Onnoy the queue management system

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This Report Presented in Partial Fulfillment of the Requirements for the Degree of Bachelor of Science in Computer Science and Engineering

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DHAKA, BANGLADESH

JANUARY 2022

APPROVAL

This Project titled **"Onnoy the queue management system"**, submitted by Md. Raiyan Hossain, ID No: 173-15-10258 and Md. Towhidul Islam, ID No: 173-15-10276 to the Department of Computer Science and Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on January 04, 2022.

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We hereby declare that this project has been done by us under the supervision of **Md. Azizul Hakim, Senior Lecturer, Department of CSE,** Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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ACKNOWLEDGEMENT

First we express our heartiest thanks and gratefulness to almighty God for His divine blessing makes us possible to complete the final year project/internship successfully.

We really grateful and wish our profound our indebtedness to **Md. Azizul Hakim**, **Senior Lecturer**, Department of CSE Daffodil International University, Dhaka. Deep Knowledge & keen interest of our supervisor in the field of *development* to carry out this project. His endless patience ,scholarly guidance ,continual encouragement , constant and energetic supervision, constructive criticism , valuable advice ,reading many inferior draft and correcting them at all stage have made it possible to complete this project.

We would like to express our heartiest gratitude to **Prof. Dr. Touhid Bhuiyan, Head, Department of CSE,** Daffodil International University, for his kind help to finish our project and our co-supervisor **Md. Jueal Mia, Senior Lecturer**, Department of CSE, Daffodil International University and also to other faculty member and the staff of CSE department of Daffodil International University.

We would like to thank our entire course mate in Daffodil International University, who took part in this discuss while completing the course work.

Finally, we must acknowledge with due respect the constant support and patients of our parents.

ABSTRACT

'Onnoy the queue management system' is one of the best queue management web application right now available in web area. During the last 2 years people are suffered by pandemic, the Novel Corona virus and it kills more then 5 million people all over the world. To keep people safe, we have to maintain social distance. To achieve the goal for maintain social distance, we need a good queue management system where people gather for getting necessary service like in the hospital or in the bank. 'Onnoy' the web application will help to manage queue for maintain social distance and safe people, especially in densely populated country like Bangladesh. In 'Onnoy' an user who logged in our system can create a queue which have a unique id to join the queue, and he can add counter or desk manager for that particular queue and also can give notice for that particular queue. Desk manager can add people and counter manager can call people to get service. General people can see how many people are waiting for service and if he/she call for service then they can see themself in - 'In Service' list. If any kind of user of 'Onnoy' are getting trouble to use our service then they can give us feed back and also suggest us to make 'Onnoy' really helpful for the people and safe the people.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

“Onnoy the queue management system” is a free platform where people can wait a virtual queue. Using “Onnoy the queue management system” web, we can create a virtual queue and the customers or visitors can view the token calling progress from anywhere through the internet and view the whole queue, and see when their token is called. The authorities have to simply share the virtual queue code with the customers then everyone can view the queue. It has an amazing user interface which is easy to use for everyone. One of the best features of “Onnoy the queue management system” is that it is a single-page application so that it is faster and does not need to reload when they visit different sections.

1.2 Motivation

In our daily lives, we often have to wait in a queue of people to receive a service in a hospital, bank, or a customer service point, etc. It is very annoying to us waiting in a line of people and also dangerous for the COVID-19 pandemic situation. On the other hand, many organizations have built their own token calling system which is costly too and those are not cloud-based, so no other organization can do it.

So we want to develop the “Onnoy the queue management system” platform to overcome those problems. Here everyone can do some service at the same time. Using the “Onnoy the queue management system” platform for both customers and authority will be beneficial.

1.3 Objective

The world is suffering from COVID-19, so we need to maintain social distance. Spatially, people when going to crowded places like – hospitals, banks, Railway ticket booking queues, etc. they need to maintain social distance to protect themselves from COVID-19. On that note, we feel we need a well-organized queue system to keep us free from the COVID and also maintain our queue without any hassle. Different organizations build their own queue system for them which is costly too. So we are creating "Onnoy the queue management system" to give them a free queue management system so that people can get a great service in the COVID-19 situation.

1.4 Expected Outcome

- Reduce of risk of people gathering
- Save the cost of building the same service for each organization
- Faster token distribution
- Customer satisfaction

CHAPTER 2

PROJECT MODEL AND SPECIFICATIONS

2.1 Introduction

In this section, we will try to elaborate on the proposed model by including chart and description. What type of model should we choose to adequately define our idea and how will it be user-friendly. When a model is chosen, it will require specific features to work on.

2.2 BPM (Business Process Model)

Business Process Modeling Notation (BPMN) is a flow chart method that models the steps of a planned business process from end to end[1]. In business process management and system engineering, business process modeling (BPM) is the activity of modeling business processes so that they can be studied, modified, and automated. Increasing process speed or reducing cycle time, improving quality, or lowering expresses, such as labor, materials, scap, or capital costs are all common corporate goals. In fact, the necessity of specific requirements for an information technology project often motivates management to invest in business processes modeling.

