# Software Requirements Specification

# PRJ566 – Winter 2025

# PRJ566 – Team No:

Team 06

# Name of Project:   Restaurant Management Application – ChowHub

# Project Leader:

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**Last updated:**

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# 1 - Introduction/Overview - Document Information

## 1.1 Document Authors

Mostafa Hasanalipourshahrabadi, Tingchen Tsao, Lily Huang, Furkan Bas, Saad Ghori

## 1.2 Revision History

|  |  |
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| Week 06 |  |
| Week 07 |  |
| Week 08 |  |
| Week 09 |  |
| Week 10 |  |
| Week 11 |  |
| Final |  |

## 1.3 Document Conventions

Any text in red indicates an exception or error.

Any text in blue is in-progress.

Any text highlighted in yellow is an important point.

Any text in green was recently added.

Any text *italicized* represents definitions.

Any text with ~~strike-through~~ is deleted.

## 1.4 Document Purpose

The purpose of this Software Requirements Specification (SRS) document is to clearly outline the requirements for developing the ChowHub Restaurant Management Application. It provides a detailed description of the system’s features, goals, and limitations, ensuring everyone involved in the project understands what needs to be built and how it will work.

This document is meant to guide the development team as they design, build, and test the application, while helping the project manager plan resources and timelines. It also ensures that restaurant stakeholders know what to expect from the application and can refer to it for any future updates or improvements. By clearly listing the project’s requirements, this SRS helps avoid misunderstandings, reduces risks, and makes it easier for everyone to work together effectively.

## 1.5 Intended Audience

The intended audience for this Software Requirements Specification (SRS) document includes everyone involved in the project. The development team—software developers, testers, and designers—will use it to build and test the system according to the requirements. The project manager will refer to it to manage resources, track timelines, and ensure the project stays on schedule. Restaurant owners or managers, as clients, may review the document to ensure the system meets their needs. The quality assurance team will use the requirements to check that the system works correctly, is user-friendly, and reliable. System integrators, who connect ChowHub to tools like POS platforms, will rely on it to ensure smooth integration. Technical writers might use the SRS to create user manuals or training materials. Lastly, future teams or vendors working on updates or expansions can refer to the document to understand the original system requirements and keep everything consistent. This SRS helps all parties work together effectively and stay aligned.

## 1.6 Group Agreement

**TEAM AGREEMENT**

**Team #:** 06

**Project Title:** ChowHub

**Project Time Frame:** January 6, 2025 – August 15, 2025

**Team Members:**

Furkan Bas

Lily Huang

Saad Ghori

Tingchen Tsao

**Team Leadership:** Mostafa Hasanalipourshahrabadi

**Team Functions:**

* Attend all scheduled online meetings on the team's channel on MS Teams.
* Communicate and collaborate through MS Teams chat or in the issues/discussion section of GitHub.
* Complete all assigned issues for the deliverables of the project by the designated soft deadline.
* Communicate in advance on the MS Teams channel or chat if there are any challenges or difficulties with any assigned tasks.
* Assist and support other team members to foster a collaborative and stress-free environment within the team.
* Submit the deliverable for the week by the soft deadline of 12:00 PM every Sunday. The group will review and finalize the work by 6:00 PM every Sunday.
* The group leader will submit the deliverable and review the GitHub repository by 9:00 PM every Sunday.
* If any member wishes to make a change after the leader has submitted, they must inform the team and obtain the leader's approval before making the change.

**Team Meetings:**

* The team will meet three times a week - Tuesday at 7:00 PM, Wednesday at 1:25 PM, and Sunday or Saturday at 1:00 PM, depending on team availability.
* The meetings will be on MS Teams, Team 06 channel.
* On Wednesdays, the team will meet with the professor to discuss and review the progress of the project. The other two meetings will be held within the team to discuss upcoming tasks, address any issues or concerns, and plan for the next steps.

**Team Problems:**

* **Conflict Resolution:** If conflicts arise, the team will address them through open discussion and mediation among its members and the leader. Should the issue remain unresolved, the matter will be escalated to the course instructor for further guidance.
* **Workload Distribution:** Tasks will be distributed equitably among all team members. If a team member is having trouble with their workload, they are encouraged to communicate with the team on the Teams’ channel, allowing others to collaborate and help.
* **No-Show Policy:** If a team member fails to complete the tasks assigned to them and does not communicate or attend meetings, the remaining team members have the authority to recommend their exclusion from the team, after notifying the course instructor.

**Team Commitment**

**The undersigned members agree to work together on the project until the end of the PRJ666 next Semester. They recognize that as a team and individually they are responsible for the quality of all deliverables.**

**Name Date**

|  |  |
| --- | --- |
| Saad Ghori | 01-26-2025 |
| Mostafa Hasanalipourshahrabadi | 01-26- |
| Tingchen Tsao | 01-26-2025 |
| Lily Huang | 01-26-2025 |
| Furkan Bas | 01-26-2025 |

# ShapeShapeShapeShapeShape2 - Project Overview

## 2.1 Project Proposal

**Project Background**

The restaurant industry has long faced operational challenges stemming from inefficient inventory management, fragmented systems, and difficulty in adapting to dynamic customer demands. Traditional approaches to managing inventory, employee shifts, menu operations, and supplier coordination often result in waste, overstocking, ingredient shortages, order cancellations, and dissatisfied customers. Additionally, restaurants often lack real-time insights into sales performance and ingredient usage, making it harder to optimize operations or make data-driven decisions. This project seeks to address these inefficiencies through a streamlined, centralized solution—ChowHub. ChowHub integrates inventory management, automated menu updates, advanced sales analysis, supplier coordination, employee management, shift tracking, and secure POS integration, tailored specifically for the fast-paced, small-to-mid-sized restaurant environment.

**Problem Statement**

|  |  |
| --- | --- |
| The Problem of: | Inefficient inventory tracking, ingredient shortages, overstocking, waste, fragmented operational systems, and limited data-driven decision-making. |
| Affects: | Restaurant owners, managers, staff (including waitstaff and kitchen staff), and ultimately, customers. |
| The impact of which is: | Increased operational costs, loss of revenue due to waste or missed sales opportunities, reduced employee productivity, lower customer satisfaction, and difficulty in scaling operations effectively. |
| A successful solution would: | * Reduce waste through real-time inventory tracking and customizable low-stock alerts. * Automate menu updates based on ingredient availability to prevent unfulfilled orders. * Streamline employee and shift management, reducing manual administrative tasks. * Improve operational efficiency by integrating with existing POS systems to avoid costly replacements. * Enhance customer satisfaction by ensuring timely service, consistent food quality, and minimal operational disruptions. * Provide actionable analytics, such as identifying top-selling menu items, peak sales times, and cost-saving opportunities. * Prioritize security and privacy by implementing strong encryption standards and enabling on-premises data storage. |

**Product Vision**

|  |  |
| --- | --- |
| For | Small-to-mid-sized restaurant owners or managers who need a cost-effective and efficient way to handle inventory, supplier coordination, menu operations, and employee management. |
| Who | Require a streamlined, integrated system to track inventory, manage suppliers, assign shifts, and optimize backend operations while improving customer experience. |
| The Product Name | ChowHub |
| That | Provides real-time inventory tracking, automated menu management, advanced analytics, shift management, and secure user authentication—all seamlessly integrated with POS systems. |
| Unlike | Traditional systems that focus on singular aspects of restaurant management, require costly replacements, or lack customization, |
| Our product | Offers a centralized, scalable, and secure solution that enhances operational efficiency, reduces waste, improves profitability, and prioritizes data privacy—all without disrupting existing workflows. |

## 2.2 Stakeholders and Users

|  |  |  |
| --- | --- | --- |
| **Stakeholder Name/Identifier** | **Category** | **Role/Responsibilities** |
| **CEO (Chief Executive Officer)** | Administration, Sponsor | Oversees the overall project and ensures resources are allocated; provides executive support and vision. |
| **Construction Manager and Scheduler** | Administration, User | Needs accurate up-to-date information for costing, scheduling, and ensuring smooth execution of the project details. |
| **Administrative Assistant** | User | Assists with project coordination and document management, ensuring smooth communication and information flow. |
| **Schedulers** | User | Responsible for organizing and maintaining the project timeline and coordinating task schedules. |
| **Cost Accountant** | User | Tracks project costs, manages budgets, and ensures financial resources are allocated appropriately. |
| **Project Leader** | Developers | Oversees the development team, ensures project tasks are on track, and manages technical requirements and milestones. |
| **Developers** | Developers | Work on coding, system design, and implementation based on project requirements, collaborating with other team members. |
| **Restaurant Owners/Managers** | End Users, Client | Utilize the ChowHub platform for inventory, menu, and employee management. Ensure the system meets the operational needs of their restaurant. |
| **Quality Assurance (QA) Team** | Developers | Responsible for testing ChowHub to ensure it works as intended, identifying bugs, and verifying that features are functional before release. |
| **System Integrators** | Developers | Work on integrating ChowHub with existing systems such as POS platforms and supplier databases, ensuring compatibility and smooth operation. |
| **End Users (Restaurant Staff)** | End Users | Use ChowHub for tasks like placing orders, tracking ingredients, and managing shift schedules, enhancing the overall restaurant workflow. |
| **Technical Writers** | Documentation | Develop user manuals, training materials, and support documents to guide end-users in effectively using ChowHub. |

## 2.3 Project Scope

**Purpose:**

ChowHub aims to simplify restaurant operations and enhance customer experience by providing an easy-to-use, all-in-one management solution for small independent restaurants. With features such as advanced menu management, real-time ingredient inventory tracking, and intuitive ordering, the ChowHub platform ensures cost-effectiveness and efficiency in the restaurant's back-of-house operations while improving customer satisfaction in front of the house.

**Objective:**

To develop a comprehensive, all-in-one web-based restaurant management system that automates and integrates essential restaurant operations, including menu updates, real-time ingredient tracking, and order processing. The platform will support multi-level user access and provide management reports along with real-time insights.   
   
**In-Scope Features:**

* **Menu management system** that dynamically updates item availability based on inventory.
* **Supplier management module** for tracking ingredient sources and reordering supplies.
* **Real-time ingredient tracking** to monitor stock levels and prevent shortages.
* **Integration with POS systems** for seamless data synchronization.
* **User authentication with role-based access** for different levels of staff and management.
* **Sales reporting and analytics** to help restaurants track performance and trends.
* **Employee management features**, including shift scheduling and payroll tracking.

**Out-of-Scope Features:**

* **Full POS system development** (ChowHub is designed to function independently but can integrate for added convenience).
* **Mobile application** (initial version will be web-based only).
* **Advanced AI-driven forecasting** for ingredient usage and demand prediction.
* **Community Forum**
* **Loyalty and Marketing**

**High Level Constraints and Assumptions:**

**Regulatory Compliance:** ChowHub will comply with data privacy regulations outlined in PIPEDA for handling any customer and business data. Moreover, the system’s design will follow AODA (Accessibility for Ontarians with Disabilities Act) guidelines to ensure accessibility for all users of the platform.

**Assumptions:**

* Users will access the system exclusively through web browsers on desktops or tablets; a mobile app will not be included in the initial release.
* Restaurants using ChowHub already have an existing POS system, which will be integrated.
* Internet connectivity will be required at all times for real-time updates and synchronization.

**Project Deliverables:**

* Fully functional web-based restaurant management system with in-scope features.
* Secure integration APIs for connecting with third-party POS systems.
* User guides & training materials to guide restaurant staff on system usage.
* Successful testing reports relating to performance and usability.

**Success Criteria:**

* **User Satisfaction:** