Project Proposal

Plumbing Service Management System

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August 18, 2025

1 problem analysis and motivation

The Plumbing Service Management System (PSMS) is a computerized platform that connects customers with professional plumbers for booking and managing plumbing-related jobs such as installation, repair, and maintenance. This system involves customers who need plumbing services and registered plumbers who provide those services.

In this system, a customer is a person who submits a booking request through the application or system interface, providing details such as service type, preferred date, and location. The plumber, who is a verified professional, can view job requests and accept or reject them based on availability and specialization. Once a job is assigned, the system updates the booking status and later generates an invoice after completion of the work.

For booking confirmation, customers may be required to provide authentication details such as their contact information, address, and sometimes an advance payment. This ensures the reliability of bookings and prevents fraudulent requests. The system will maintain accurate records of all customers, plumbers, services, job statuses, and invoices in a secure database.

As a large amount of service and transaction data is to be maintained, it is necessary to design and develop a system that will be high-performing, dependable, self-operating, and easily upgradable.

The Plumbing Service Management System will provide a secure, user-friendly interface for customers to book plumbing services from their homes, offices, or any location without the need for physical visits or manual coordination. The platform will streamline communication between customers and plumbers, track job progress, and ensure transparency in service costs and payments.

2   Literature Review

The demand for reliable plumbing services is increasing due to rapid urbanization and the growing dependency on efficient home maintenance. Traditional methods of hiring plumbers are often inefficient, time-consuming, and unreliable, leading to customer dissatisfaction and service delays. This paper proposes a Plumbing Service Management System (PSMS), a digital platform designed to connect customers with professional plumbers for installation, repair, and maintenance services.

The PSMS ensures transparency in the booking process, provides secure digital payment options, and supports real-time job tracking to increase trust and reliability. By incorporating automation, secure data management, and user-friendly interfaces, the system reduces the risks of fraud, improves efficiency, and offers a structured workflow for both customers and service providers.

Furthermore, the proposed model can be extended with advanced features such as IoT-enabled leak detection, predictive maintenance, and integration with smart home devices. Overall, the PSMS creates a sustainable and reliable service ecosystem, addressing both the operational challenges of plumbers and the convenience needs of customers in modern urban societies.

3 Methodology

A set of methods, practices, processes, techniques, procedures, and rules for development.
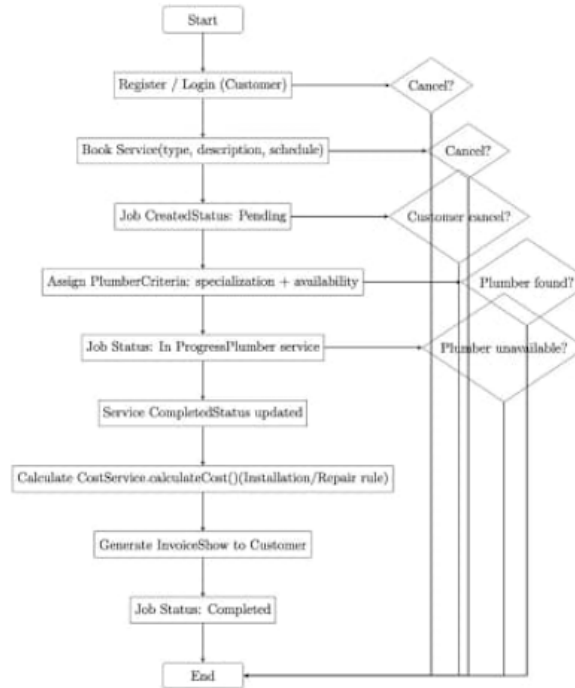

Figure 1: Flowchart of Plumbing Service Booking Process

4   Feasibility Study

The feasibility of the Plumbing Service Management System is considered in three areas:

Economic Feasibility

This project does not require expensive tools. We will use Java (open-source) and a free IDE (such as IntelliJ IDEA Community or VS Code). The system can run on a normal computer. The only cost is student time and effort, so it is economically feasible for us.

Technical Feasibility

The required technology is available. Java is taught in our course and supported by many free libraries. We have access to laptops, and we can build simple file-based storage for customers, plumbers, services, and job data. The project scope is small, so it is technically possible for beginners.

Operational Feasibility

The system will be easy to use because it provides a simple text-based menu. Customers, plumbers, and admin functions will be handled step by step. As students, we can operate and test the system ourselves, and it can be extended in future semesters.

5   Main Phases

1. **Requirement Analysis**
   We list what the system should do in short. Who will use it (customer, plumber, admin). Basic features: create customer, request a service, assign plumber, update job status, simple report. We will keep scope small for this semester.

2. **System Design**
   Make a basic use case diagram and a simple class diagram (Customer, Plumber, Service, Job). Decide the data storage (just text/CSV files). Console menu based interface is okay.

3. **Implementation**
   Write the classes and functions in Java. Main methods will include: displayInfo(), updateStatus(), calculateCost(). Add a simple menu (console-based) for add, list, search, and file save/load operations.

4. **Testing**
   Test each feature by hand with a few small test cases. Check common flows: create job, assign plumber, change status to Completed. Fix basic bugs we find.

5. **Deployment**
   Prepare a short README with how to run. Keep a small sample data file. Do a short demo run and submit the code.

Project Task Schedule for Plumbing Service Management System

| SL	Task	Duration (Weeks)	Responsible Person(s)	Phase
1	Requirement Specification & Data Collection	1–2	Project Manager & Team	Research & Planning
2	Requirement Finalization	3	Project Manager & Team	Analysis
3	System Design (UML, DFD, Class Diagram)	4–5	Team Members	Design
4	System Modeling & Finalization	6	Team Members	Design
5	System Development (Coding Classes: Customer, Plumber, Service, Job)	7–10	Developers	Implementation
6	Testing & Feedback Sharing	11–12	Developers & Testers	Testing
7	Beta Version Delivery & Feedback	13	Project Manager & Team	Testing
8	Final Delivery & Documentation	14	Project Manager & Team	Deployment

6   Work plan of the project
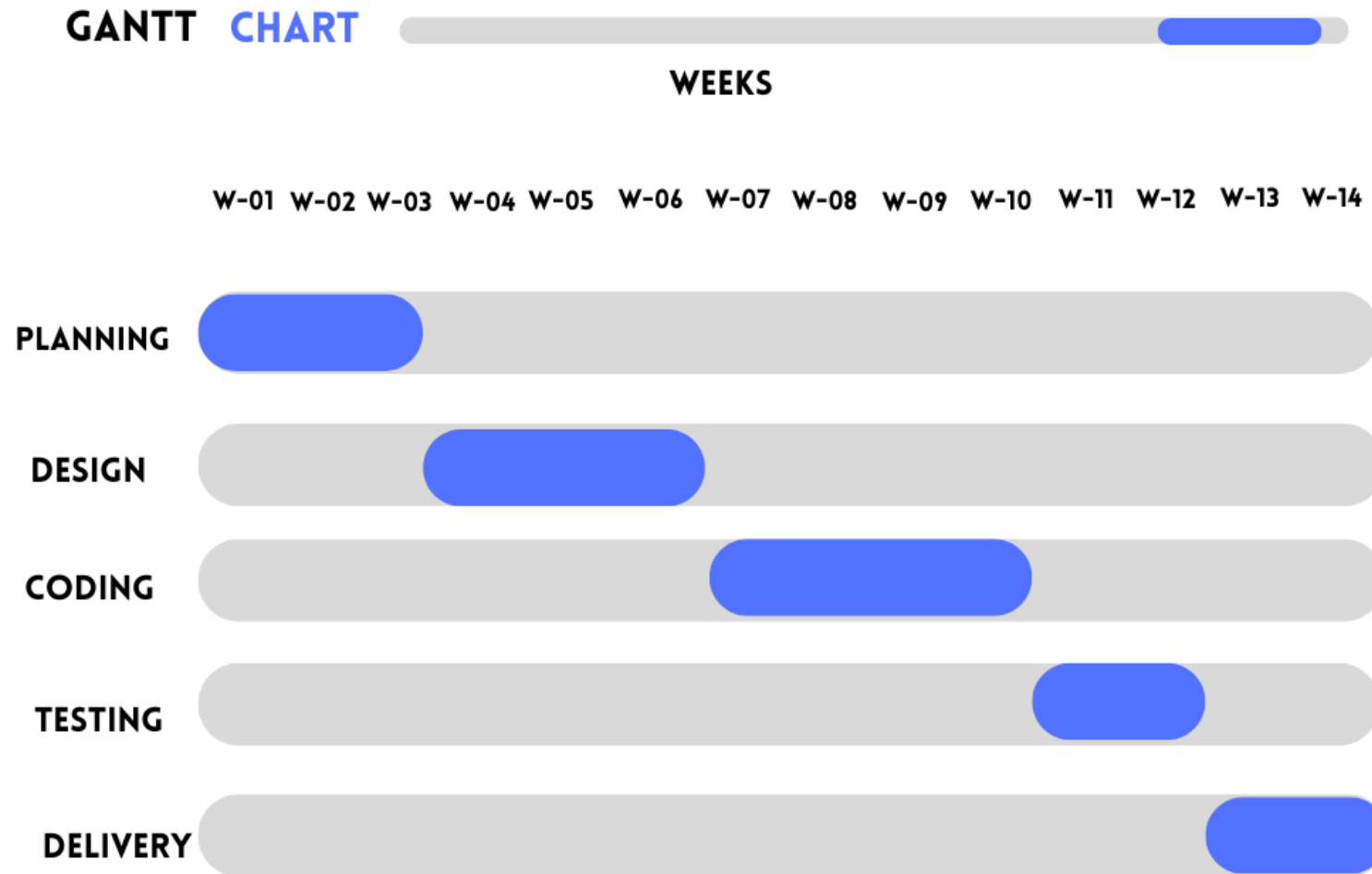
Figure 2: Gantt Chart for Project Timeline

7 Budget Details (Detailed Comparison)

SL	Criteria	Cost specification	Existing system (Tk)	New system (Tk)
1	Customer Class Cost	Team meeting	2500	2000
2		Customer search feature	10000	8000
3		Display customer info method	5000	4000
4	Plumber Class Cost	Plumber profile	12000	10000
5		Experience tracking	80000	60000
6		Specialization management	10000	8000
7	Service Class Cost	Service type handling (Install/Repair)	10000	8000
8		Service description management	7000	6000
9		Cost calculation method	5000	4000
10	Job Class Cost	Job booking system	15000	12000
11		Job status tracking	10000	8000
12		Invoice generation	7000	5000
13		Notifications	5000	4000
14		**Total cost**	**93500**	**75000**

8   Conclusion

The Plumber Service Management System (PSMS) effectively demonstrates the planning and implementation of an object-oriented project to manage plumbing services. By defining four main classes — **Customer**, **Plumber**, **Service**, and **Job** — the system provides a structured approach to handle customer information, plumber details, service offerings, and job bookings efficiently. Each class encapsulates relevant attributes and methods to perform specific functionalities, such as displaying information, calculating service costs, and updating job status.

The exercise has reinforced our understanding of project proposal planning and object-oriented design principles. Implementing this system has improved our confidence in developing scalable, maintainable software that automates service management tasks, ensures clear data organization, and enhances overall operational efficiency in a practical, real-world context.

References

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