 HSBC

Automated Meeting Room Booking System

# CODEFURY 2024

## Team: NAGS

## MOB\_PUN\_TEAM 1

# Introduction

The Automated Meeting Room Booking System is a comprehensive solution designed to streamline the process of booking, managing, and viewing meeting rooms within an organization. This system addresses the common challenges faced by companies in managing their meeting spaces efficiently, ensuring that all employees have access to the resources they need, when they need them.

The system is tailored to handle multiple user roles—Admins, Managers, and Members—each with specific functionalities and access levels. Admins are responsible for creating and managing meeting rooms, ensuring that all available resources are up to date and accurately represented in the system. Managers can book rooms based on their specific requirements, such as seating capacity and available amenities, while Members can view their meeting schedules but do not have booking privileges.

The goal of this system is to enhance organizational efficiency by automating the booking process, reducing the likelihood of double bookings, and providing a clear overview of room availability and schedules. By implementing a role-based access control system, the Automated Meeting Room Booking System ensures that users interact with the platform in a manner consistent with their responsibilities, leading to a more streamlined and organized workflow.

# Technology Used

The Automated Meeting Room Booking System is built using a combination of frontend and backend technologies that ensure it is scalable, responsive, and secure. The key technologies used in the development of this system are as follows:

**3.1 Frontend Technologies**

* **HTML5:** Provides the structural framework for the user interface, ensuring that the content is organized and accessible.
* **CSS3:** Used for styling the application, with an emphasis on responsive design to ensure compatibility across various devices, including desktops, tablets, and mobile phones.
* **JavaScript (ES6+):** Powers the interactivity of the frontend, managing dynamic content updates, form validations, and other client-side operations. Modern features of JavaScript, such as asynchronous programming and ES6 modules, are leveraged for efficient and maintainable code.
* **Bootstrap/Material-UI:** These frameworks are utilized to streamline the styling process, offering pre-designed components that are both aesthetically pleasing and functionally robust.

**3.2 Backend Technologies**

* **Java:** Serves as the primary programming language for the backend logic, handling user authentication, role-based access control (RBAC), room management, and booking processes.
* **JUnit:** A testing framework used to write and execute unit tests for the backend code, ensuring that the system functions as expected under various conditions.
* **Java Collections Framework:** Utilized extensively for managing user data, room details, and booking information, allowing for efficient data manipulation and retrieval.

# Architecture

The architecture of the Automated Meeting Room Booking System is designed to be modular, scalable, and secure, ensuring that it can handle the needs of a growing organization while maintaining a high level of performance and reliability. The system architecture is divided into the following key components:

**4.1 User Management**

The user management module handles the registration, authentication, and role assignment of users. This module ensures that only authorized users can access specific functionalities based on their roles (Admin, Manager, or Member). It is designed to be flexible, allowing for the addition of new roles or modification of existing ones as the system evolves.

**4.2 Room Management**

The room management module is responsible for the creation, updating, and deletion of meeting rooms. Admins use this module to define room attributes such as seating capacity, available amenities, and booking price. This module ensures that all rooms are properly configured and available for booking.

**4.3 Booking System**

At the core of the application is the booking system, which manages the process of searching for available rooms, making bookings, and tracking scheduled meetings. This system integrates closely with the user management and room management modules, ensuring that bookings are made in accordance with user privileges and room availability.

**4.4 Schedule Retrieval**

This module allows users to view their meeting schedules, providing a clear overview of their upcoming meetings, including room details and timings. For members, this module is the primary interface for interacting with the system, ensuring that they are always informed of their meeting commitments.

**4.5 Data Flow and Integration**

Data flow within the system is designed to be efficient and secure. User inputs are validated at the frontend before being sent to the backend for processing. The backend processes the data, interacts with the database (planned for future versions), and returns the appropriate responses to the frontend. The architecture is designed to facilitate easy integration with external systems via APIs, ensuring that the system can grow and adapt to new requirements.

This detailed documentation provides a comprehensive understanding of the Automated Meeting Room Booking System developed by Team NAGS for the Codefury hackathon. The system's design and future plans ensure that it is a robust, scalable, and secure solution for managing meeting room bookings within any organization.

# Future Plans

As the Automated Meeting Room Booking System evolves, there are several enhancements and features planned to improve its functionality and user experience:

**2.1 Database Integration**

Future iterations of the system will include the integration of a robust database system, such as SQL or NoSQL, to provide persistent storage for user data, room configurations, and booking history. This will not only enhance data retrieval speeds but also ensure data integrity and security over time.

**2.2 Enhanced Security Features**

Security is a paramount concern, and future updates will introduce advanced security measures, including encrypted password storage, multi-factor authentication (MFA), and JSON Web Tokens (JWT) for secure session management. These enhancements will protect user data and prevent unauthorized access to the system.

**2.3 API Development**

To allow for greater flexibility and integration with other corporate systems, a RESTful API will be developed. This API will enable external applications to interact with the Automated Meeting Room Booking System, allowing for features such as automated booking via email or integration with calendar systems like Google Calendar or Microsoft Outlook.

**2.4 UI/UX Improvements**

The user interface will undergo continuous enhancements to ensure a seamless experience across all devices. Planned improvements include the adoption of modern frontend frameworks such as React or Angular, providing a more dynamic and responsive user interface. Additionally, user feedback will be incorporated to refine the overall design and usability of the platform.

**2.5 Reporting and Analytics**

A reporting and analytics module will be added to give admins and managers insights into room usage patterns, booking trends, and user behaviour. These insights will help in optimizing resource allocation and making data-driven decisions regarding meeting room management.