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Internship Report

(Covid Seating)

Project report submitted in partial fulfillment of the requirement for the degree of Bachelor of Technology

in

Computer Science and Engineering/Information Technology

By

Prajwal Sharma (181220)

UNDER THE SUPERVISION OF

Dr. Pradeep Kumar Gupta

To

Department of Computer Science & Engineering and Information Technology

Jaypee University of Information Technology, Waknaghat, Solan 173234, Himachal Pradesh

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Candidate’s Declaration

I hereby declare that the work presented in this report entitled **“ Covid Seating ”** in partial fulfillment 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 March 2022 to May 2022 under the supervision of **(Dr Pradeep Kumar Gupta)** (Associate Professor, Department of Computer Science and Technology).
The matter embodied in the report has not been submitted for the award of any other degree or diploma.

(Student Signature)
Prajwal Sharma,
181220

Signature (Dr.P.K.Gupta)	signature G. Divyasree
Dr. Pradeep Kumar Gupta	Gopali Divyasree
Assistant Professor (SG)	DC Functional Analyst
Computer Science	HashedIn by Deloitte
Dated:	Dated:

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DECLARATION

I hereby declare that this submission is my own work carried out at Hashedin by Deloitte, Bangalore from March, 2021 to June, 2021 and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which has been accepted for the award of any other degree or diploma from a university or other institute of higher learning, except where due acknowledgment has been made in the text.

Prajwal Sharma

181220

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ACKNOWLEDGEMENT

Firstly, I express my heartiest thanks and gratefulness to almighty God for His divine blessing makes us possible to complete the project work successfully.

I am really grateful and wish my profound my indebtedness to Supervisor Dr Pradeep Kumar Gupta, Designation, Department of CSE Jaypee University of Information Technology, Wakhnaghat. His endless patience, scholarly guidance and continual encouragement at all stage have made it possible to complete this project. I would like to express my heartiest gratitude to Dr Pradeep Kumar Gupta, Department of CSE, for his kind help to finish my project.I would also like to express my heartfelt gratitude to Gopali Divyasree(DC Functional ananlyst, Hashedin) for her mentorship and guidance throughout the product month. I would also generously welcome each one of those individuals who have helped me straight forwardly or in a roundabout way in making this project a win. In this unique situation, I might want to thank the various staff individuals, both educating and non-instructing, which have developed their convenient help and facilitated my undertaking. Finally, I must acknowledge with due respect the constant support and patients of my parents.

Prajwal Sharma
Jaypee University of Information Technology

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CHAPTER 1

1.1 Introduction

Hashedin By Deloitte: Hashedin by deloitte has extensive expertise in cloud native development and high end software engineering. The training duration of 2 months in Hashedin University comprises of hectic yet insightful training in cloud development, frontend technologies, backend technologies and specialization tracks post which the interns are divided into teams and are asked to build a full stack end to end product. Technologies like React Js, Angular Js, Java, Advanced Java, Backend frameworks like Spring boot Java are taught during the internship period and similar tech stacks can be used to deliver the product.

I was assigned a project Covid Seating to automate the process of booking seat for the employees prior to the working day. We have used React Js for the frontend UI design and Spring Boot Java for the backend with MySQL as the database. Web development is the backbone of the industry as all the softwares and applications which are useful in every aspect of life are created using web development technologies. It is not only a major field in the arena of IT industry but also a very useful one.

Because the risks of Covid continue to pose a threat to employees and the overall well being of the people, companies are looking forward to start a hybrid mode of work where employees can work in the office and at home interval wise so that the concept of social distancing and government regulations can be followed properly to avoid crowd of employees working in the office. This becomes a tough task as managing the seating arrangement of such great number of employees can be a cumbersome task if we do it manually. Hence, s solution for this can be to make a proper seating arrangement booking system to increase efficiency.

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1.2 Problem Statement

As companies are looking ahead to work after Covid-19 outbreak, they will be choosing among the three modes of work for the employees: work from home, hybrid model, work from office model. As covid continues to pose threat to employees and the overall well being of the people, it is at best for the companies to adopt a hybrid model where employees work from office and home turn after turn so that the office campus does not become crowded and the government regulation of social distancing are followed properly.

In this case when hybrid model is followed, The employees will be working for lesser number of days in the office rather than the full week so a system to manage their seating arrangement has to be made. Otherwise the employees can get very confused as to where they should sit when they are working in the office and also the concern of vaccination status of the fellow employees might trouble them.

Every employee would be looking forward to sit on a seat of his/her preference while keeping in mind that the people sitting next to them should be vaccinated .
This can be a really tricky task if it is not automated as manual interference to achieve the safety of employees is almost impossible when we talk about a large company with hundreds and thousands of employees.

Hence, a product to automate this process must be present so that the employees can book a seat of their preference a day before going to office and also consider the vaccination status of the employees who would be present on that day. In this way they can socially distance themselves from the people who are not vaccinated and stay safe.

1.3 Objective

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The purpose of Covid Seating is to maintain a regulatory system for organization office campus where employees can book a seat a day before they will be visiting the office. Covid Seating is more generic, it gives employees the flexibility to select seats based on their preference and status of the seats available.

Also it gives employee the additional advantage to view the details of the users who have already booked a seat and through these details the employee can view the vaccination status of those employees and can safeguard himself from any risk of getting infected by non vaccinated employees.

Also the employees can update the vaccination status in case they have got vaccinated.
The aim of this project is to make the seat allotment for the employees a piece of cake so that the organization can focus on doing better in their work rather than seating the employees. This product has the potential to be incorporated in every organization as most of the companies are looking forward to hybrid mode of work.

When hybrid model is followed, The employees will be working for lesser number of days in the office rather than the full week so a system to manage their seating arrangement has to be made. Otherwise the employees can get very confused as to where they should sit when they are working in the office and also the concern of vaccination status of the fellow employees might trouble them.

To keep the mental and physical health of employees in a good condition this product can be useful as now the employees would not be worrying about if the employees sitting next to them are vaccinated or not.

1.4 Methodology

The main methodology of this project revolves around creating a full stack end to end product that will be able to give the employees the interface to book a seat for themselves for the next day at office and also allow them to view the vaccination status and other user details of the employees who have already booked a seat.

The employee will be able to login to the dashboard using company credentials, which will be validated using the credentials added in the database table. If the validation is successful the employee will be directed to the dashboard else and error with a alert box will be thrown saying the credentials entered are invalid. The validation is an important part as employee should only be able to login the dashboard and not signup as the credentials are given by the company only.

After validation from the backend the user is directed to the dashboard, where he/she can view the seat layout, which consists of the seat layout of the office from which the employee can choose and book a seat of his preference and when he hovers over the booked seat, the details of the user who has booked that seat will be displayed.

Also the dashboard consists of a seat mapping list table which basically maps the employee with the seat he/she has booked.

A confirmation mail is sent to the employee to his mail id once the seat booking is confirmed which they can use for reference the next day.

Covid Seating also gives employees the chance to cancel their seat if they change their mind and want to book a new seat.

The interaction between the frontend, backend, and the database occurs through the http request using the backend(API) and frontend axios APIs. This communication between the frontend, backend and the database ensures that all the above mentioned functionalities are achieved.

For the backend entities are created to store the employee details and seat details. API paths are given to access the http methods for communication purpose.

The frontend is created using react which uses HTML, CSS and JavaScript. The styling and few number of components are also imported using Material UI for react which will be explained in the further pages.

React has been used for frontend due to the reusability of the components it provides and vast number of functions and dependencies to make our frontend production level.

For the backend Spring Boot Java has been used due to its simple and production grade framework architecture for creating micro-services and making the process of using dependencies very easy.

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1.5 Project Outcome

Using Covid Seating, the employee will be able to book or secure a seat for the upcoming day in the office which basically is the need of the hour for hybrid mode of work in companies. This will not only let the employees stay safe by distancing themselves from the non vaccinated people but will also let them sit where they want.

- **Saving time**

  The employees can save a lot of their time as now they would not be worrying about looking for seats next to vaccinated people. Also they will have a clear idea where they will be seating and will provide a reference to others employees as well.

- **Prevention from getting infected**

  The main aim of Covid Seating is to keep the employees safe by giving them an idea about the vaccination statues of the people who would be visiting the office the next day. Using this information they can accordingly book their seat at a distance from non vaccinated people.

- **Provide ease of use to the employee**

1.6 About Hashedin by Deloitte

Hashedin technologies, Private limited is one of the leading technical firms in India, which specializes in serving its clients with software modernization and innovative solutions for building the product which is best suited for the needs of the client.

We bring traditional cloud development using modern cloud delivery - a pod-based delivery model. Pod is a collaborative team used as a unit to utilize a full set of native cloud development capabilities. This group of advanced software engineers working with cross-cutting, stack-filled skills (e.g., Dev, QA, Design, etc.) are self-made and self-governing.

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Our organization is made up of small, cooperative teams to deliver high quality solutions to our customers. We build future leaders by encouraging people to take their work seriously, and empower them to work on projects that help learn and develop.

At Deloitte's HashedIn, we develop a culture of thinking outside the box. But it does not mean that our people are limited in their technical talents. We focus on creating a workplace of the future that rewards individual contributions and applauds how to engage at the same time. We always encourage our people to build the next and measure the skills of the future.

The training program for freshers is called Hashedin University. HashedIn University is a strong, yet fun-filled training camp for new recruits that gives them the opportunity to expose themselves to new technologies and turn them into industry-ready leaders. Collaborating with industry leaders and peer education is the foundation of all programs.

Hashedin By Deloitte: Hashedin by deloitte has extensive expertise in cloud native development and high end software engineering. The training duration of 2 months in Hashedin University comprises of hectic yet insightful training in cloud development, frontend technologies, backend technologies and specialization tracks post which the interns are divided into teams and are asked to build a full stack end to end product.

