

General and Detailed Design

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CIS-330-01 System Analysis & Design

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1. System of Interest

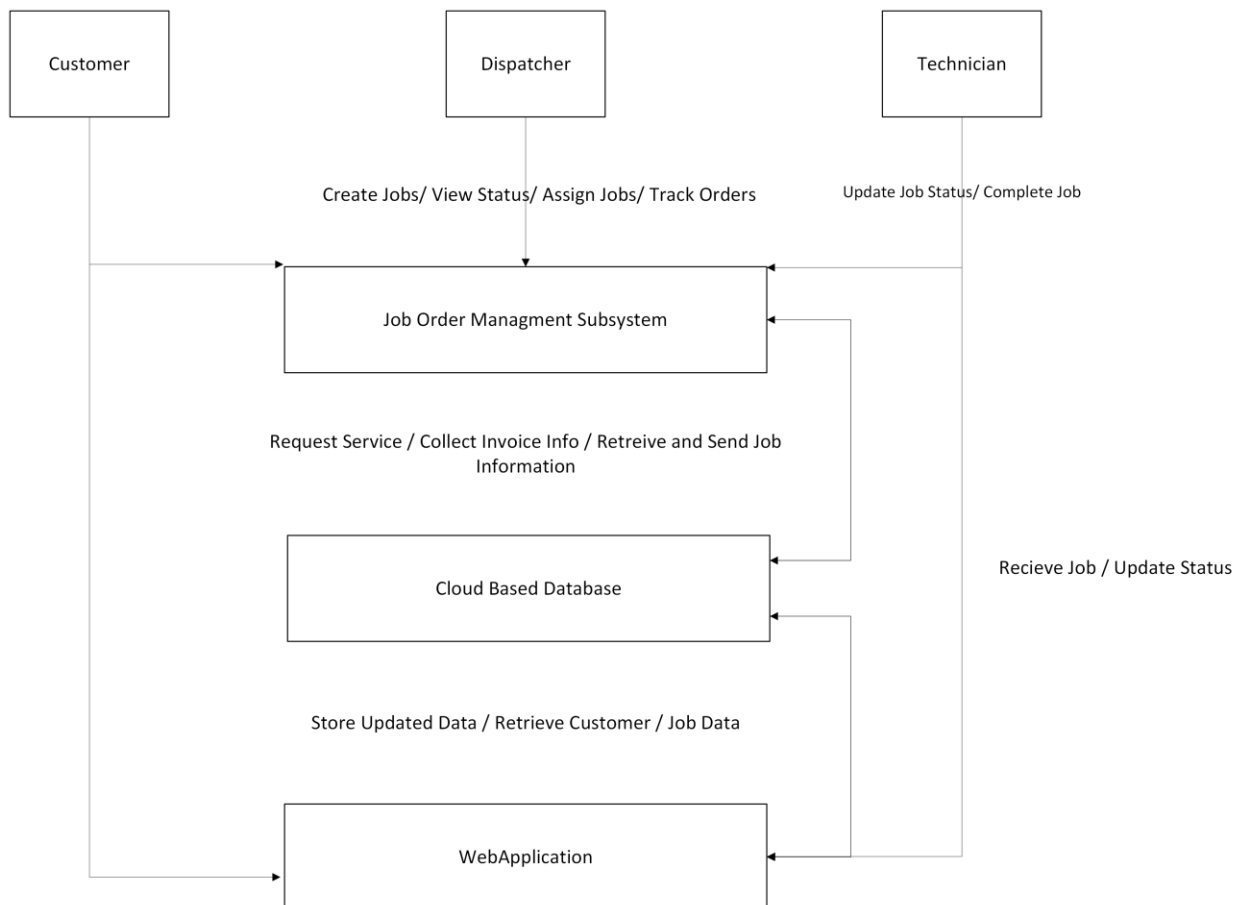
Our Field Service Management System for Price Heating and Air consists of three main subsystems designed to streamline service operations. This system will help manage job orders, schedule and dispatch technicians efficiently, and provide real-time information to service technicians and dispatchers. By integrating cloud-based storage and a web application, the system ensures seamless communication and data accessibility for all users.