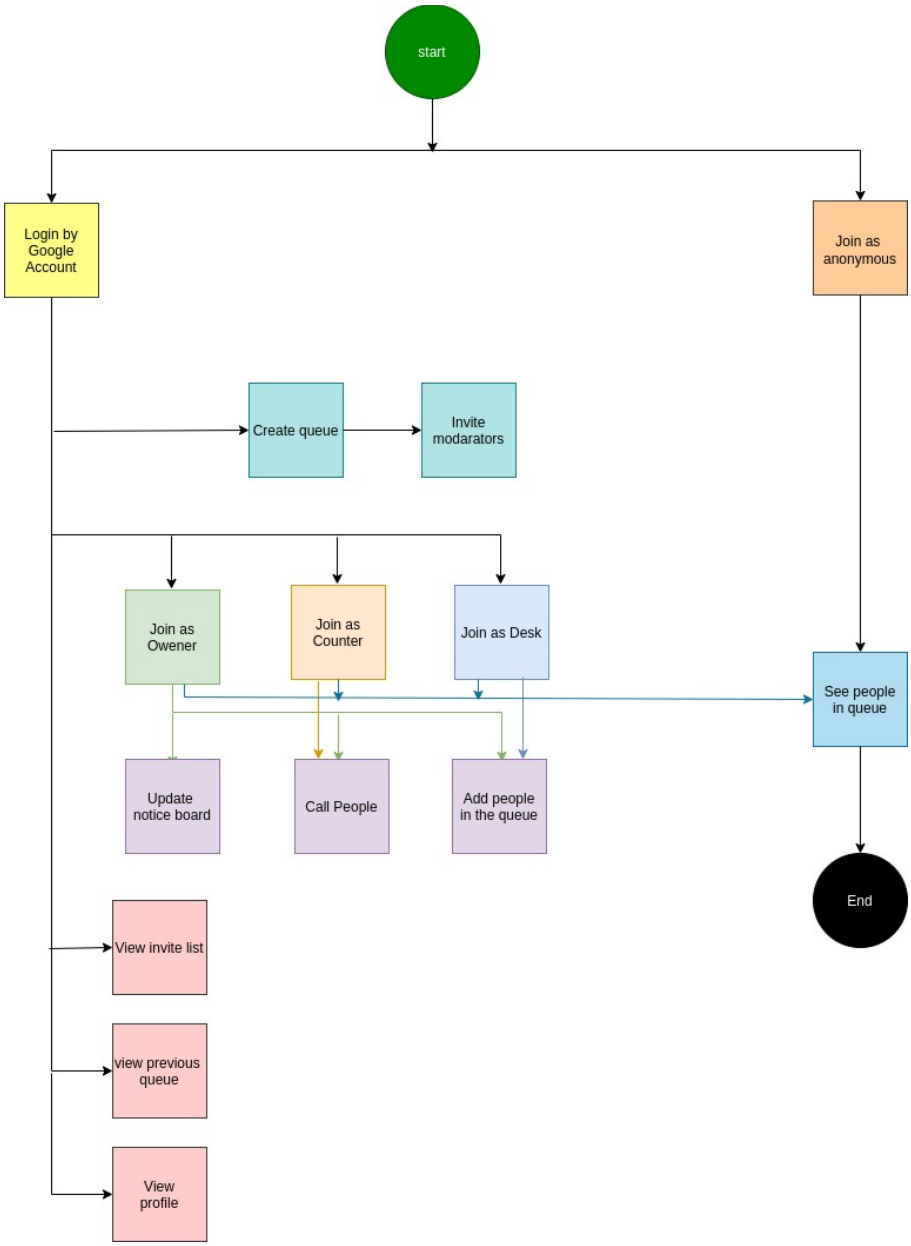

Figure 2.1: Business Process Model

2.3 ER Diagram

An Entity–relationship model (ER model) describes the structure of a database with the help of a diagram, which is known as Entity Relationship Diagram (ER Diagram)[2]. In our model, users can create queue. Users has name, email, photo, previous list, invite list.

Queue has a queue id and every queue id has tittle, time, owner, notice, last serial no, invite list, counter list, desk list, service list and waiting list.