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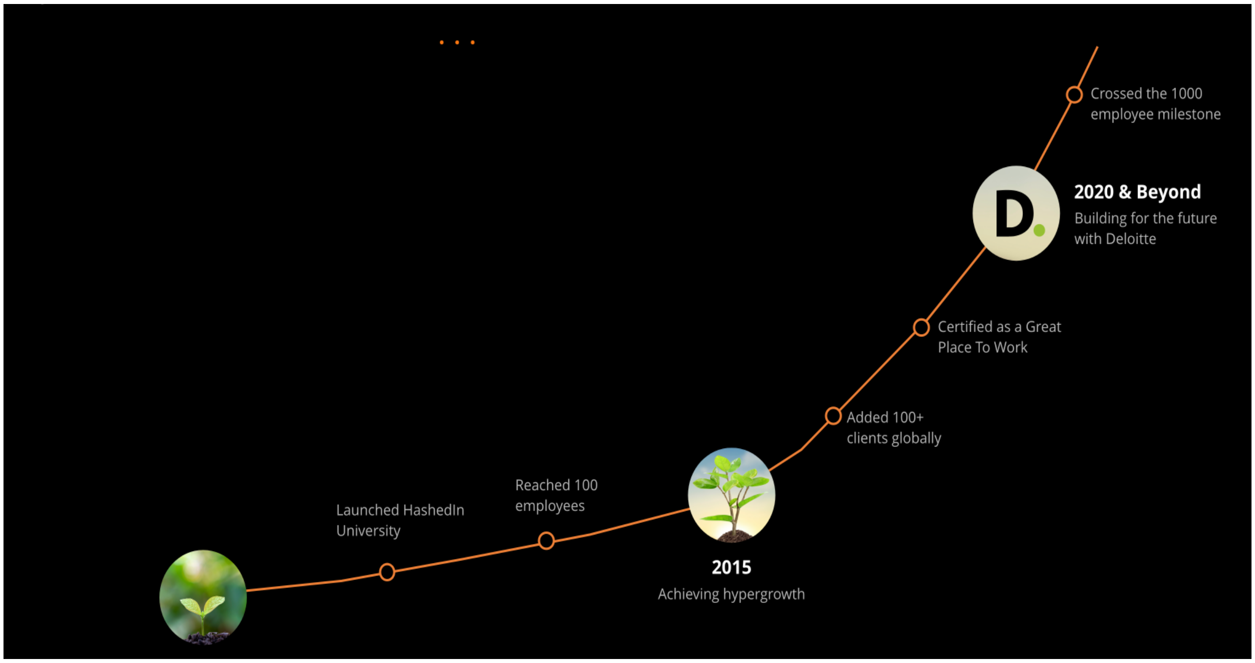
Crossed the 1000 employee milestone
2020 & Beyond
Building for the future with Deloitte
Certified as a Great Place To Work
Added 100+ clients globally
Reached 100 employees
Launched HashedIn University
2015
Achieving hypergrowth

Fig1) Hashedin

Deloitte Touche Tohmatsu Limited , commonly known as Deloitte, is a British international professional services company that manages a network of offices in more than 150 countries and regions worldwide. Deloitte is one of the Big Four accounting organizations and the largest network of professional services in the world for the benefit and value of professionals, headquartered in London, England.

The company was founded by William Welch Deloitte in London in 1845 and expanded to the United States in 1890. It merged with Haskins & Sells to form Deloitte Haskins & Sells in 1972 and Touche Ross in the US to form Deloitte & Touche in 1989. In 1993, an international company was renamed Deloitte Touche Tohmatsu, later abbreviated as Deloitte. In 2002, Arthur Andersen's performance in the UK and a few of the company's processes in Europe and North and South America agreed to merge with Deloitte.

Subsequent acquisitions led Monitor Group, a major strategic consulting firm, in January 2013. The international firm is a UK-based private company, limited by a guarantee, backed by a network of legal entities.

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Deloitte provides auditing, consultation, financial advice, risk advice, tax, and legal services to approximately 334,800 professionals worldwide. In FY 2021, the network received US $ 50.2 billion in total revenue. As of 2020, Deloitte is the third largest private company in the United States, according to Forbes.

The combination of HashedIn providers and digital capabilities, cloud, AI and cyber Deloitte will enhance software marketing capabilities and smart options that drive innovation. HashedIn Purchase Index is Deloitte's commitment to investing in cloud and software system engineering skills, in line with Deloitte's news release.

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CHAPTER 2

2.1)Literature Survey

Seat booking applications have been and are being used in every domain from movie seat booking to bus, flight, train etc. seat booking application. But seat booking for office is a recent product that is being considered now due to the covid pandemic situation. Although such applications have been in the market for some time but companies never had a strong reason to use them and now the need for such products has bloomed in the past two years due to covid regulations and Covid Seating aims to provide companies an efficient way to manage employee seating.

Companies can integrate this product in their existing company applications to automate the process of seat booking and integrate it under one roof to provide ease of use to the user or such applications can also be integrated with enterprise softwares such as google workplace, Microsoft Outlook, Jira, teams etc which are used by almost every company now.

2.2)Technologies learnt and Used

During our Internship we were trained on many technologies like GCP cloud, Docker,React Js, Spring Boot Java, Advanced Java, Python Serverless course etc. Apart from technical skills I also learnt many soft skills such as working in tight deadlines, being able to work in teams and enhance my technical skills on daily basis.

For the frontend HTML, CSS, Javascript, Typescript, Material UI are used which will be described below with reference.

Docker: Docker is set of platform as a service that virtualizes the OS level to containerize the software and the dependencies. These containers can then be used to run the software in any environment. Developers can build, deploy, run, update and stop these software containers using simple commands.

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GCP: Google Cloud Platform is used as a cloud service to run deploy production level code and also it provides many functionalities to create cloud functions, gcp bucker for storage etc. It rivals with AWS azure etc. During our internship all the codes were deployed in google cloud run itself.

We were also trained regarding the CI/CD(continuous integration/continuous deployment) piplelines and on how to create jobs and steps for deploying a code on cloud run.

FrontEnd- ReactJS

1) HTML: Hyper Text Markup Language happens to be the standard markup language for most of the web pages. It provides the structure to our webpage. There are different tags in html which have different functionalities useful for creating the webpage. Hyper Text: This in simple words means text within text. A link is hiddenly stored within the text. Whenever someone clicks on a link that takes you to a new webpage, this means you have interacted with a hypertext. It is way to link one webpage to another.

Markup language: It can be defined as a language used to apply layout and formatting to text document. It makes the text more visually appealing and interactive. Text can be converted to links , tables and images etc.

Webpage: It is usually written in HTML and then a web browser translates it. URL is used to identify a web page. Webpages are of two types static or dynamic . But with HTML we can create static web pages.

HTML is made up of different HTML tags and content is different for different tags. Tags are basically contained inside “<” and “>” annotations. HTML is a must for creating any good frontend component. Which is styled using css/sass.

<!DOCTYPE> : It simply tells the web browser about the version of HTML.
<html>: It tells the browser that the current document is of type HTML. All things written between html tag describes the web document. It also acts as a container for the other elements except <!DOCTYPE>.
<head>: First tag inside the html tag. Contains metadata. Should be closed before the body tag.

<title>: It is optional. It basically is the name displayed on the tab of the web browser window. Should be placed in the head tag and closed immediately.

<body>: Defines the content visible to the user.

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<h1>: Top heading level
<p>: Stands for the paragraph in the webpage.

2) CSS: CSS is used to style the HTML component. It makes the webpage frontend aesthetic and provides a good User Interface. In addition to CSS, SaSS(Syntactically Awesome Style Sheets) are also used which basically means CSS with additional powers and functionalities. It has many features which are not existing currently in CSS. Sass makes code reusability possible and can be used in different components of our Application. CSS can perform basic actions like change of color and size etc, but can also do things like animation. The web browser does not interpret or understand Sass, therefore Sass files are converted to Css automatically in VS code to make them browser friendly. Sass makes it possible to reuse our code by using variables, functions, inheritance etc which was not possible in Css.

There are three ways to add CSS to a document.

- Inline CSS: applies style to a single element. Add the <style> attribute to the required element.
- Internal CSS: <style> has to be added inside the <head> tag.
- External CSS: In this the html document should have a link or a reference to the external CSS file. The reference has to be provided inside the <link> tag inside the head section. The external document should be saved with a .css extension. Also it should be free of any HTML tags.

  <link rel=”stylesheet” href=”styles.css”>

3) Javascript: Javascript happens to be the most popular programming language in the world and is also called the language of the web. It accounts for the creation of more than 97% of the websites along with HTML and CSS.

It is lightweight and interpreted language. It does client side validation as it verifies the user in the frontend itself . In addition to this we can add countless number of functionalities to make our web-app responsive and production level.

4) Typescript: It is a programming language similar to javascript developed and maintained by Microsoft. It is

a superset of javascript and is syntactically strict. Typescript will give the compilation error at development time i.e. compilation. Typescript defines the type of variable that is it’s datatype unlike in javascript.

ReactJS:

React makes it easier to design user interfaces for web applications. It uses states which can help us to define a particular component to render whenever the state changes.

React is component based which means that the overall structure of our web application can be divided into different parts called components which will have their own javascript or typescript code and their own css styling. These components can then be clubbed together to integrate them and make the frontend responsive. The components are reusable and can be used anywhere throughtout the code. It uses props to share data between the components and hooks to fetch data and share data.

It uses virtual Dom to increase the app performance as the DOM of javascript is faster and more efficient than the regular DOM. React JS is also open to a number of libraries which are immensely useful for making our web application to be acceptable by the user.
React makes creating interactive user interfaces a breeze. Create simple and appealing views for each component in your app or website, and react will assist you update and render the appropriate components as your data changes.

Js+HTML- JSX

React JS is a programming language, not a framework. It's simply a library created by Facebook to address various issues with the creation of UI components. Developers can use React JS to create massive web applications that can alter data without having to reload the page. The primary goal of React JS is to make web pages load quickly and easily. It only works on application user interfaces. In MVC, React JS can be used with other JavaScript libraries or frameworks, such as Angular JS. A React application is made up of several components, each of which is in charge of interpreting a small, reusable chunk of HTML. Complex applications can be developed using simple building blocks by nesting components within other components. A component may also keep track of its own internal state; for example, a Tab List component may keep track of the currently open tab.

React JS has also been used to create popular social media sites such as Instagram, Facebook, Skype, and Netflix.

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Backend- Spring-Boot Java

Java Spring framework is a famous, open-source framework for developing production level applications that would be running on Java Virtual Machine(JVM).

Spring Boot is a framework tool that makes the process of creating micro services easier through Auto-configuration, configuration through through opinionated approach, and by creating standalone apps.

The reason why Spring Boot is so popular is because it uses dependency injection where objects can define their own required dependencies and spring container automatically injects them. Also the process of injecting dependencies in spring initialize is very straightforward and an easy task without the requirements to install the dependencies on our own. Spring Boot basically has four layers:

1) Presentation Layer: This layer consists of Authentication and JSON translation

2) Business Layer: This layer consists of business logic of our project, Validation, and authorization.

3) Persistence layer: The repository looks after the storage of data.

4) Database: The database consists of the entities we created and stores them as tables with the populated data.

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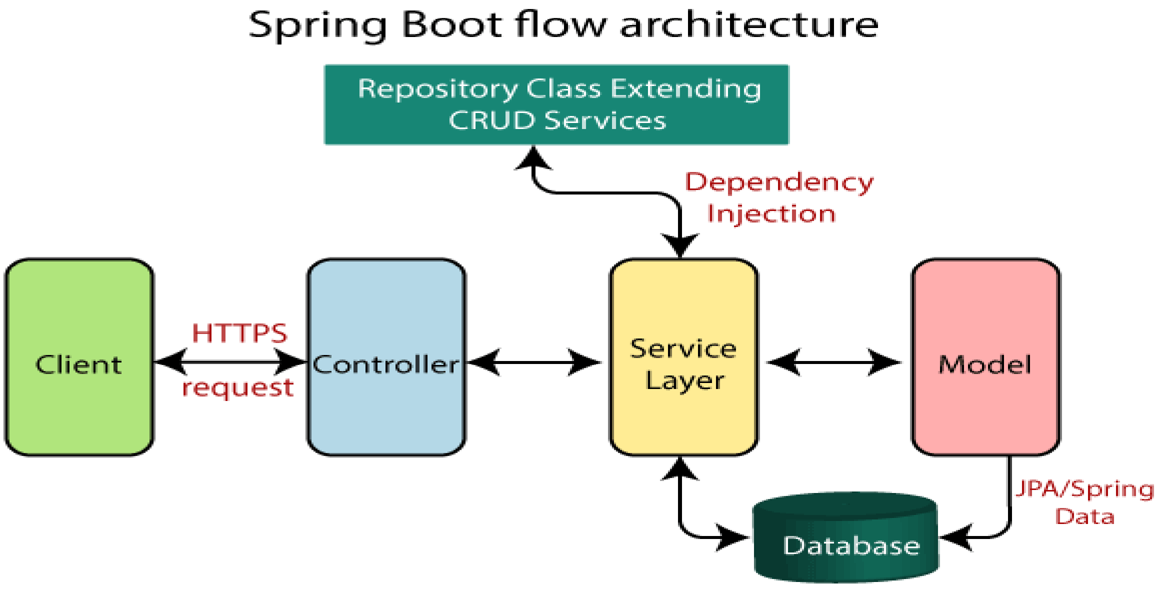

Fig 2) Flowchart of SpringBoot Java

The above figure depicts the spring boot architecture.

