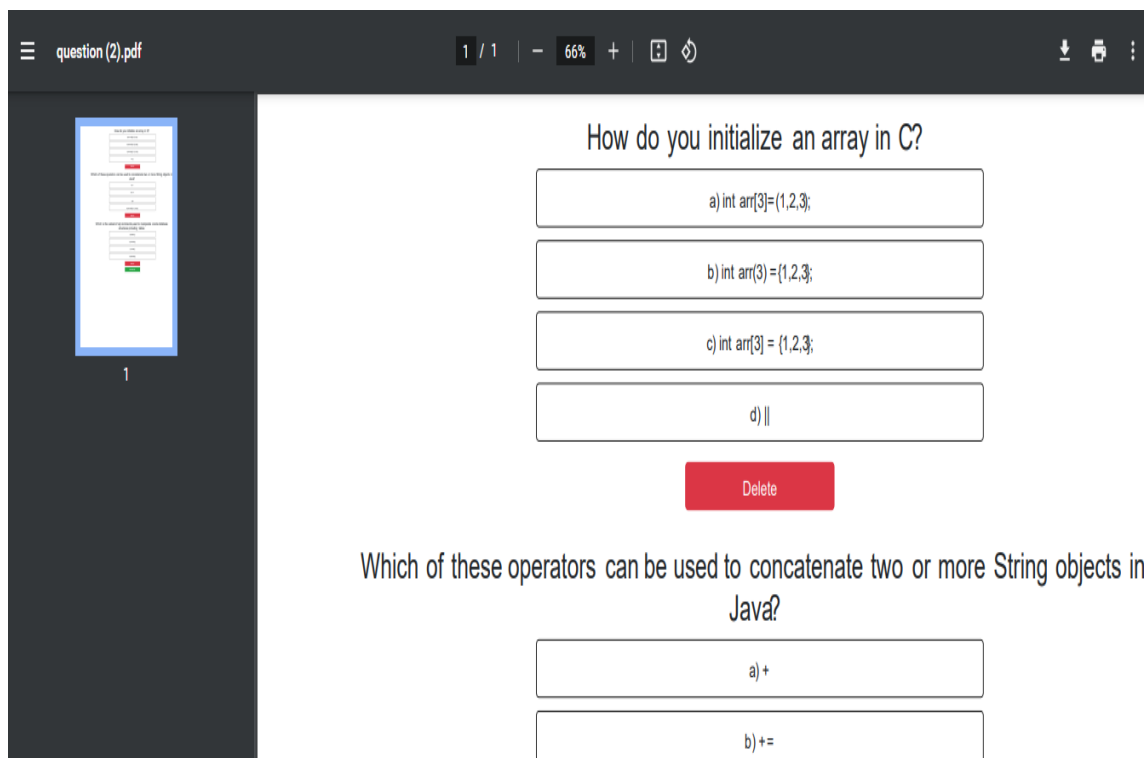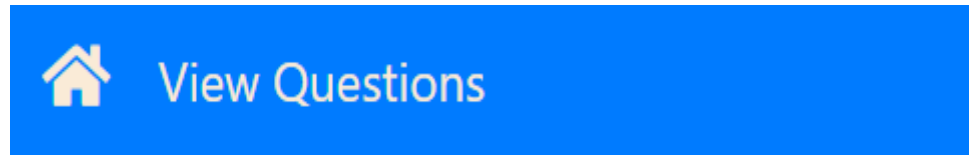*Figure 3.9.21 Question Download*

ii) If the user has nothing to preview thus nothing to download.

Figure 3.9.22 Nothing to download

K) Feedback:

i)Layout:
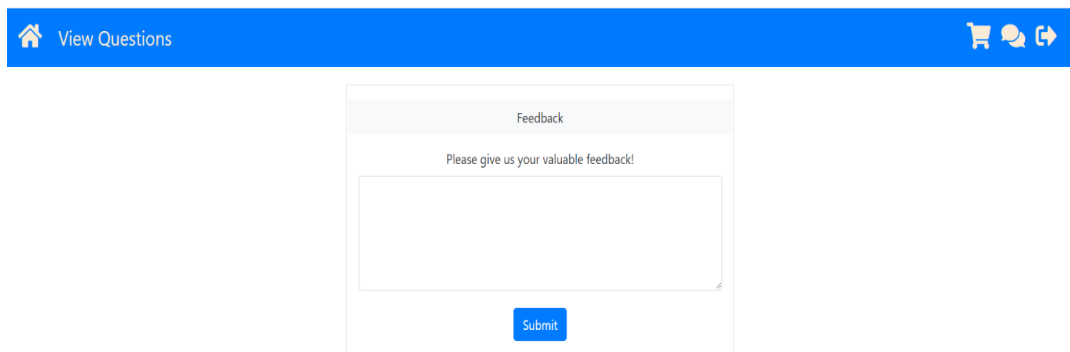
Figure 3.9.23 Layout Of Feedback