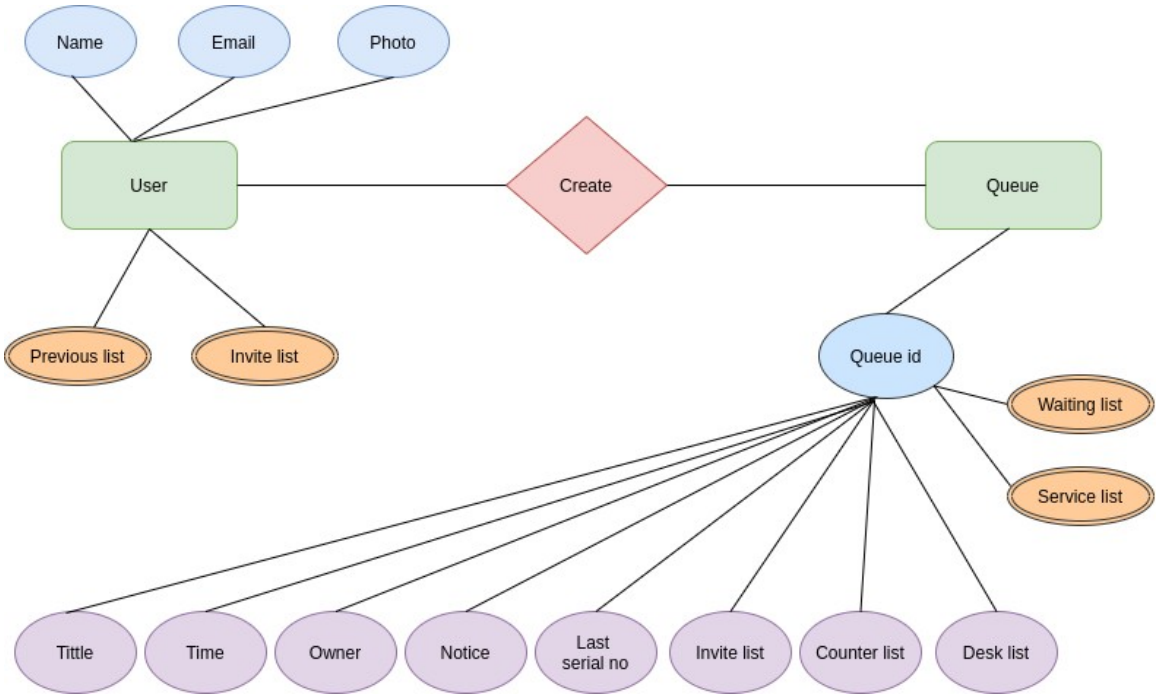

Figure 2.2: ER diagram

2.4 Requirements and Specifications

A System Requirements Specification (SRS) (also known as a Software Requirements Specification) is a document or set of documentation that describes the features and behavior of a system or software application[3]. Before developing any software, we have to determine the requirements. This will reduce costs and risk in the long run.

2.4.1 Hardware Requirements

For building this project, we need some basic components such as:

- A personal computer or laptop.
- A stable internet connection.

2.4.2 Technical Requirements

For building this project we have used different types of programming languages and frameworks to make our application more user-friendly.

Frontend: HTML5, CSS3, Javascript ES6, Javascript DOM, Bootstrap.

Backend: Javascript, Node.js, Express framework.

Database: Firebase real-time database.

Server: Linux

Operating System: Ubuntu

2.4.2.1 HTML5

HTML is the standard markup language for Web pages[4]. It has some tags and by that we can markup our information on the website as we want to, but by HTML we can't beautify or can't give style our information in such a way to attract visitors to our website. It helps browsers like Firefox, Chrome, Internet Explorer etc. to render our information and help search engines to find information from billions of websites by its tag. It is the building block of any webpage. Nowadays, developers say HTML is outdated and they use other templating languages to build websites but actually they are not languages, they just use HTML more efficiently.

2.4.2.2 CSS3

CSS is the language we can use to style an HTML document. CSS describes how HTML elements should be displayed[5]. CSS is nothing without HTML, because it works on the HTML tags and it can change basic behaviour of HTML tags, gives color, font formatting, background of tags. It is used for formatting our website such that our website becomes eye-catching and user friendly and easy to navigate all the features in the website. It is also used for creating complex effects like animation or svg images. One of the best features of CSS is media query which helps us to show our content according to our devices screen size.

2.4.2.3 Javascript

JavaScript is not a class-based object-oriented language. But it still has ways of using object oriented programming [6]. It's syntax is very easy that's why many beginners learn JavaScript as their first programming language.

2.4.2.4 Document Object Model (DOM)

With the HTML DOM, JavaScript can access and change all the elements of an HTML document[7]. It is basically used to change or remove HTML tags by the javascript files. By using DOM we also can add new elements or insert elements into the page. We also can change the attributes value, set dynamic href into the page by DOM. Sometimes developers use DOM to style HTML according to conditions to give a clear view to their website's visitors. We can attach events like click, keypress, submit and set actions according to the events and give the functionality to our website.

2.4.2.5 Bootstrap

Bootstrap, the world's most popular front-end open-source toolkit, featuring Sass variables and mixins, a responsive grid system, extensive prebuilt components, and powerful JavaScript plugins[8]. It has some predefined class to style any content. But the Bootstrap Grid system makes bootstrap so much popular in the developer community because It has the ability to make any website responsive by just calling a class on the HTML property. They have other useful components like Card, Carousel, Modal, etc. We use their component and grid system to make our website responsive for all sizes of device screens. Also, they use a nice tone of color which is very comfortable for human eyes.

2.4.2.6 Node.js

Node.js is an open-source and cross-platform JavaScript runtime environment. It is a popular tool for almost any kind of project.[9]

2.4.2.7 Express framework

Express is the most popular Node web framework and is the underlying library for a number of other popular Node web frameworks[10]

To be able to use Express JS, we must first grab JavaScript and HTML. Web applications are easier to manage with Express JS. It is a component of MEAN of the software stack, a JavaScript-based Technology.

2.4.2.8 Firebase real-time database

The Firebase Realtime Database is a cloud-hosted NoSQL database that lets us store and sync data between our users in real time[11]. Using this database one of the best advantages is we do not have to reload the page. Firebase will automatically trigger the changes when anything is changed in the database. Another reason behind using it is because this is completely free. We do not have to worry about buying hosting.

2.5 USE-CASE Diagram

A use case diagram is a dynamic or behavior diagram in UML. Use case diagrams to model the functionality of a system using actors and use cases.[12] In our proposed system, there are four actors. At first, the owner login with his google account and then creates a virtual queue. He can invite others as counter or desk and he can also publish notice. The counters and desks also log in with a google account and accept or decline the invitations. The desks can add people to the queue and the counters can call people to their own counter. Normal people join the queue without any login so they join anonymously. They can view themselves and other people in the queue.