When creating a spring project we create a class Entity where we define the tables we want to create. In order to create an entity in Spring boot we use the annotation entity and give the features or columns of the same.

Once the code is run, table is automatically created in our database.

To write our business logics in functions we use the package service where the business logic related to particular entity can be written.

To store the data we use the interface repository where the storage occurs and the requests we pass in controller will access the repository to make changes.

We use controller package to define paths for the APIs and mention the type of http request we would be using for that particular API. The various http request methods include GET for retrieving the data, POST for posting the data , UPDATE/PUT for updating the data in the database, DELETE for deleting the data. In addition to these also we have many http methods but in the project we have used only these particular http methods.

Spring initializr

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Using spring initializr we can easily define the structure of our spring boot project. We can choose and add any number of dependencies we would be needing for out spring project in the initializr itself.

Project initialization: We can create either a maven or gradle project. In this project we have used maven project.

Language selection: We can choose among any of the language among Java, Kotlin, Groovy for our project. Java is selected by default and we can also choose the version for it.

We can also modify the artifact name, project name etc in the initializr itself.

Database-MySQL

Database is one of the three main components when it comes to making a website or a webapp. Mysql database is one of the many database which can be used for storing our data. And fro this database we can fetch, post, delete , update data using our UI and API's. My SQL is a RDMS(Relational Database Management System) to store and do the management of very large amount data. The reason why it is called relational databases is because all the data is stored in different tables and we can establish relationships between these tables using mapping such as one to one, many to one, one to many and many to many. There are a lot of advantages of My SQL database such as:

- It gives a commendable support to business operations

  It includes a wide variety of services, features and is isolated, atomic, consistent, and transactional. Huge amount of data can be dumped into these databases without worrying about data being lost or corrupted.

- The uptime is 24/7

  The major reason why many companies use this database is because the uptime is 24/7. It has huge amount of available solutions such as master or slave replication and special server clustering.

- My SQL managing cloud and ensuring security

  Security in cloud services has been a major headache since the use of cloud technology has become prominent. Without any flexible security mechanism the data might be hacked with and employees or organizations might become a victim to cybercrime.

My sql helps in improving security and keep data confidential.

- Ensuring that the business performance is improved

  When using mysql database, improved performance in the business and increased productivity of the company can be expected to happen for sure. It is highly scalable and secure. It is made to meet the demands where a huge amounts of queries can be run without compromising with speed and security.

- Easy Management and usage

  It has low installation time and acceptable rate of downloading. It is compatible with various operating systems and provides the privilege to streamline the business productivity.

Cloud Technologies

1) CI/CD

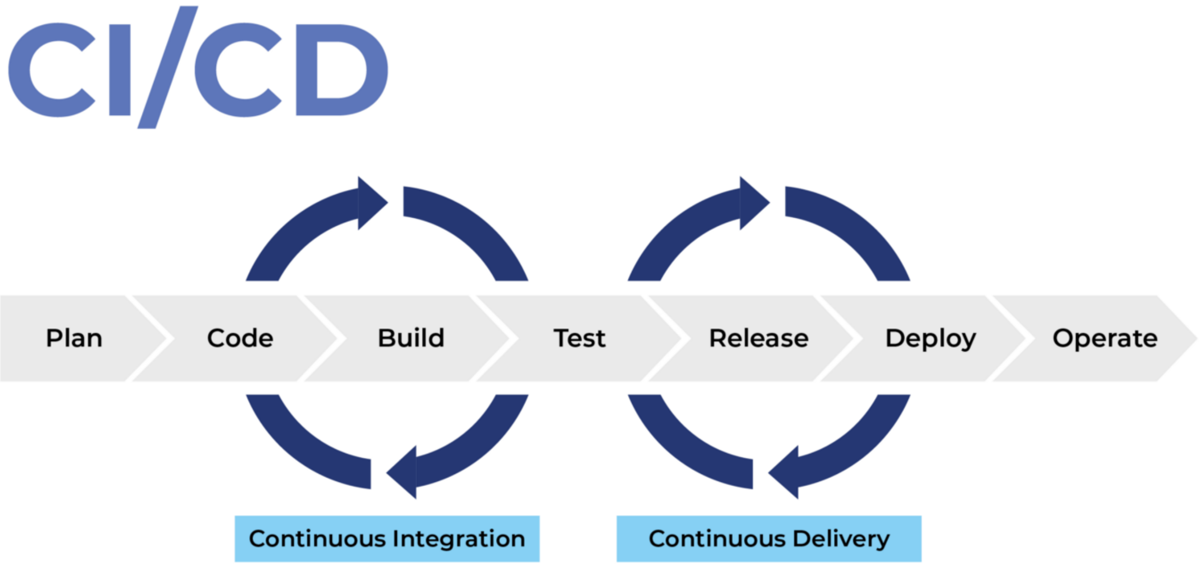

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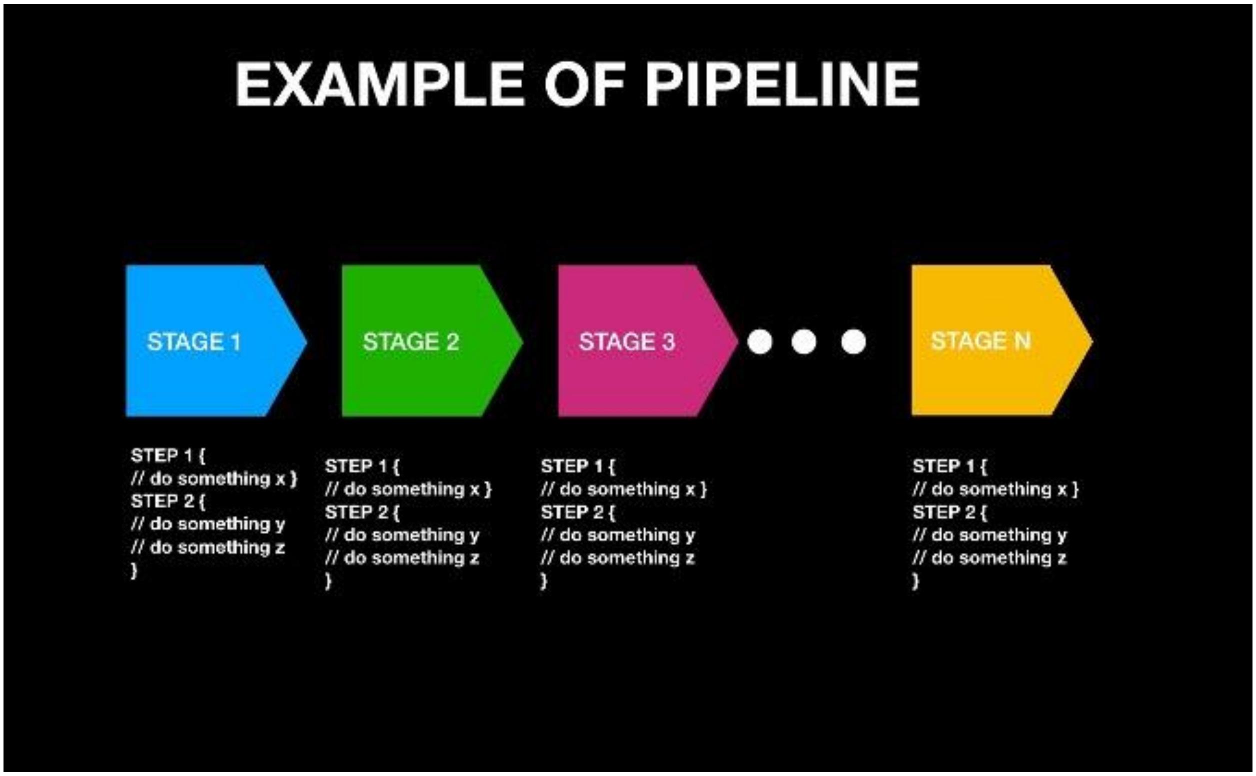
Fig3) CI/CD pipeline

CI CD is a practice in DevOps where developers can easily develop deploy and test their codes. In continuous Integration the code gets integrated a number of times and gets deployed by an automatic pipeline.

CD introduces the changes to the code with every commit that the developer makes and makes the code ready for deployment.

Pipeline is basically a code written by the dev ops team or even the developers such that the automated process of CI CD can be achieved. It is a chain of events like jobs and events which take care of every step in the pipeline.



EXAMPLE OF PIPELINE

STAGE 1

```
STEP 1 {
// do something x }
STEP 2 {
// do something y
// do something z
}
```

STAGE 2

```
STEP 1 {
// do something x }
STEP 2 {
// do something y
// do something z
}
```

STAGE 3

```
STEP 1 {
// do something x }
STEP 2 {
// do something y
// do something z
}
```

STAGE N

```
STEP 1 {
// do something x }
STEP 2 {
// do something y
// do something z
}
```

Fig4) Example of pipeline

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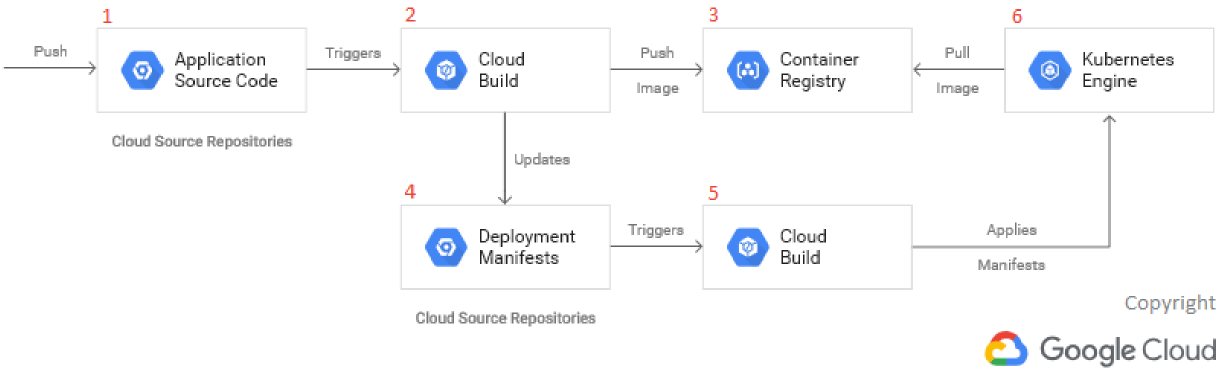

Fig5)Figure depicting the process of deployment on Google cloud run in GCP.