ii)Feedback is empty:
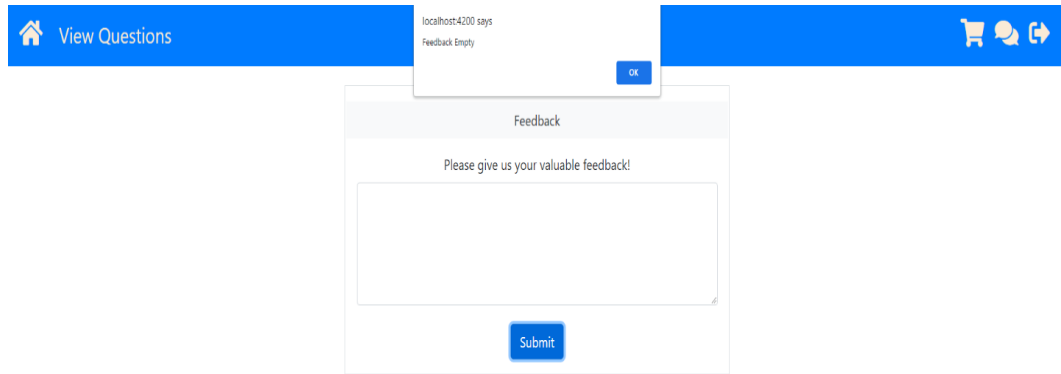
Figure 3.9.24 Unsuccessful Feedback

iii)Feedback successful:
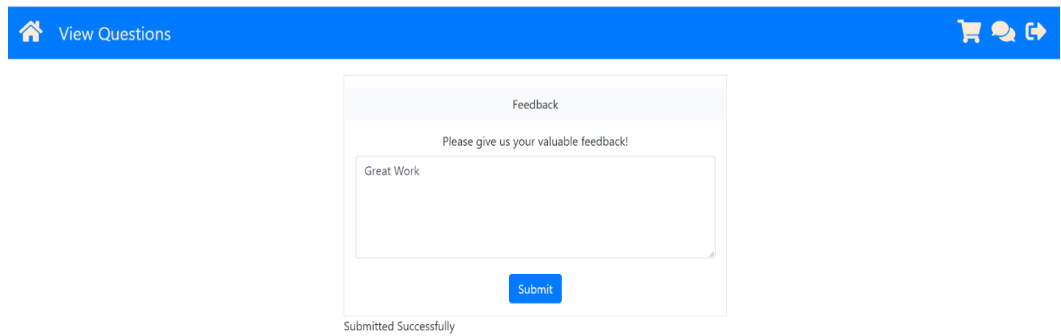
Figure 3.9.25 Successful Feedback

3.10 Test Cases for Project

Sl: No:	Test Case Name	Test Procedure	Condition to be tested	Expected Result
1.	User registration	Correct email and password provided	Email should be Unique and should have @ and .com in it and Password should have a minimum length 3	pass
a)	Email:Akhil18@gmail.com Password: abc	Email id and password correct	Email id and Password satisfy the given Condition	pass
b)	Email:shivang06@ymail.com Password: ab	Email id is correct and password is incorrect	Email satisfy the validation but password does not meet minimum length criteria.	Fail
c)	Email: Mayank009 Password: abc@12	Email id or password is incorrect	Email does not satisfy the criteria	Fail
d)	Email:Akhil18@gmail.com Password: abc	Email id is not unique	Email does not satisfy the criteria cause it is not unique	Fail

Figure 3.10.1 User Registration

S. No:	Test Case Name	Test Procedure	Condition to be tested	Expected Result
2.	User login	User id logged in correctly , password correct	Email and Password should match User Table in Database	fail
a)	Email:Akhil18@gmail.com Password: abc	Email id and password correct	Email and Password is correct	pass
b)	Email:shivang06@ymail.com Password: abc@12	Email id and password correct	Email and Password should match User Table in Database	pass
c)	Email: Mayank009 Password: abc@12	Email id or password is incorrect	Email and Password should match User Table in Database	Fail
d)	Email: one21@gmail.com Password:1'1='1	Email id or password is incorrect	Email and Password s should match User Table in Database	Fail

Figure 3.10.2 User login

Sl: No:	Test Case Name	Test Procedure	Condition to be tested	Expected Result
3.	Password Reset	User id logged in correctly , password correct	User should remember his/her Email id and Password and the New Password should have Minimum Length of 3	
a)	Email: Akhil18@gmail.com Old Password: akhil8 New Password: OneAk	Password Reset Successful	New Password must not be same as old password and shall not start with any number	pass
b)	Email: shivang06@ymail.com Old Password:Hunt New Password:Hunt	Password not reset	New Password must not be same as old password and shall not start with any number	fail
c)	Email: Mayank009@gmail.com Old Password:abc@ New Password:abc@123	Password Reset Successful	New Password must not be same as old password and shall not start with any number	pass
d)	Email: one21@gmail.com Old Password:one21 New Password: 1'1='1	Password not Reset	New Password must not be same as old password and shall not start with any number	fail