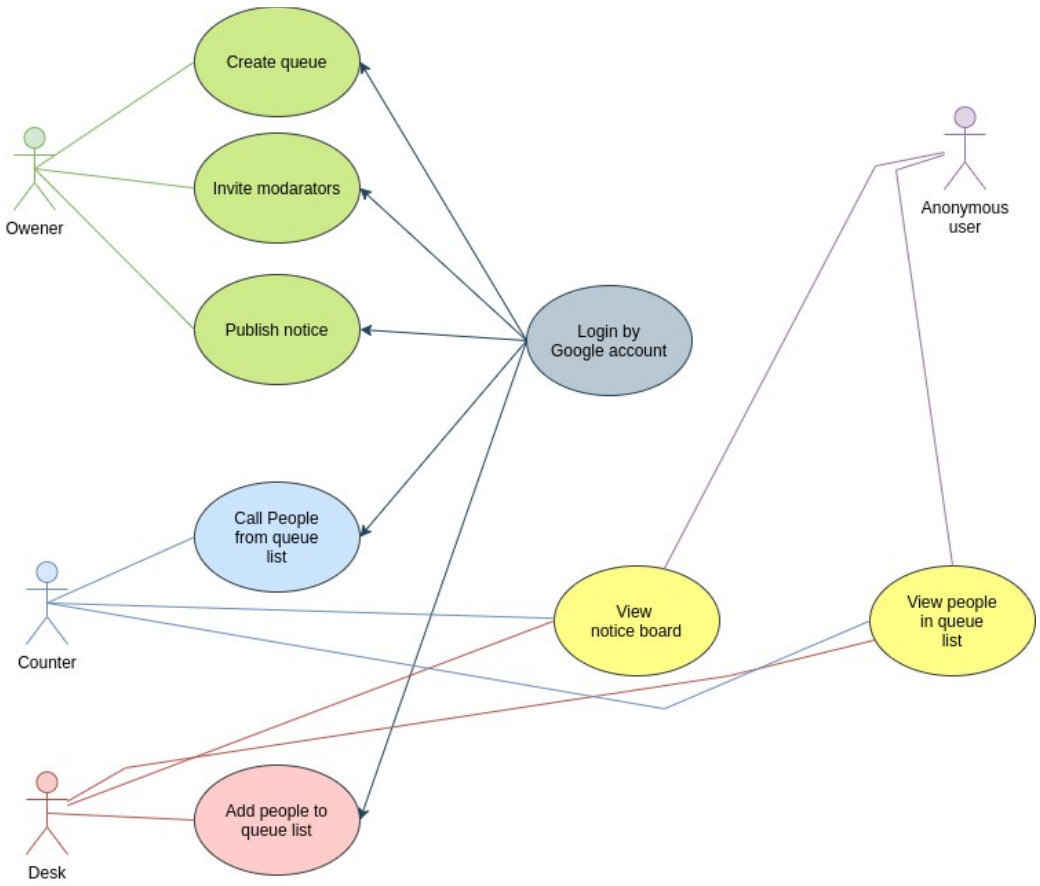

Figure 2.3: Use-Case diagram

CHAPTER 3

FEATURES & DESIGN

3.1 Introduction

In this section, we will demonstrate all the features of our project and how the user interface looks, and also how a user uses all the features of our website.

3.2 Front-End Design

The user interface is a crucial component of every website. Depending on the user interface and how friendly it use for a user, how successful will be the website. So that We give the highest attention to building the most user-friendly interface we can. We design very simple, easy-to-find all features and a well-defined interface for our users that they can get all features with just a finger tap. On the way to building the website, it was not so easy to create such an interface that is very simple for our users. Also, we use natural and flat eye-catching colors for our website. Following this segment, now we discuss all the tabs we have on our website.

3.2.1 Home

On our Home page, there are two sections on top. At the left side of the top, we can see the navigation bar. On the left side of the navigation bar, have a hamburger menu icon to open the side-drawer, and just behind the hamburger menu we see our website title ‘Onnoy’.

Figure 3.1: Hamburger menu and title of the ‘Onnoy’

On the right side of the navigation bar, we see the date and authentication button.

Figure 3.2: Time and Authentication Button

We can see a welcome message and ‘Create’ and ‘Join’ button on the bottom of the navigation bar on our home page.