CHAPTER 3

System Design

3.1) System Requirements

3.1.1) Software Requirements:

- Front end: React JS
- Backend: Spring Boot Java
- Database: MySQL

3.1.2) Hardware Requirements:

- Any desktop with an active internet connection
- 2 GB RAM
- 1.2 GHz processor

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- Windows/Linux/Mac OS

3.2) Functional Requirements:

- Login
    - Input: Employee uses the company credentials for logging in
    - Output: On successful login, employees will be redirected to the dashboard
- Dashboard
    - Description: Options for choosing the office location will be available for the employee.
    - Input: Choose the office location
    - Output: User can select the seat from the seat selection section of the dashboard.
- Seat Selection
    - Description: A map of seating arrangement of the office will be shown.
    - Available seats: The available seats will be shown in normal white color. The employee will be allowed to select only from the available seats. Also one user can select only one seat.
    - Booked Seats: The booked seats will be marked in red color. When the employee hovers over these seats, the details of the fellow employee who has booked that particular seat will be displayed along with their vaccination status. Using this information the employee can accordingly select the seat to ensure his/her safety.
        - ➢ Constraints: One employee can secure only one seat.
        - ➢ Input: Secure a preferred seat and submit to book it.
        - ➢ Output: A success message will pop up on successful booking.
- Seat mapping list

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    - Description: A catalog of employees along with their respective booked seat numbers will be listed.
    - Input: Click on the tab to view the seat mapping list
    - Output: Details of the employees who have booked the seats will be shown along with their seat number and vaccination status.

- User Profile
    - Description: Click on the user profile link from the navigation bar and the user information will be displayed.

- Logout
    - Description: On clicking the logout button, employee will be redirected to the login page again.

On successfully booking a seat, an automated confirmation mail will be sent to the employee on his company id which he can use for reference the next day.

The employee will also have the option to cancel the seat booking in case he changes his mind and wants to either book another seat or cancel the seat.

3.3)Algorithm Development

Web development techniques are very beneficial for the target audience as they can access the visual version of the app and find a solution to their daily life problems. The UI of any website is kept simple and easy to use so that any employee of any designation can access it. To achieve this simple result three steps are followed to improve the full stack project project algorithm. The first Is the UI component called the front of any web application, a very important component as all visuals are in this component so to target audiences this

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component needs to innovate. The following is the background part where the server operates and all data is downloaded and stored. Lastly the part of the database that is the backbone of any web application as more data is available to us on a daily basis and the right storage method is much needed. Therefore, any data that accesses a web application needs to be stored in a simple and efficient way to reuse it.

3.4) System Design diagram

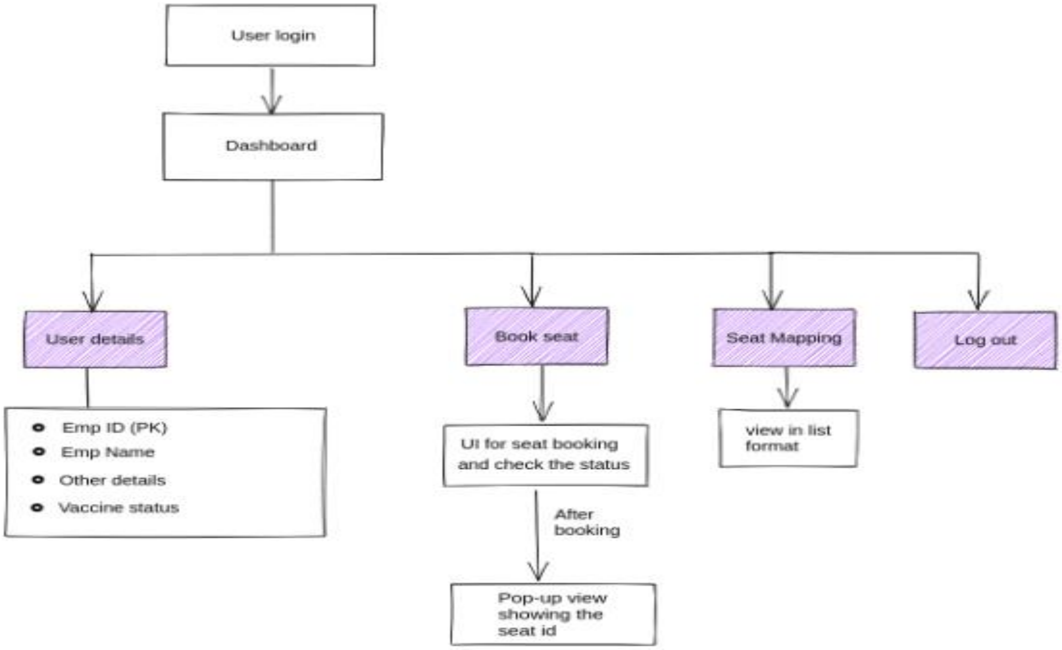

Fig6) System Design Diagram

The above system design gives a clear cut idea about the workflow of the product. Upon successful login the employee will be redirected to dashboard where he can view the user details, seat layout, seat mapping list.

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3.5)Architectural Diagram

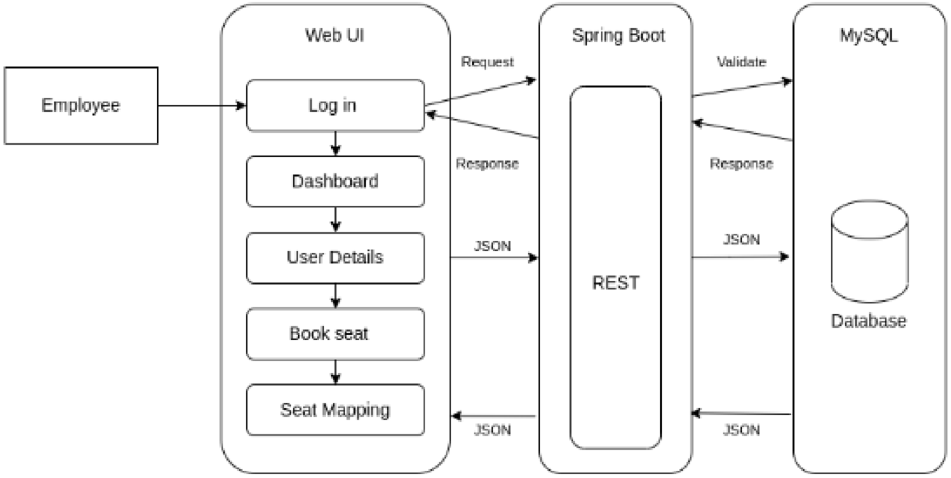

Fig7) Architectural diagram

The above architectural diagram shows the integration of the frontend, backend and the database through the http requests and response in Json format.

Employee will login and enter the credentials in the frontend UI. The credentials will be sent via POST request to the backend where the validation will occur. After the validation is successful redirection to the dashboard will occur, where the user will be able to book a seat by sending a POST request to populate the seat database and a GET API populate the seat mapping list table.

Also if the designation matches to a particular position, the employee has admin privileges in that case.

Being an admin, he can block the seats(for any reason like maintenance etc) and then the employees would not be able to book among the blocked seats

3.6)Tables Created

- Employee

`

  - Employee Id (primary key)
  - First Name
  - Last Name
  - Designation
  - Vaccination Status
  - Email Id
  - Password

- Seat
  - Seat Id (primary key)
  - Is Booked
  - Employee Id (foreign key)

- Seatblocked
  - Blocked seat Id

Employee and Seat table has one to one mapping which will be unidirectional from employee to seats. This will ensure that one employee will be able to book only one seat. If an employee tries to book another seat an alert box with a message that you have already booked a seat will be displayed.

3.7) Software used for testing the API and the database

- **Postman:** It is an API software for building and using APIs. We can test our API's using postman. We just need to enter the host name followed by the API path of the respective API's.

`

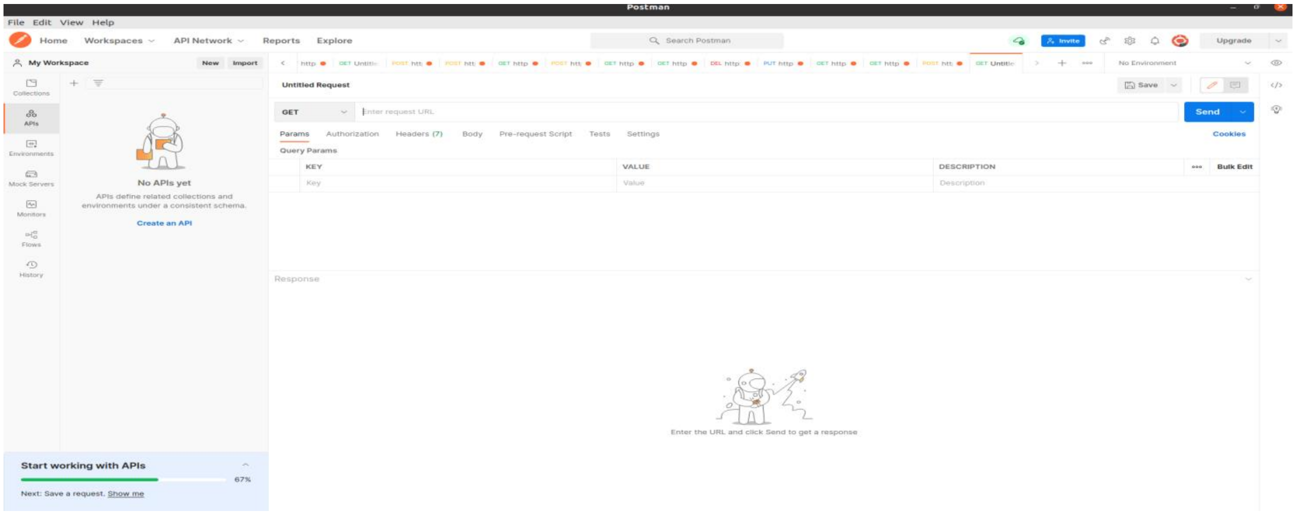

Fig 8) Postman for testing API's

- **D-beaver:** It interacts with the databases through JDBC drivers and provides the user the comfort to create view or edit tables in the databases. It has option to vie many databases such as MySQL, postgres, Apache, MariaDb, Oracle etc.

The below snippet is from the dbeaver, which shows the Entity Relationship diagram between seat and employee table.

These platforms are very useful when it comes to testing our APIs and viewing and editing the data in out tables. They provide an excellent and easy user interface for the same.

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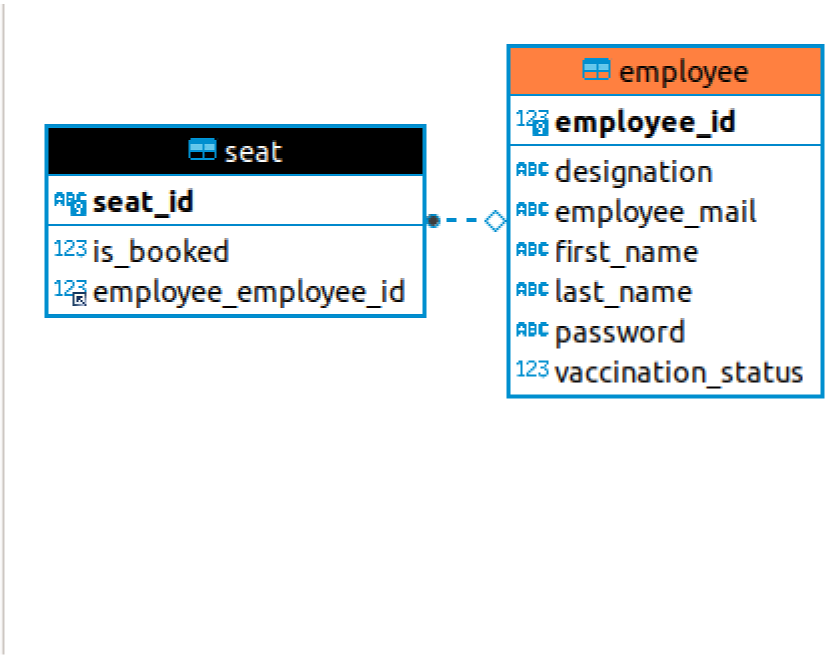


Fig9) Dbeaver tables diagram

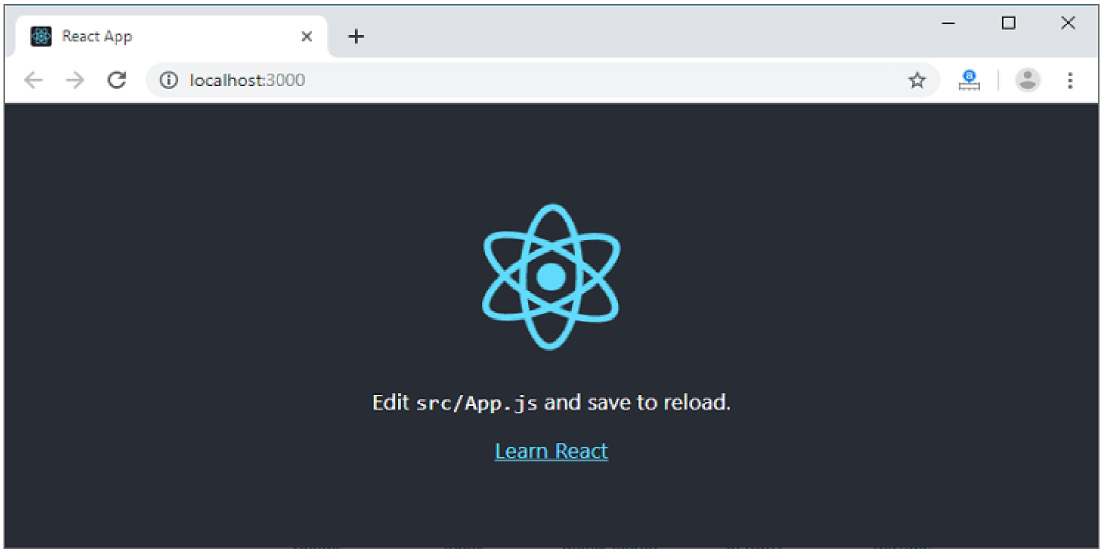
3.8)Implementation Steps

1. Creating react app.

Prior to creating react app we need to install node.js , post which we can run the commands to create react app.

We use “create-react-app app-name” to create a react app which gives the following output upon deployment in localhost.

`



Edit `src/App.js` and save to reload.

Learn React

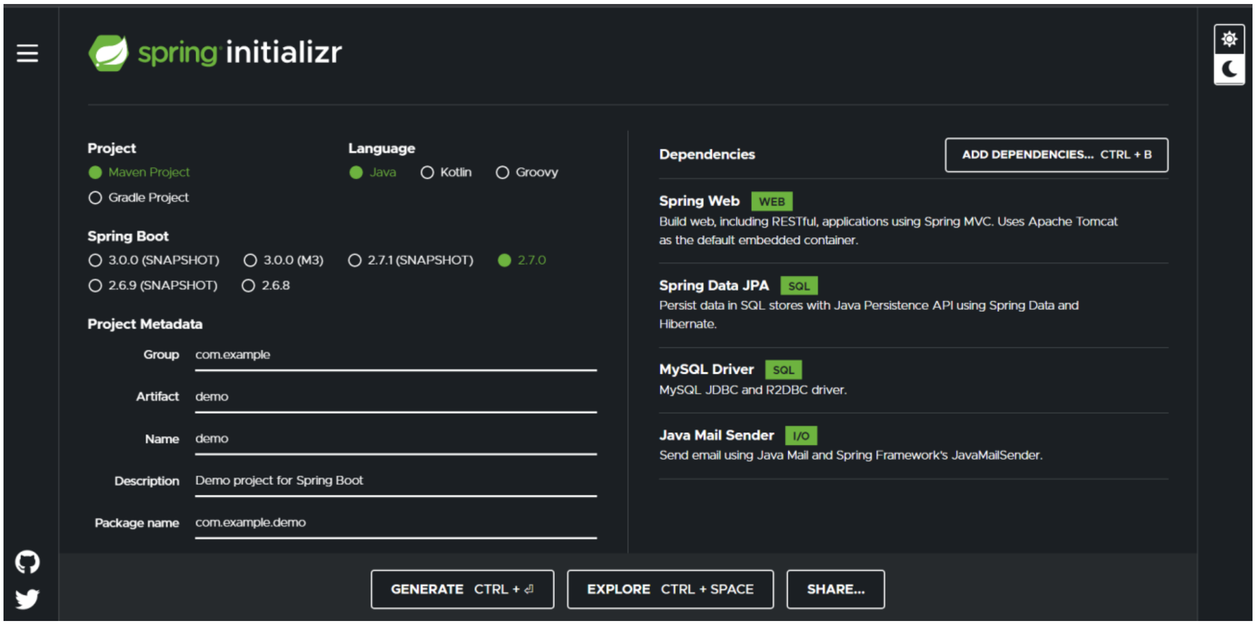
Fig10) Default React App

This is the default content of the app which will further be modified by creating components and rendering them. By default the react app runs on localhost:3000.

2. Adding components to the default react app

    - Login component consisting of a javascript file and a css file.
    - Navbar component consisting of a javascript file and a css file.
    - Dashboard component consisting of a javascript file and a css file.
    - Seat layout component consisting of a javascript file and a css file.
    - Seat Mapping List component consisting of a javascript file and a css file.
    - User Details page component consisting of a javascript file and a css file.
    - Logout component consisting of a javascript file and a css file.

3. Creating a spring project(backend)



Project
● Maven Project
○ Gradle Project

Language
● Java ○ Kotlin ○ Groovy

Spring Boot
○ 3.0.0 (SNAPSHOT) ○ 3.0.0 (M3) ○ 2.7.1 (SNAPSHOT) ● 2.7.0
○ 2.6.9 (SNAPSHOT) ○ 2.6.8

Project Metadata

Group com.example
Artifact demo
Name demo
Description Demo project for Spring Boot
Package name com.example.demo

Dependencies

Spring Web WEB
Build web, including RESTful, applications using Spring MVC. Uses Apache Tomcat as the default embedded container.

Spring Data JPA SQL
Persist data in SQL stores with Java Persistence API using Spring Data and Hibernate.

MySQL Driver SQL
MySQL JDBC and R2DBC driver.

Java Mail Sender I/O
Send email using Java Mail and Spring Framework's JavaMailSender.

Fig11) Spring Initializr for Maven project

The above snippet shows a spring initialize project where we can add all the dependencies we need for our project and also mention other details.

In the backend we need to create entities, controllers, repositories and service class for the following entities.

- Employees
- Seat

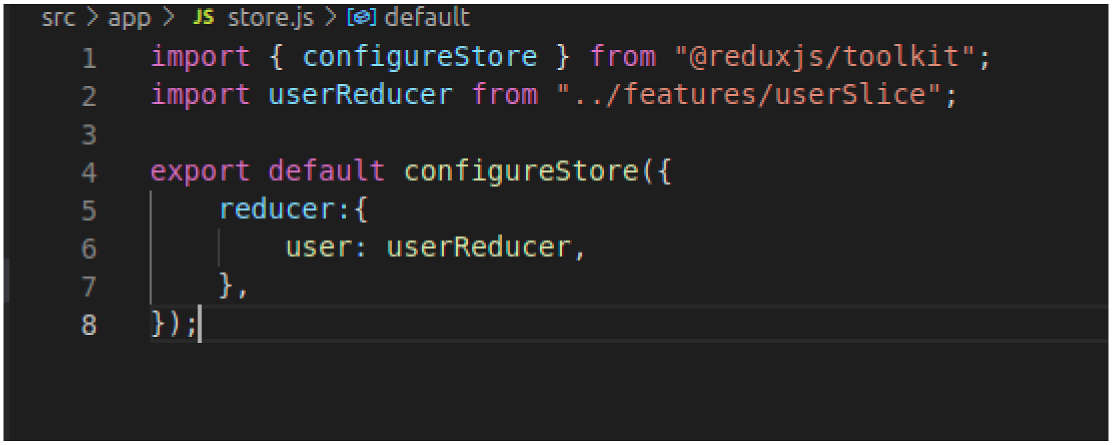
4. Using Material UI components for styling

This is a collection of components made using Google's material design principles. Many adjustable and accessible UI widgets are included in Material UI. Because the components are self-contained, they will only inject the styles that they need to display, which can improve the performance of your application. This library is supported by a strong community and active maintainers. It currently has more than 65k stars on GitHub, making it one of the most well-known component libraries available. Material UI is a light, user-friendly, and simple design and layout that makes it simple to create stunning apps. It may brag about having a consistent and easy-to-use interface that represents the Google design team's considerable understanding. This library will be the right answer for you if you want to create a consistent, light, and appealing interface in a short period of time without losing performance or accessibility.

- It provides customizable, stylish and simple libraries of react components.
- We can create tables, cards, logos, etc using material UI.

5. Redux for storage

- Redux is a java script library which is used for managing and keeping a central record of application states. These states can then be used anywhere else in the project using useSelector hook object.
- In Covid Seating we have used redux to store the credentials of the logged in user, so that these credentials can be used at various components of the web app.

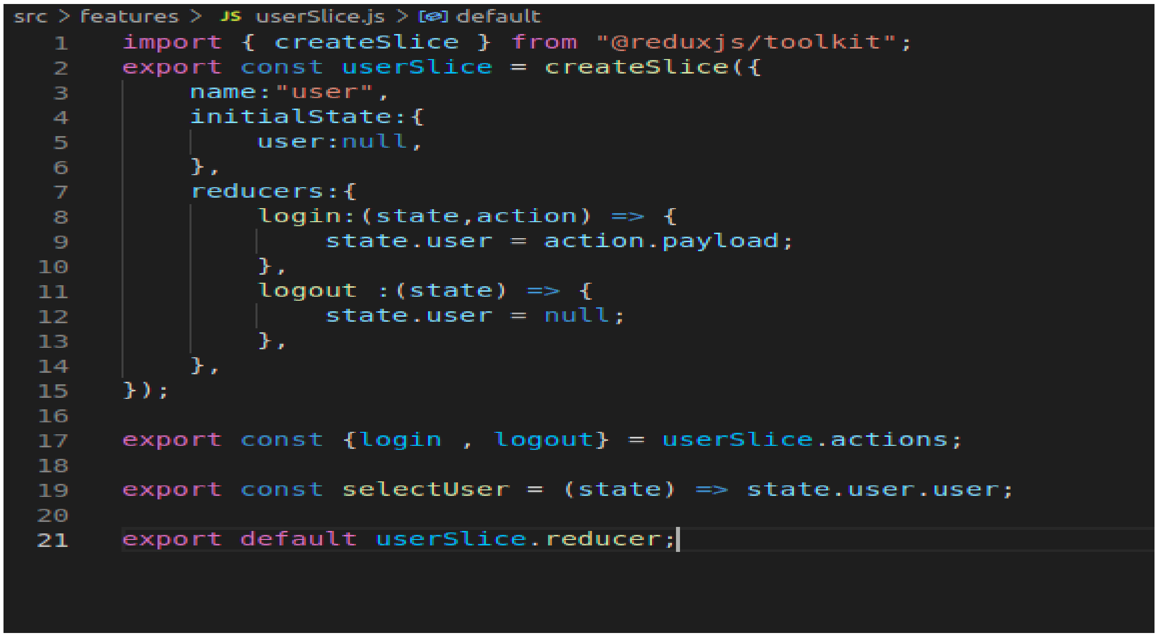


```
import { configureStore } from "@reduxjs/toolkit";
import userReducer from "../features/userSlice";

export default configureStore({
    reducer:{
        user: userReducer,
    },
});
```

Fig12) Redux store

This is the code snippet for the redux store where the user credentials are stored in user.

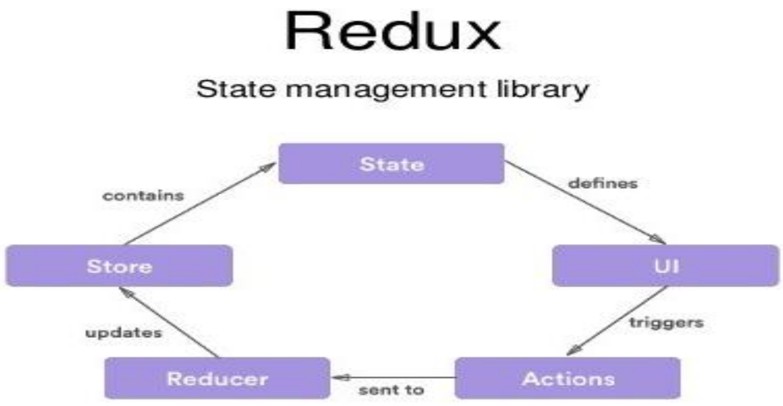
`



```
import { createSlice } from "@reduxjs/toolkit";
export const userSlice = createSlice({
    name:"user",
    initialState:{
        user:null,
    },
    reducers:{
        login:(state,action) => {
            state.user = action.payload;
        },
        logout :(state) => {
            state.user = null;
        },
    },
});

export const {login , logout} = userSlice.actions;

export const selectUser = (state) => state.user.user;

export default userSlice.reducer;
```

Fig13) Redux userSlice

The user slide component basically is used here to toggle between login and logout states using user actions. The user credentials which we want to store for our app will be stored in login component in dispatch section.



`

Fig14) Redux workflow

After that these credentials can be used anywhere in the app.

React with redux

When value is spent on multiple components in your React project, React is usually hired. If you only need to use the state in one component and no other components are dependent on it, Redux is not required. Redux tracks track of app status in a single fixed (object) tree that can be directly converted. A new thing is formed when something changes (using actions and reductions). Redux makes it easy to track the status of your application. Another way to look at it is to help control the data you display and how you respond to user activities. Because having a circuit in the data management component is easy and requires you to think about structure.

To some extent, attaching the status to the resources of the child part works. This allows your components to interact with each other, but if you have a lot of data / could be used everywhere, it is best to use a reux-like solution to give access to a wider application. Lots of resources, bad jsx-code, and debugger-hell alternatives. Redux is also a clear way to manage API / database responses. Those calls should not be sprayed on all your parts.

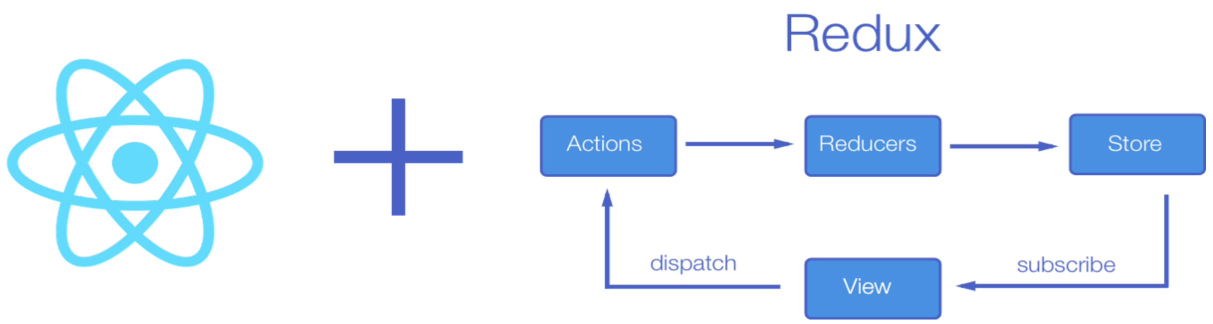


Fig15) React with Redux

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CHAPTER 4

4.1)Performance Analysis

4.1.1) Use Cases:

1)Employee

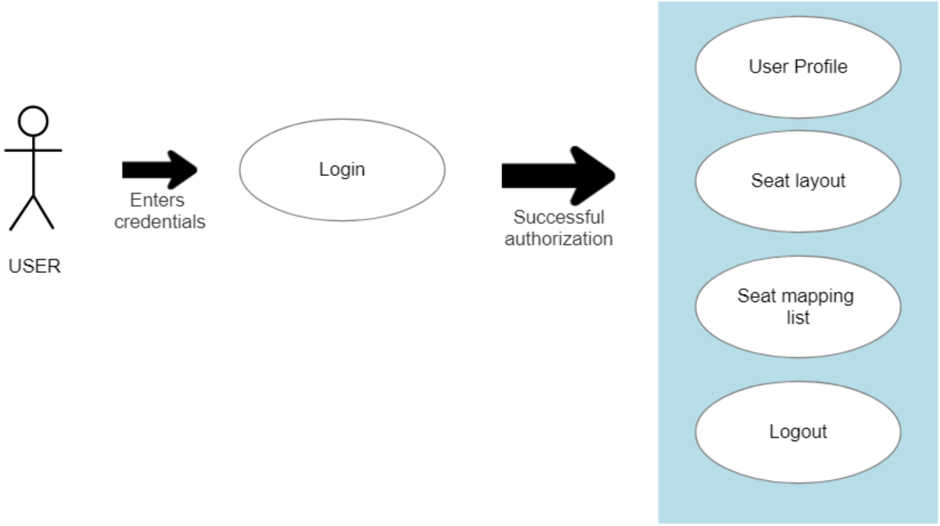

Fig16) Employee use case

- The employee will be able to secure a seat based on his preference for the upcoming day.
- The employee will be able to view the details, vaccination status and seat number of colleagues who have already booked a seat.
- The Employee will be able to view his details and update their vaccination status.

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- The employee will be able to update or cancel their booked seat.

2)Admin

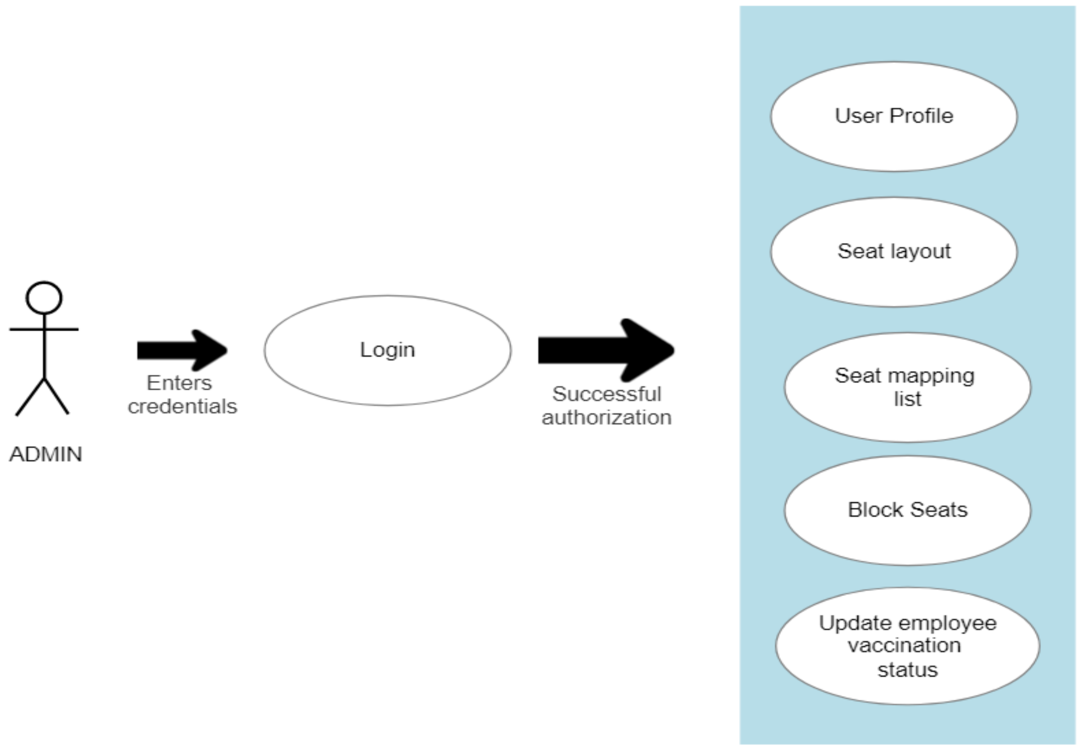

Fig17) Admin use case

- Admin will be chosen based on designation and will be redirected to admin dashboard
- Admin will have the privileges to block the seats and floors and also update the vaccination status of the employees.

4.1.2)Input Output mapping

- Login
    - Input: Employee uses the company credentials for logging in
    - Output: On successful login, employees will be redirected to the dashboard
    - Exception: Whenever the credentials entered are wrong
    - Status: Passed
- Dashboard
    - Description: Options for choosing the office location will be available for the employee.
    - Input: Choose the office location
    - Output: User can select the seat from the seat selection section of the dashboard.
    - Exception: Redirection to dashboard will not occur for invalid users
    - Status: Passed
- Seat Selection
    - Description: A map of seating arrangement of the office will be shown.
    - Available seats: The available seats will be shown in normal white color. The employee will be allowed to select only from the available seats. Also one user can select only one seat.
    - Booked Seats: The booked seats will be marked in red color. When the employee hovers over these seats, the details of the fellow employee who has booked that particular seat will be displayed along with their vaccination status. Using this information the employee can accordingly select the seat to ensure his/her safety.
        - Constraints: One employee can secure only one seat.
        - Input: Secure a preferred seat and submit to book it.

`

    - ➢ Output: A success message will pop up on successful booking.

  - Constraints: One seat for one employee
  - Status: Passed
  - Admin privileges: Admin can block multiple seats but select only one seat

- Seat mapping list
  - Description: A catalog of employees along with their respective booked seat numbers will be listed.
  - Input: Click on the tab to view the seat mapping list
  - Output: Details of the employees who have booked the seats will be shown along with their seat number and vaccination status.
  - Status: Passed

- User Profile
  - Description: Click on the user profile link from the navigation bar and the user information will be displayed.
  - Constraints: employees cannot update their information on their own
  - Status: Passed

- Logout
  - Description: On clicking the logout button, employee will be redirected to the login page again.

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- Status: Passed

CHAPTER 5

5.1) Results

5.1.1) Login Page

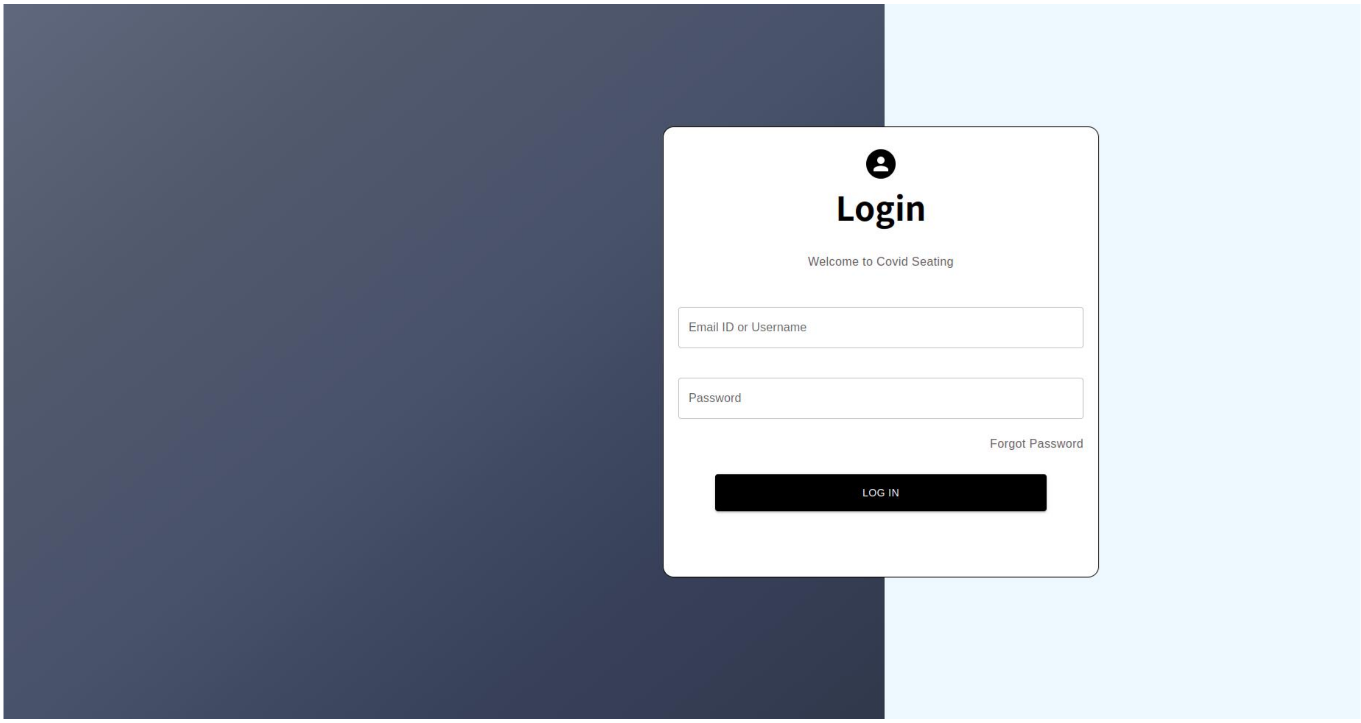

Fig18) Login page

The Login page consists of two fields which are Email Id where the employee work credentials are expected to be entered.

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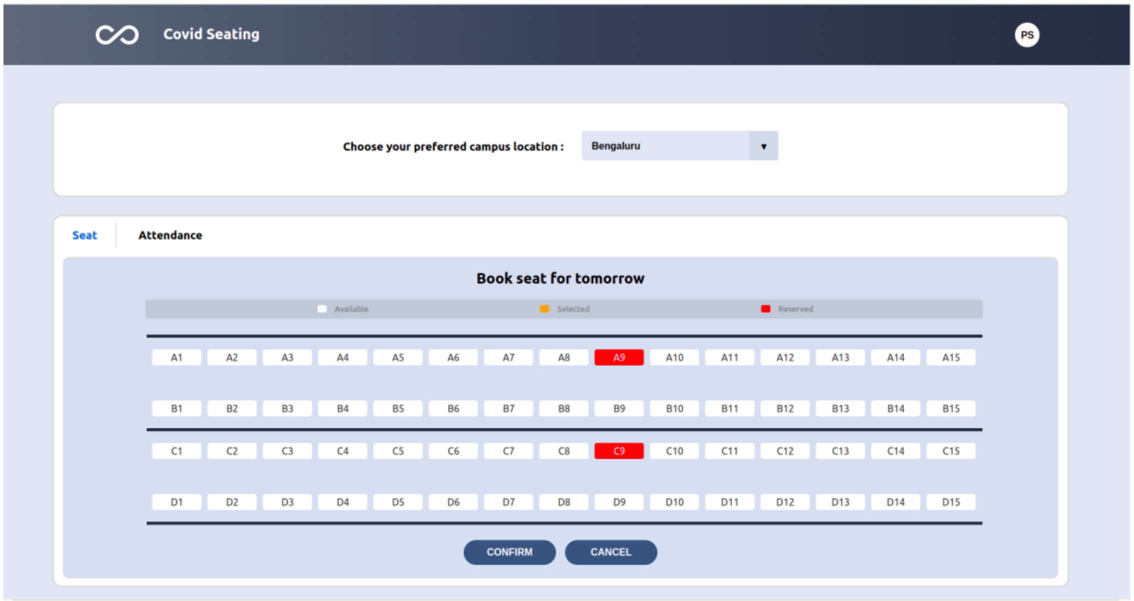
The second field is the password which is set by the company authorities and the user needs to enter the same.

5.1.2) Employee Dashboard



Choose your preferred campus location : Bengaluru ▾

Book seat for tomorrow

⬜ Available 🟧 Selected 🟥 Reserved

A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15
B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15
C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15
D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15

Fig19) Employee Dashboard

The employee dashboard consists of components which are Navabar, Seat Sealection layout and Attendance/Seat Mapping List. Each component is rendered indivisually with its own folder with javascript file and css files. This provides ease of readability and manages the different sections of the web-app in a proper manner.

5.1.3) Employee Profile page

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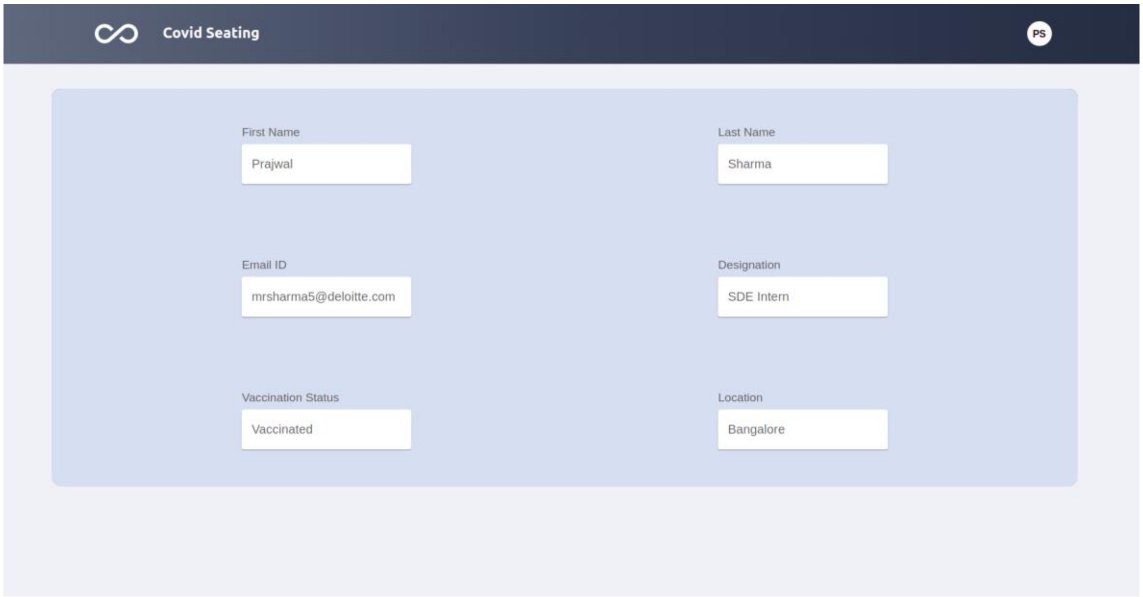


First Name
Prajwal

Last Name
Sharma

Email ID
mrsharma5@deloitte.com

Designation
SDE Intern

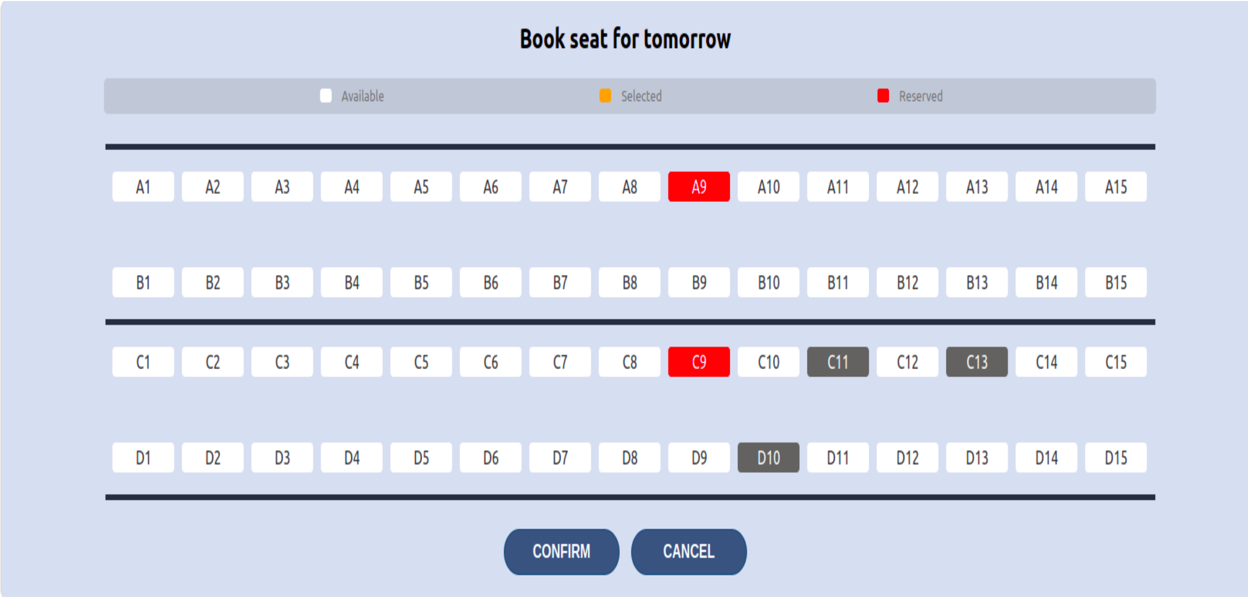
Vaccination Status
Vaccinated

Location
Bangalore

Fig20) Employee user details page

The employee profile page consists of the various details of the employee such as name, designation, email id, vaccination status and office location.

5.1.4) Seat Booking Layout



Book seat for tomorrow

□ Available 🟧 Selected 🟥 Reserved

A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15
B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15
C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15
D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15

Fig21) Seat booking layout

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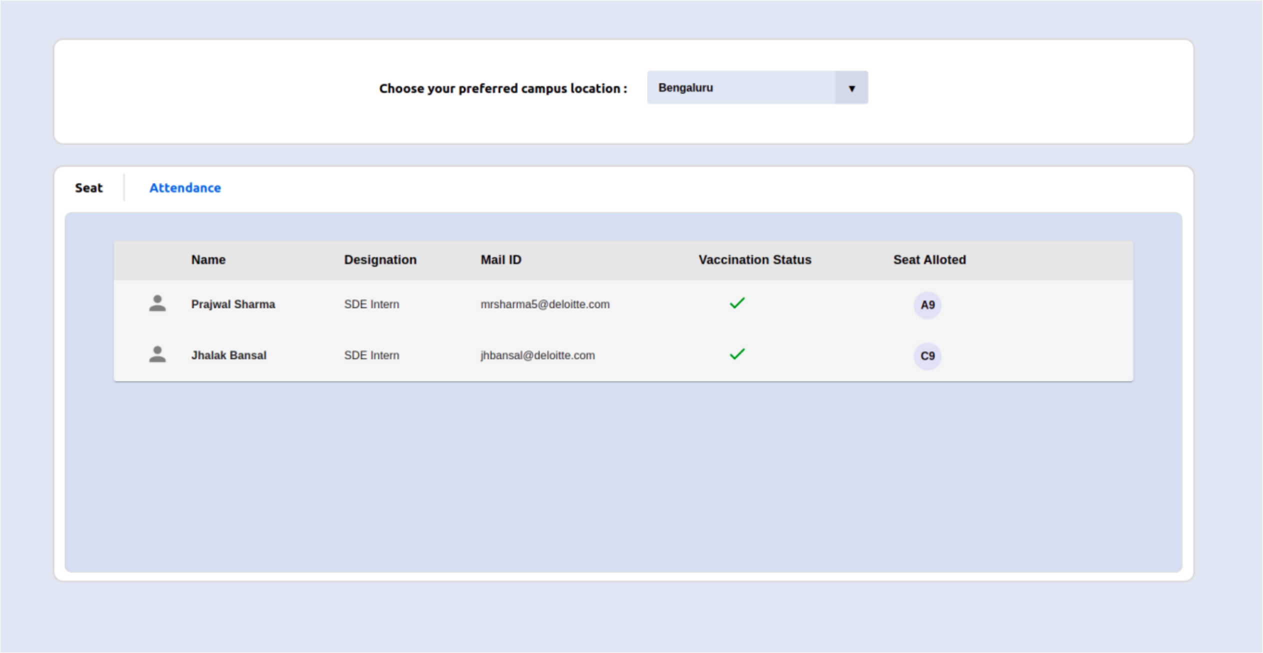
In the seat booking layout the available seats can be seen in white colour, the already booked seats are in red colour and the seats blocked by the admin can be seen in gray colour. The employee can only choose from the list of available seats and upon seting them the seat colour will change to yellow and on clicking on confirm button the seat will be selected.

If the user changes his mind he can also cancel the seat booking and book another seat.

On hovering over the booked seat, the employee can see details of the fellow employee who has booked the seat.

5.1.5) Seat Mapping List to view the booked seats with the employees who have booked them



Choose your preferred campus location : Bengaluru ▾

	Name	Designation	Mail ID	Vaccination Status	Seat Alloted
	Prajwal Sharma	SDE Intern	mrsharma5@deloitte.com	✓	A9
	Jhalak Bansal	SDE Intern	jhbansal@deloitte.com	✓	C9

Fig22)Seat Mapping List

The employee can view the attendance list where the employee details along with the vaccination status can be

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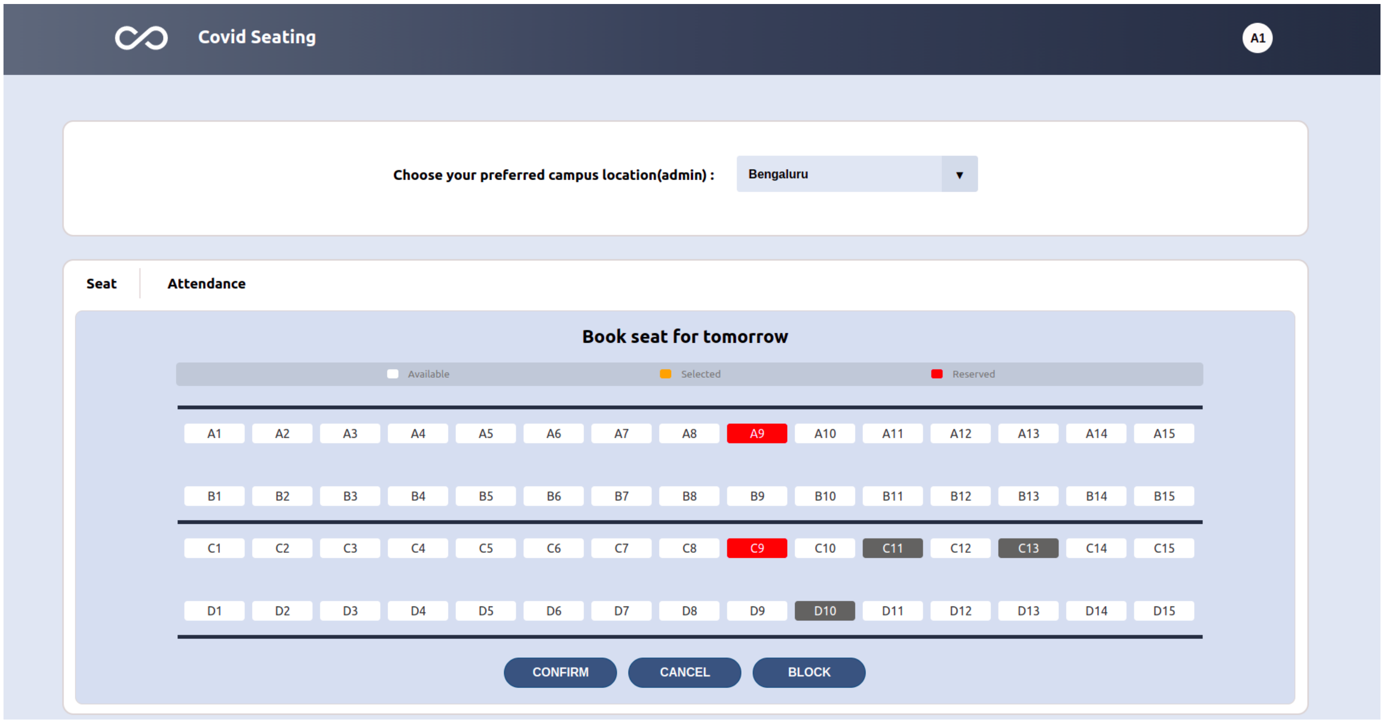
seen along with the seat he/she has booked.

5.1.6) Admin Dashboard Page



Choose your preferred campus location(admin) : Bengaluru

Book seat for tomorrow

□ Available 🟧 Selected 🟥 Reserved

A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15
B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15
C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15
D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15

Fig23) Admin Dasboard

For Admin, an additional functionality to block seats has been added, where admin can block any number of seats if those seats are to be kept for no use for the next day.

5.2)Conclusion

This Internship was indeed very insightful and a pool of knowledge where I not only gained not only a lot of knowledge in Full stack development but I have also learned how to work in team and how the development

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and deployment of a production project takes place. Apart from Full Stack development I also learned a lot about cloud services particularly GCP, docker and CI/CD pipeline for efficient deployment of code. I also got a lot of insight on Git commands and how code sharing occurs between team mates and how all the changes made by one particular team member can be fetched by all team mates.

The product month was the most insightful which happened after training where we were divided in teams and were given a problem statement upon which we had to ourselves create the system design and workflow of the product. We were assigned Product coach, Tech coach and design coach who helped us with the various aspects of the project. I learnt a lot of new things and was able to apply my knowledge from the training to build a real life product which was Covid Seating. I worked both in backend and frontend.

Working on a real life project like Covid Seating, I realized the need os such products in the market right now as the covid pandemic has made it difficult for employees to visit their offices on regular basis. Due to this many companies have started hybrid mode of work for employees where they will be visiting offices for few days in the week. Also the need of being healthy and preventing the employees from getting infected by covid becomes a driving force for many companies to use this product so that the overall well being of the employees is not compromised with.

The various concepts and tech stacks used in this project has become a great insight for me regarding the currently popular technologies and the advancements in them.

5.3)Application

Due to the COVID 19 pandemic, the overall scenario of the way people are working and the offices are operating has changed immensely. This has given rise to hybrid mode of working where employees can visit the office on some particular days. Using COVID SEATING the employees will be able to make this hybrid mode of working more efficient and easy by being able to book a seat of their preference for the upcoming day. And the next day they visit the office they would need not worry about wasting their time on choosing a seat for themselves, or worry about if the person sitting next to them is vaccinated or not as they would have already seen the details of the fellow employees in the application.

`

5.4)Future Scope

The future work for this project would be to create different layouts for different floors of the office with a more detailed description of the seat location. This will provide the user a more view of the seat he would be securing for the upcoming day. Also the employees could add their vaccination certificates in order to verify their status of vaccination. Also SSO can be added if the company gives permission for it, and by using that we will be able to login using SSO and the need for hard coding the users would not be required.

I would also like to extend my work by integrating this product with the already available company dashboard applications so that employees can avail the benefit of office related tasks all in one roof. Also creating a 3D seat layout for the seat selection section will not only provide a good user experience but will also help in the employees deciding the exact location they want to be seated the next day. We can also add the functionality of forgot password, where on forgetting the password the administration would be able to contact the employee and provide a new password.

Also a scheduler can be created which would be integrated with the application such that it would send an email to the employee whenever it is their day to be in the office. This way the employee will have a clear idea as to when he will be working in the office. The social distancing feature can be added, where if any non vaccinated person books a seat, then the seats besides him would be automatically blocked.

`

5.5)References

1) *becurious.edcast.eu*

2) *https://javascript.info/*

3) *https://reactjs.org/*

4) *Vardakis, Angelos & Kaklamanis, Christos & Papaioannou, Evi. (2019). AN ONLINE SEAT-BOOKING APPLICATION FOR CULTURAL EVENTS. IJASOS- International E-journal of Advances in Social Sciences. 487-496. 10.18769/ijasos.592737.*

5) *Condell, Joan & McDevitt, J. & McGilloway, D. & McGlinchey, J. & Galway, G.. (2008). Seat Booking System for a Cineplex. Computer and Information Science. 1. 67-79. 10.5539/cis.v1n2p67.*

6) *Youtube tutorials*

7) *Company Study Material*

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