Figure 3.10.3 Password Reset

Sr; No:	Test Case Name	Test Procedure	Condition to be tested	Expected Result
4.	User Logout	User id logged in correctly , password correct	User must be logged in	fail
a)	Email:Akhil18@gmail.com Password: abc	User is logged in	User must be logged in	pass
b)	Email:shivang06@ymail.com Password: abc@12	User is not logged in	User must be logged in	fail

Figure 3.10.4 User Logout

Sr: No:	Test Case Name	Test Procedure	Condition to be tested	Expected Result
5.	Search Question	User id logged in correctly , password correct	Login test	Fail
a)	Keyword:: list	No category named list found	User must be login, Must be of a particular category	Fail
b)	Keyword: string	Category with the name string found	User must be login, Must be of a particular category	Pass

Figure 3.10.5 Search Question

Sl: No:	Test Case Name	Test Procedure	Condition to be tested	Expected Result
6	User Feedback	User id logged in correctly , password incorrect	Must be login, minimum length 8 characters, Maximum length 100	
a)	Great	Minimum length must be 8	Must be login, minimum length 8 characters, Maximum length 100	Fail
b)	Example: Phone is not up to the mark, Display is very dull	Feedback successful	Must be login, minimum length 8 characters, Maximum length 100	Pass

Figure 3.10.6 User Feedback

S No:	Test Case Name	Test Procedure	Condition to be tested	Expected Result
7	Save Questions	User id logged in correctly , password correct	Must be login, must click on submit, Same question must not be repeated	Fail
a)	Clicking on submit question for adding new question	Question added successfully	Must be login, must click on submit, Same question must not be repeated	pass
b)	Clicking on submit question for already added question	Question not added	Must be login, must click on submit, Same question must not be repeated	Fail

Figure 3.10.7 Save Question

S: No:	Test Case Name	Test Procedure	Condition to be tested	Expected Result
8	Preview Saved Questions	User id logged in correctly , password correct	Question must be saved	Fail
a)	User is logged in and question is saved/added	Will be able to preview saved question	User must be logged in and question must be saved	
b)	User not logged in	Will not be able to use preview saved question	User must be logged in and question must be saved	Fail
c)	User is logged in but nothing is added to preview saved question	Nothing to preview	User must be logged in and question must be saved	Fail

Figure 3.10.8 Preview Saved Questions

S No:	Test Case Name	Test Procedure	Condition to be tested	Expected Result
9	Delete Saved Questions	User id logged in correctly , password correct	User must be logged in and questions should be saved	
a)	User not logged in	Will not be able to use delete saved questions	User must be logged in and questions should be saved	Fail
b)	User is logged in but no question is added in preview question	Will not be able to use delete saved questions	User must be logged in and questions should be saved	Fail
c)	User is logged in and question is added in preview question	Will be able to delete saved question	User must be logged in and questions should be saved	Pass

Figure 3.10.9 Delete Saved Questions

CHAPTER 04

Operational Management

4.1 Performance Engineering

The system is expected to service the request of 200 users concurrently. Angular has been used to improve the user experience and performance.

4.2 Exception Handling

The exception handling of Question Generator is made robust. Exceptions are identified based on the captured requirements. Exception handling is used in every method of used classes.

4.3 Security Mechanism

Users must be logged in and authorized before they can access the

main features of application.

4.4 State and Session Management

Depending on the user email the preview of the selected questions is done.

4.5 Data Access Mechanism

The data is accessed from the database according to the requirement. If any record is required from the database, then the connection to the database is created at the time of the request and the required details are fetched. The connection string is stored in the configuration file for ease of maintenance.

4.6 Database Management

4.6.1 Data Model

Microsoft SQL Server uses the relational database management system all the connections to the database are made by the data access classes.

4.7 Non-Functional Requirement

4.7.1 Security

As the proposed system has different uses and each user performs the role specific functionalities, it should have high security and the same is implemented using Role Based Access Control (RBAC).

4.7.2 Availability

The system, being an online one, will be available around the clock.

4.7.3 Scalability

This application can handle the request from 200 users at a time without any performance degradation.

CHAPTER 5

CONCLUSION

5.1 Conclusion

I had completed my internship with the Infosys and I have learned so much from this internship offered by the internship, really helped me in shaping my personality and equipping me with the knowledge of these technologies. My implemented capstone project code remains with Infosys due to Non-Disclosure Agreement. I like to thanks my company mentor, Mrs. Rohini, senior educator at Infosys who guided me through the whole journey of my capstone project in Infosys and solved all my doubts during the internship. I would also like to thank my university Dr. Surjeet Singh who really helped me in solving my queries regarding this internship/project report.

I like thank you my TNP officer Mr. Pankaj Kumar for his support and hard work during the whole placement process because I know how complex is the management of the placement drive.

5.2 Future Scope of Capstone Project

We worked with different technologies that were new to me in this 'Question Generator Application' but there are many scopes in which project can improved. Following are the scope in which it can we improved:

i)   We will try to develop the project in such a way that if a user submits a pdf, then the application can fetch the question and add those question in the pdf to its question bank.

ii)   A user can edit/modify the question in the preview itself rather than adding a new question.

iii)   Make the UI more user friendly.

REFRENCE

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