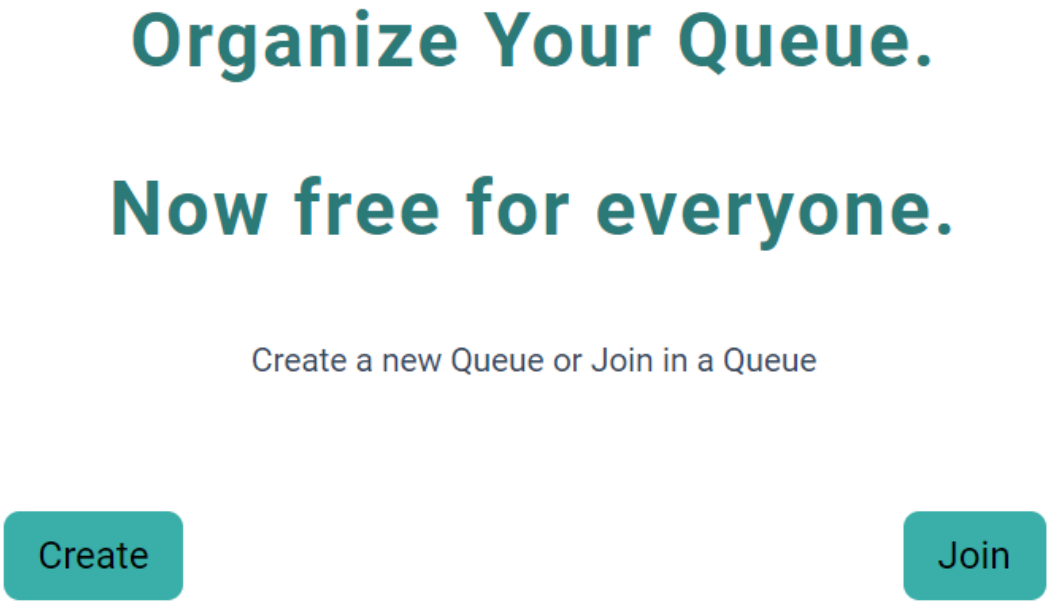

Figure 3.3: Main area of Home Page

3.2.1.1 Side-Drawer

By clicking on the hamburger menu button our side-drawer will open and we can see all the options we have on our website. here we can get Home, Profile, Create, Join, Previous, Invitation, Report and About section to go. Behind the hamburger menu icon, we can see the title of the website - '**Onnoy**'.

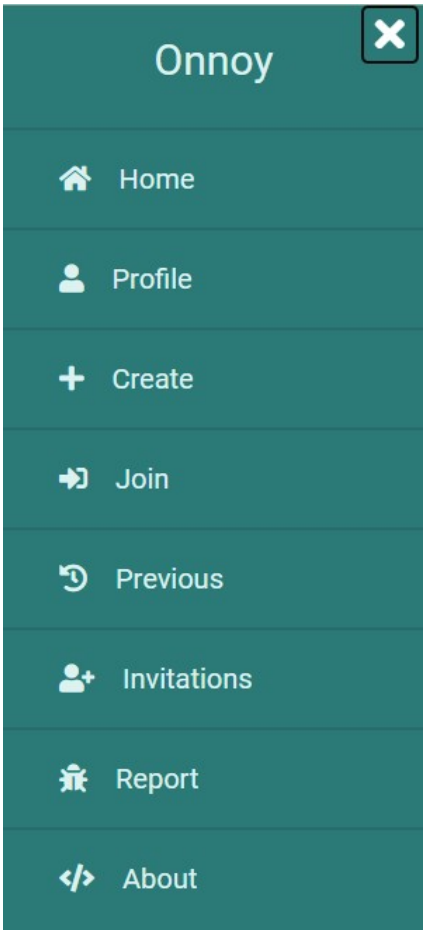

Figure 3.4: Onnoy's navigation menu

On the top of the side-drawer we have a 'X' button to close the side-drawer. Also we can close that side-drawer by clicking on anywhere outside the side-drawer.

3.2.1.2 Date & Authentication

On the right side of our navigation bar we see the first date, where we can see today's date. On the right of the date we can see the Authentication option. If we do not log in then we can see a button named 'Sign In'. On clicking on 'Sign In' button a popup window will come and we can sign in by google account. If you are logged in by multiple Google accounts on your machine then you can select your preferred account to create or join a queue.

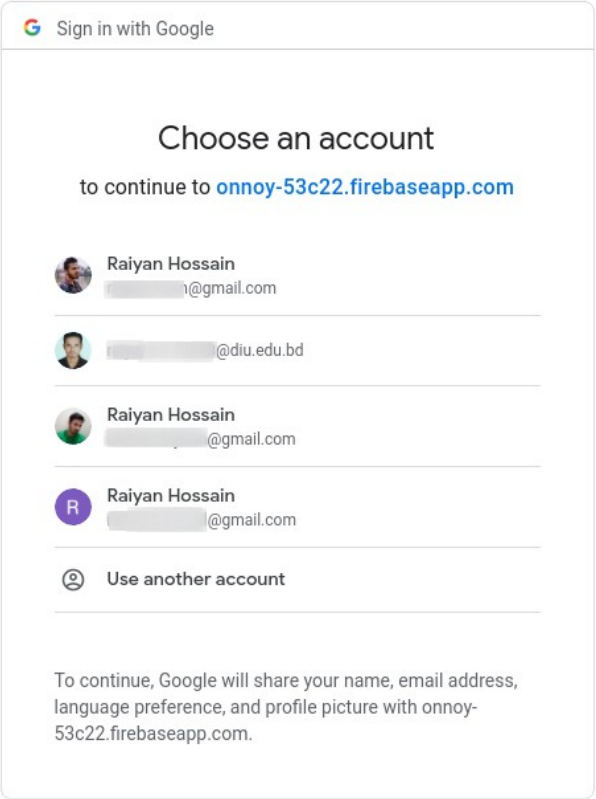

Figure 3.5: Google Sign In PopUp Modal

3.2.2 Profile

You can come and see your profile from the navigation side-drawer by clicking on the 'Profile' button. On the profile tab you can see your profile. You can see the image of your google account, your name, your email and how much queue you have in your account on our website.

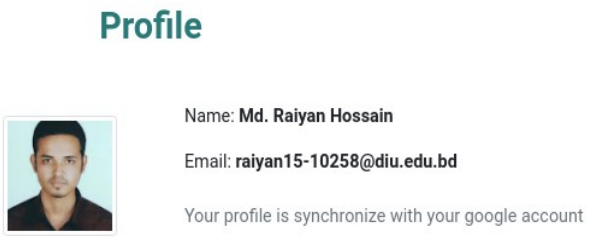

Figure 3.6: Profile of yours

If you want to change your profile, then at first change your google account profile. It will automatically update your profile.

But If you are not logged in then you can see an interface like bottom on 'Profile' tab -

Figure 3.7: Profile tab if you are not logged in

3.2.3 Create

Another tab name is - ‘Create’. On the ‘Create’ tab we can create a new queue. But it is required to log in to create any new queue. If you're logged in then we can see ‘Create’ window like that way -

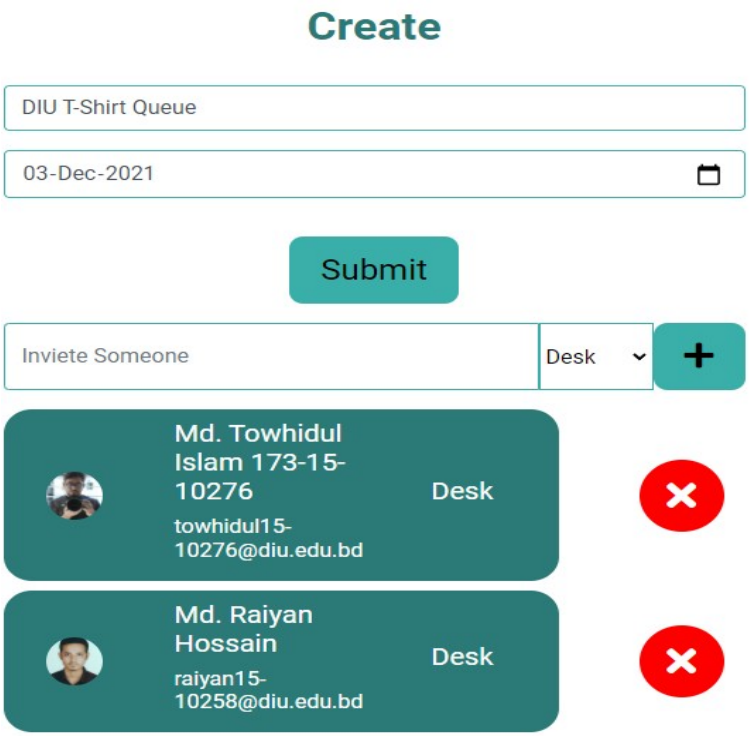

Figure 3.8: Create tab

Here, At the first input box, you can give the title of your queue which will be visible to all others who will join your queue. Then you can select the date from which day you want to start that queue. We use Bootstrap Datepicker, so that it is very easy to select any date you want. On the ‘Invite Someone’ input box you can write any email and select the roll of that person from the right dropdown option, after that you click on plus button to add someone to your queue as a moderator of your queue. After all things are done, you tap on the ‘Submit’ button to create a queue. That’s all, that’s how easy it is to create a

queue to enjoy the amazing feature of ‘Onnoy’. By creating a queue, you will get a unique key which is very important to join any one to the queue from anywhere.

3.2.4 Join

Our most useful feature is available on the ‘Join’ tab. This was the driving feature to choose this project. Because when we chose this project, at that time COVID-19 was very dangerous and our country suffered very badly from coronavirus.

On the ‘Join’ tab, there is an input box and just a button for everyone.

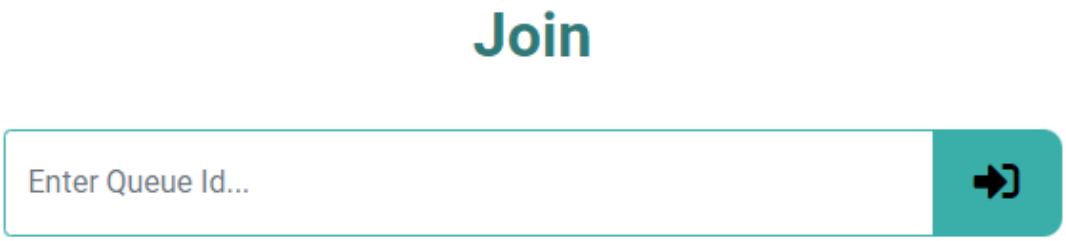

Figure 3.9: Join tab first view

If you want to join a queue, somehow you need to know a valid queue-id to join any queue. If you pass a valid queue-id then you will see a screen like it -

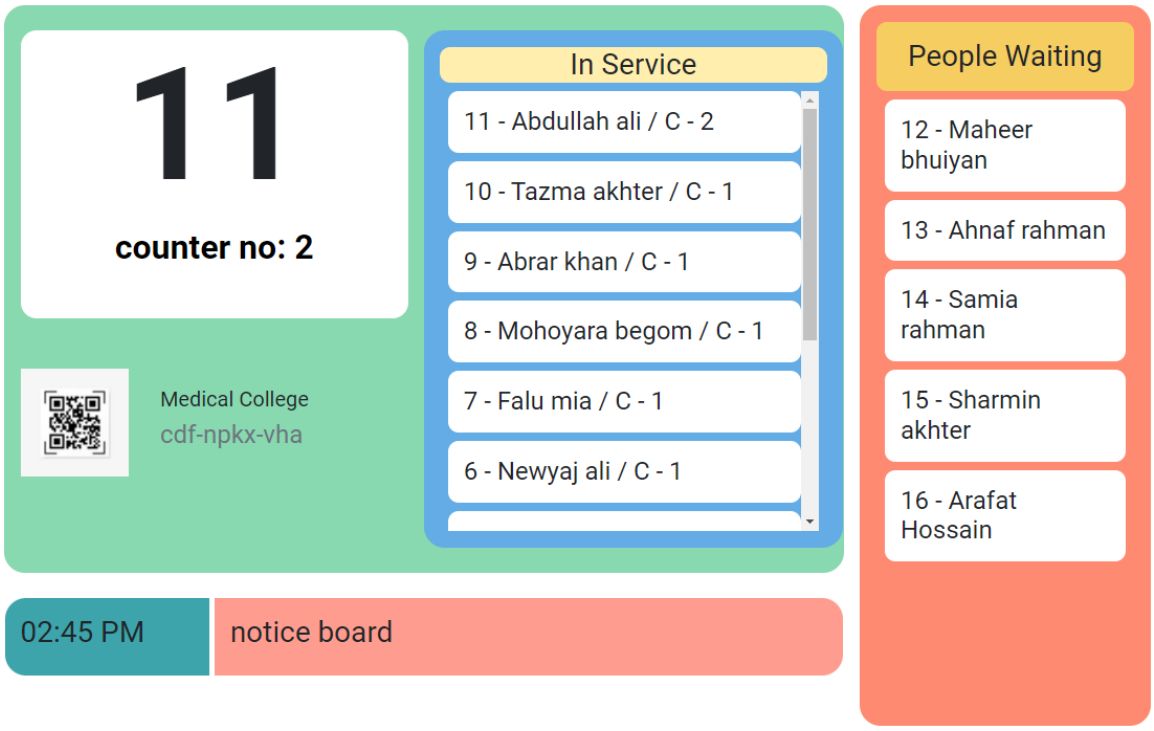

Figure: 3.10: Join Tab after joining to a queue

On that screen, he/she can see what is his/her serial number, counter number, queue title, queue id, and owner name. Also he/she can see which people are in service and which people are waiting for the service. Another thing is, random users can also see the important notice from the owner of the queue.

If you are the owner of the queue, then you can add people to the queue, you can add people in service, you also can edit notices with an editing button. Owners also can add moderators for a particular queue. Moderators also can add people in service and waiting queue, but they can not make a notice to the random user.

3.2.5 Previous

In the 'Previous' tab, a user can see all the queues that he/she joins or creates. He/she can edit all the queue that he created previously. By clicking the 'See Details' button he/she can see the details of the queue. If he/she is the owner of the queue then he/she can edit that selected queue. he/she can add counter or desk people. He can invite some other

people to his/her queue. One thing should be mentioned here that, Owner can also delete his/her queue at any time he/she wants to delete it.

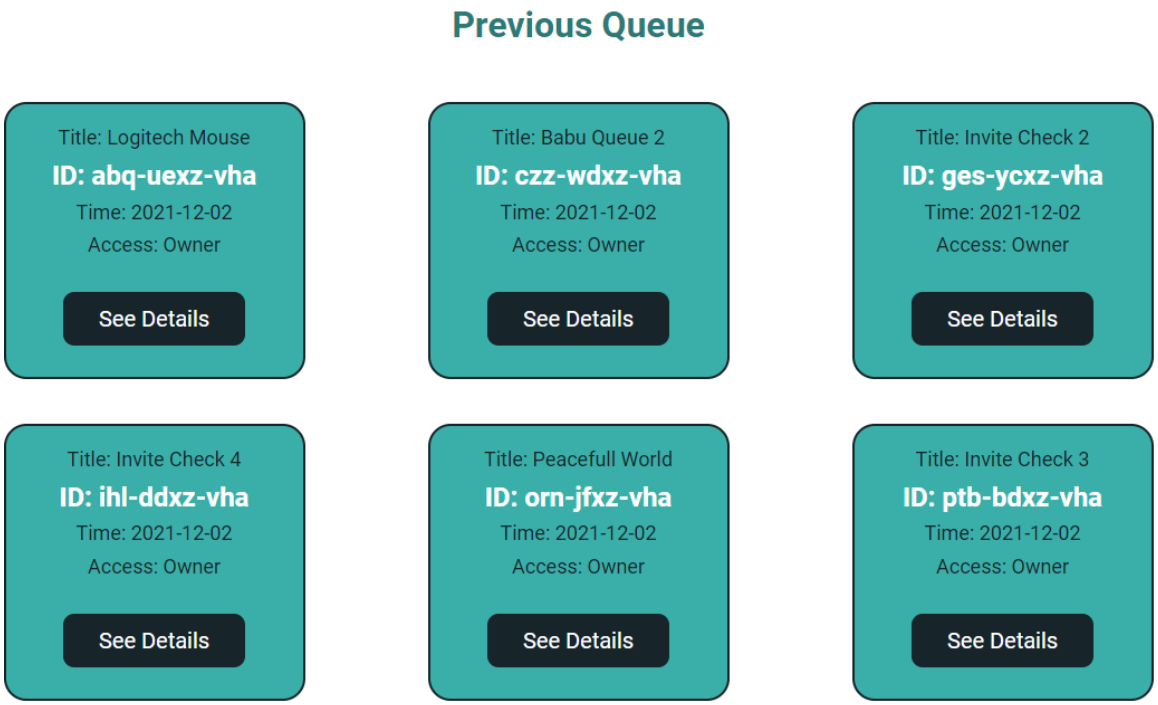

Figure 3.11: Previous Queue

3.2.6 Invitations

In the 'Invitation' tab, a user can see the queue where he/she was added by any owner/moderator. He/she can accept or decline as his/her by choice. If he/she declines the invitation then it will disappear from the invitation tab. If He/She accepts the invitation then it will be added to his/her 'Previous' tab. He/she also can get out from any of the queue if they want to go out of that queue. If he/she is added as moderator, then they will get access to modify the 'In Service' and 'People Waiting' sections. If he/she is added as just a service client then he/she will be added to the 'People Waiting' section of the particular queue.

Figure 3.12: Invitation Tab

3.2.7 Report

On the ‘Report’ - tab, any of the users of our website can contact us to give us any information about our website bugs or errors that happened to their end. Every report we will get as a mail in our mail. One business information should be shared right now. If any of our users like our work and they want to create a new website by us then they can also inform us and we the developers will be grateful to us.

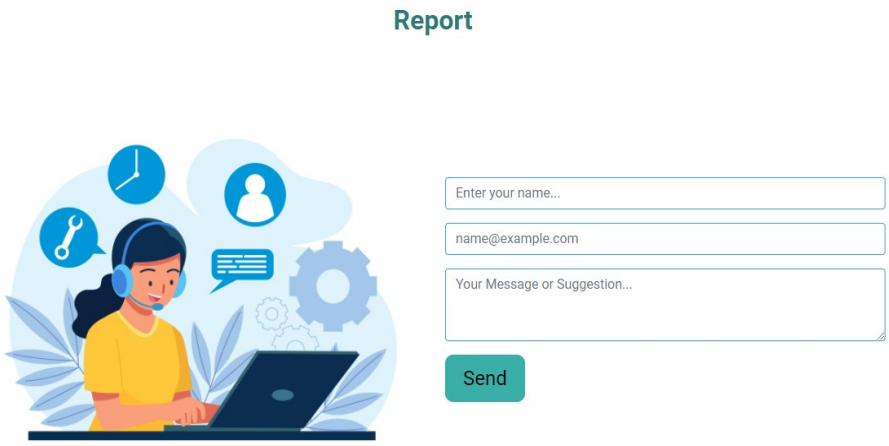

Figure 3.13: Report Tab

3.2.8 About

In the 'About' - tab, any of the users can know about us who work behind this project. As it was an university project, so we have a supervisor Name: Md Azizul Hakim(email: azizul.cse@diu.edu.bd) and we have also a co-supervisor Name: Md Jueal Mia(email: jewel.cse@diu.edu.bd) . They guided us to complete this project. And we have two team members in '**Messier Object**'. Our team leader name is Md Raiyan Hossain (email; raiyan15-10258@diu.edu.bd) and other member name is Md Towhidul Islma (email: towhidul15-10276@diu.edu.bd).

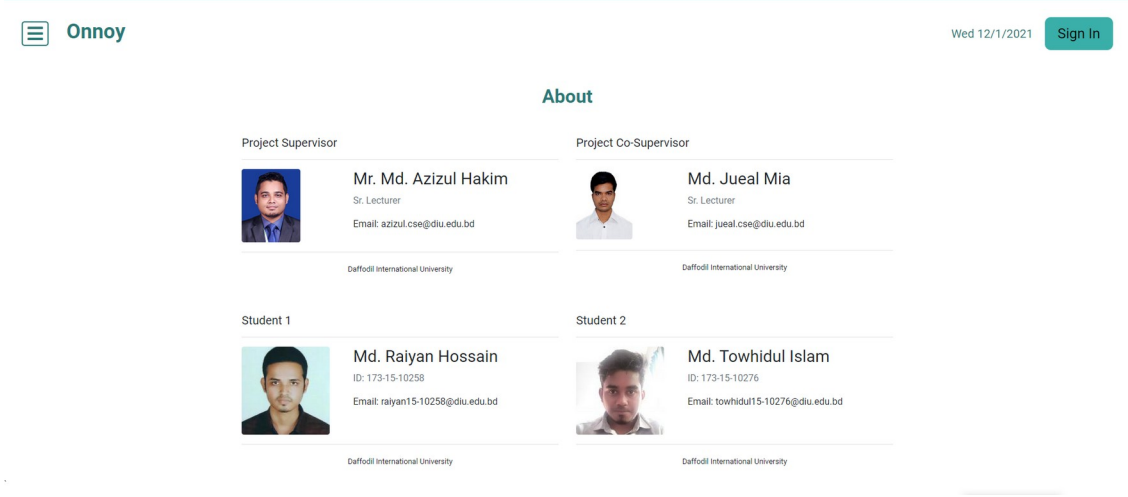

Figure 3.14: About Tab

CHAPTER 4

CONCLUSION & FUTURE SCOPE

4.1 Conclusion

Using this project, people do not have to physically wait in a queue for a long time. Moreover, In this pandemic situation, they can safely take any service where people geathers to get such kind of service where many people do not maintain their physical distance. People also save their time by using this service, because they can see how many people are in the queue and when they should come to the service place and between this waiting time they can complete their other necessary work. On the other hand, many service providers can save their money and time because other queue management systems are not free, but our project gives fully free service to them.

4.2 Future Scope

In the near future, we will add Artificial Intelligence to track how much time is needed to complete to give a single service to an individual person. Then we can give an approximate time to come to the service place, this will help people save their valuable time and use it more efficiently.

Reference:

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