The first subsystem is the Job Order Management Application, which handles job scheduling, tracking, and completion. Dispatchers will use this system to assign jobs based on technician availability and skill set. Job statuses, such as Pending, In Progress, and Completed, will be tracked within this subsystem to ensure efficient workflow management.

The second subsystem is a Cloud-Based Database, which will securely store all job orders, customer records, technician schedules, and invoices. This database ensures that all users have real-time access to accurate information. It will be designed with strong security measures to protect sensitive customer and financial data while maintaining system reliability.

The third subsystem is the Web Application, which will serve as the primary interface for technicians and dispatchers. Technicians will use the app to receive job details, update job statuses, and generate invoices, while dispatchers can use it to enter service requests, track technician arrival times, and confirm payments. The web application may be developed for use with web browsers, ensuring broad accessibility and even allowing use with mobile devices.

These three subsystems will work together to create an efficient and user-friendly Field Service Management System. The integration of real-time data, cloud storage, and web browser/mobile accessibility will help Price Heating and Air improve service response times, enhance customer satisfaction, and optimize field operations.



2. Environment

The proposed Field Service Management (FSM) system will be deployed on Google Cloud Platform (GCP), providing scalable, secure, and cloud-native infrastructure. It will be accessible on a wide range of devices and operating systems, including Windows 11, iOS, and Android, ensuring compatibility for both onsite computers and off-site mobile devices such as phones and tablets.

The FSM will integrate with the organization's existing Identity and Access Management (IAM) system to provide secure, role-based authentication across all platforms. Users,

whether office staff or field technicians, will be able to access real-time data and services through a responsive interface tailored to their devices.

Data synchronization will occur instantly across all user touchpoints, allowing seamless coordination between mobile users in the field and desktop users at headquarters. The system will also support integration with external systems via APIs for email notifications, cloud file storage (ex. Google Drive), and potential CRM or analytics platforms.

In summary, the FSM system will enhance operational efficiency by unifying communication, data access, and task management across all devices and systems, while leveraging the power and flexibility of GCP and existing company technologies.

In terms of device usage, the FSM system will be fully optimized for:

- Mobile phones and tablets, enabling technicians and supervisors to receive work orders, update job statuses, capture images, collect signatures, and communicate with customers in real-time.
- Desktop and laptop computers, used by dispatchers, customer service agents, and management teams for scheduling, reporting, and administrative functions.

3. Application Components

The key parts of this FSM will be divided into three primary components: the cloud database, web app, and the application hosting server. All of these will be purchasable, however the software and environment for these components will be developed in-house.

The design application components will consist of functional parts of the system that will handle specific tasks. The key parts will include the user interface, authentication & authorization, device integration, and data storage components. There will also be integration APIs alongside a security layer.

Size/Scope:

Functional Scope:

- Track customer job orders, including service date, location, and issue details.
- Allow dispatchers to assign jobs to technicians based on availability and skill.
- Let technicians view job details, update job status, and record service notes.
- Generates and stores invoices and reports for completed jobs.

Out-of-Scope:

- Does not handle payroll or HR tasks.
- Will not include real-time GPS tracking of service vehicles (at this stage).
- Does not include a full CRM (Customer Relationship Management) component.
- Does not allow customers any access to the system.

Programming Languages:**Job Order Management Application-**

The Job Order Management Application will be developed using C# and the .NET framework for use on windows workstations.

Web Application-

The web application will utilize the Django (high-level Python web framework) for simple, practical, and cheap design of the web app. Django utilizes standard HTML, CSS, JavaScript and Python for development. Interactions with APIs will utilize JSON data formatting.

Database:

The database will utilize PostgreSQL as its open-source relational database management system (with the use of SQL as its query language). This DBMS is well supported with Django and allows for JSON data to be stored efficiently along with standard relational database structured data.

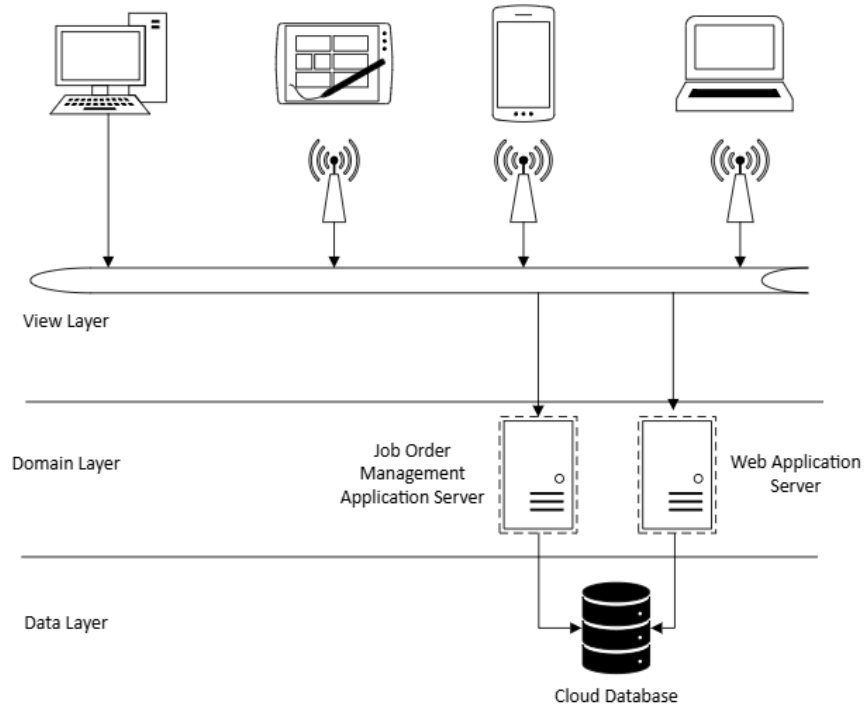
Build or Buy:**Build:**

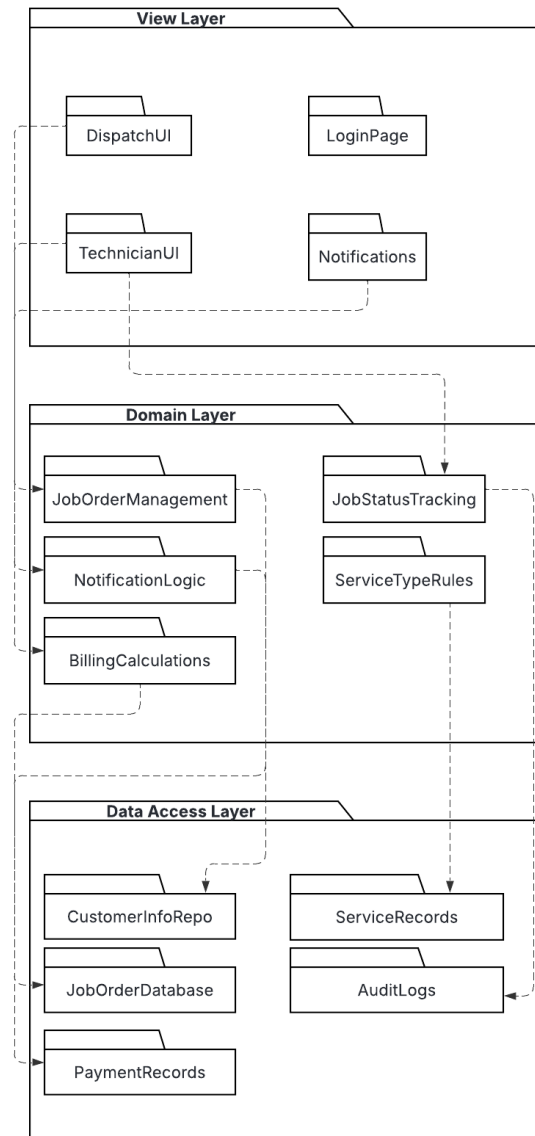
- Web Application
- Job Order Management Application
- Web User Interface
- Database

Buy:

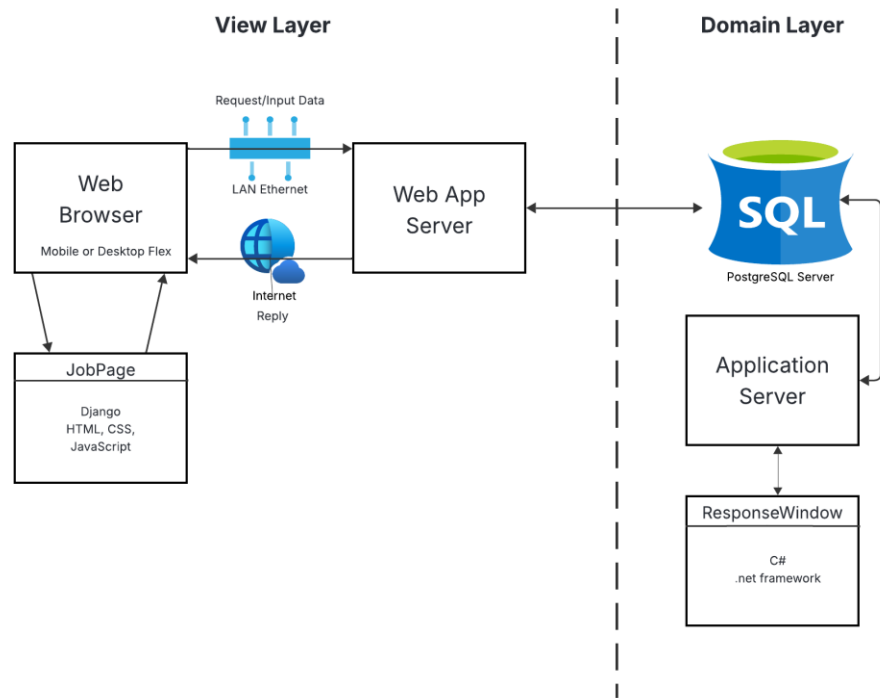
- Google Cloud Services/Hosting

Deployment Diagram





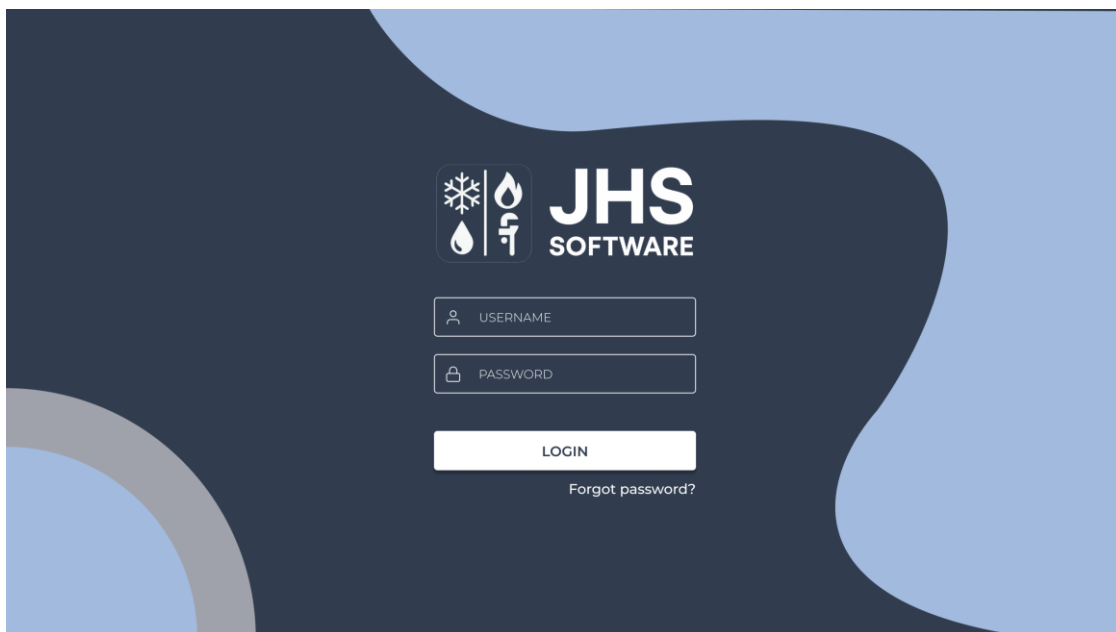
Package diagram

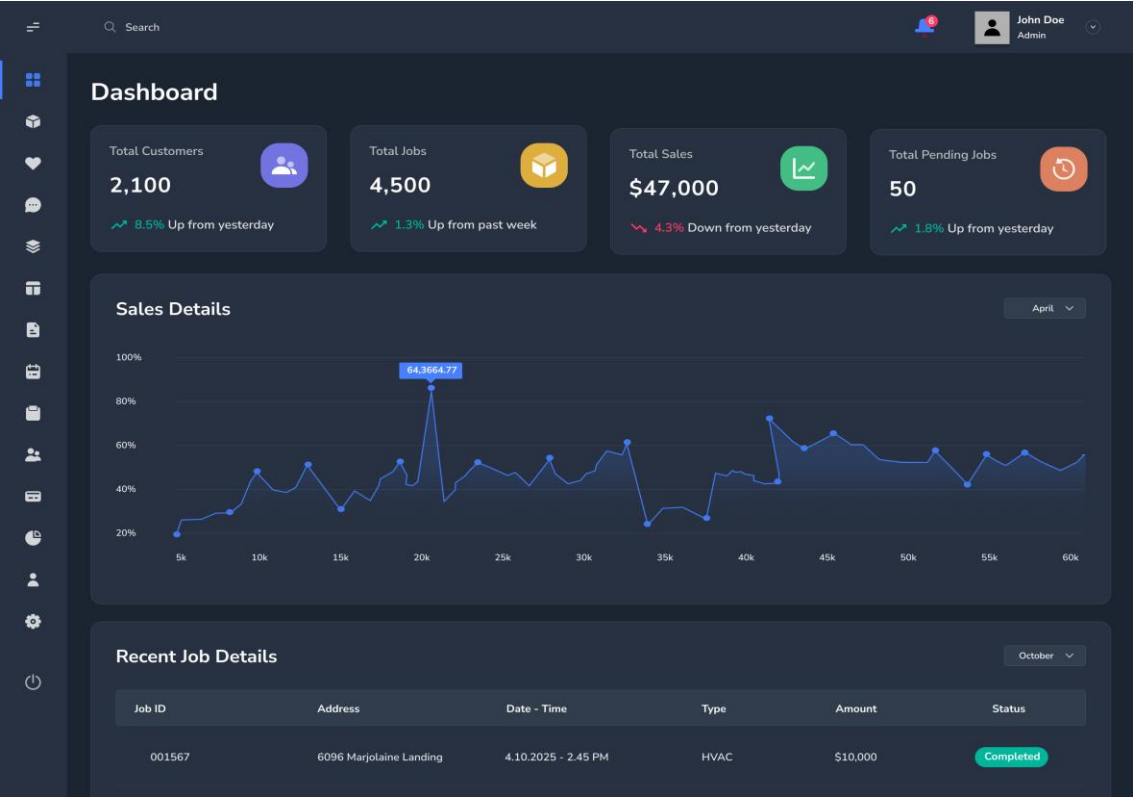


Component Diagram

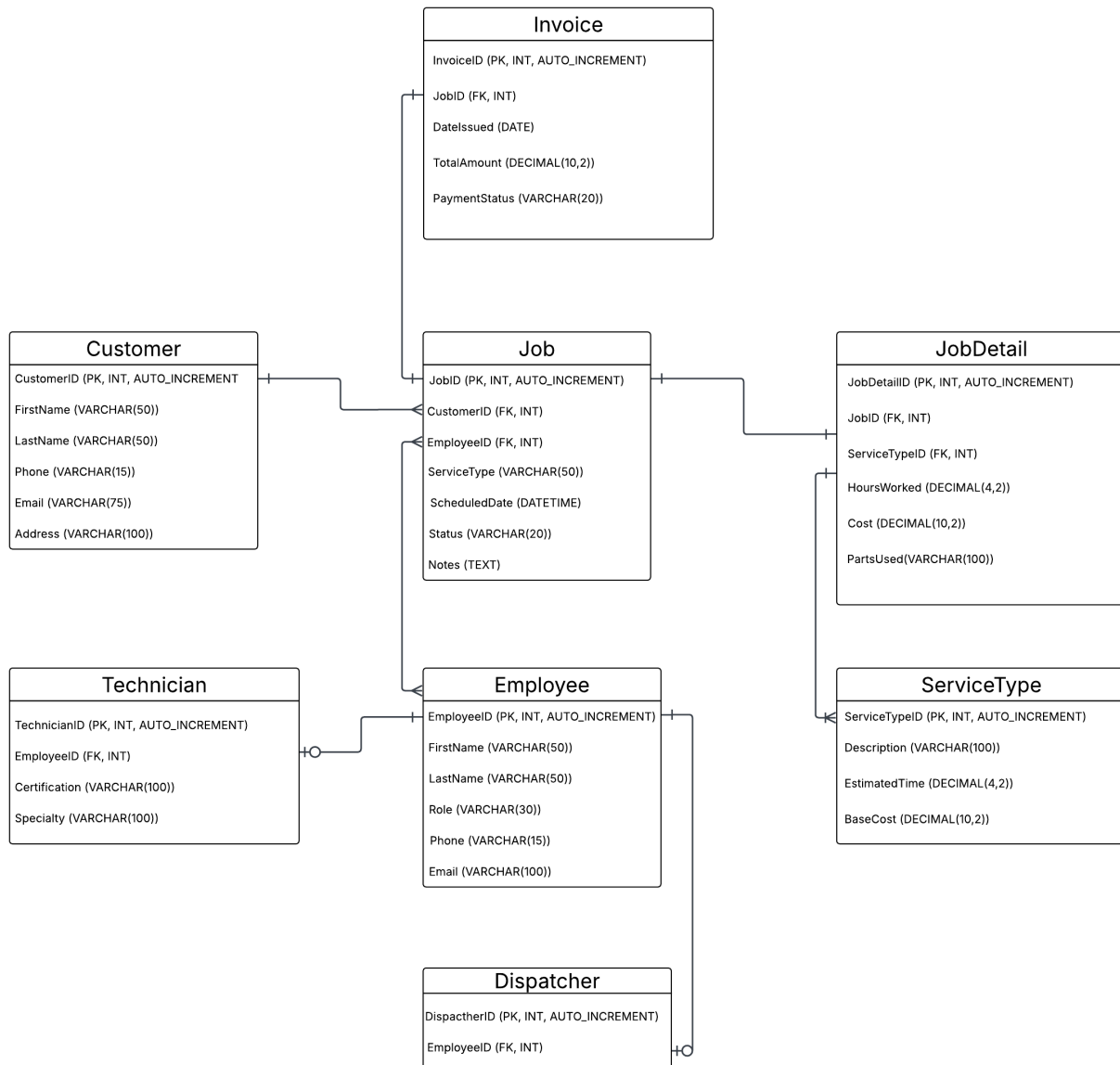
4. User Interface

For our user interface, a user will be able to log in with their credentials onto the JHS platform. They will first see the dashboard, where they will see common metrics like total pending jobs. They will also be able to choose other options on the left side vertical menu.



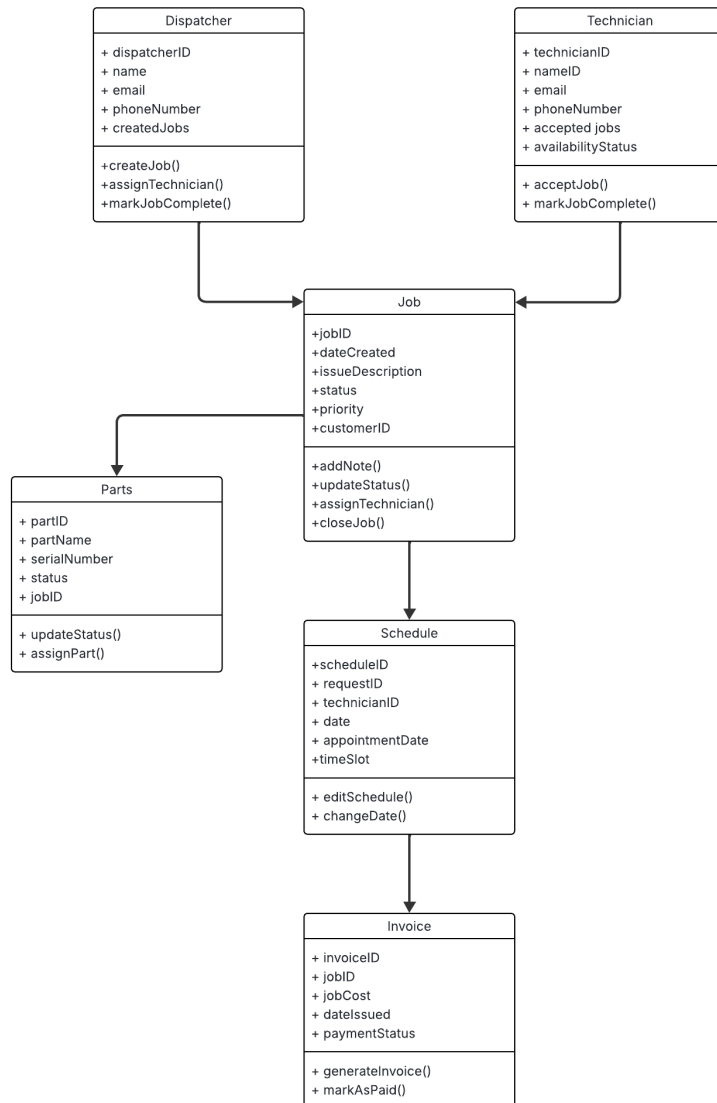


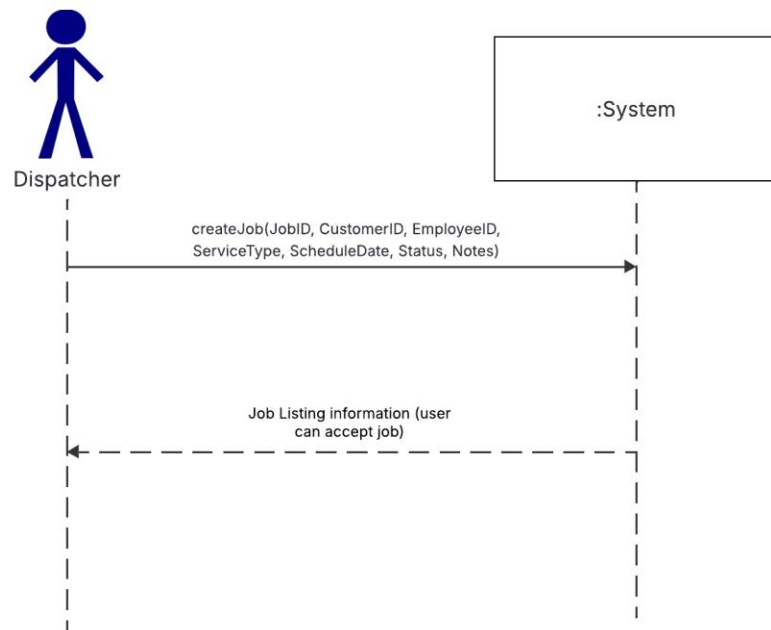
5.Database



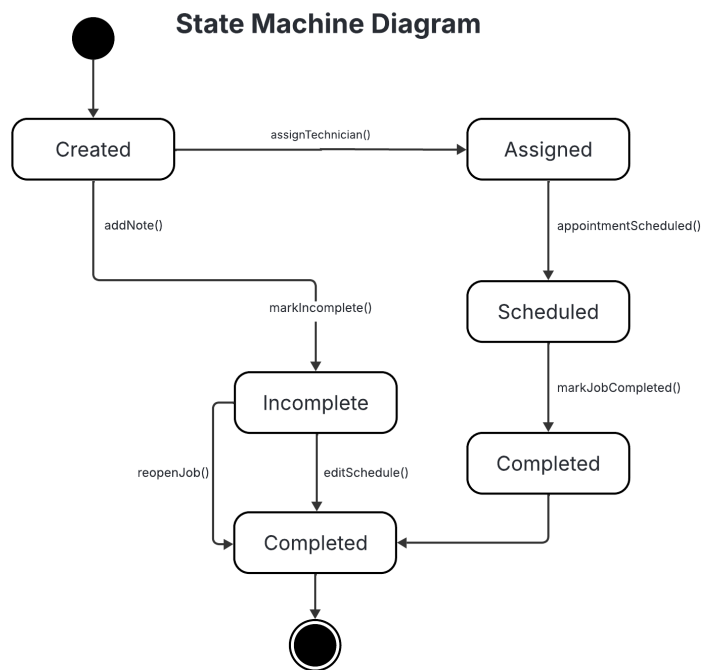
6. Software Classes and Methods

Class Diagram





System Sequence Diagram



State Machine Diagram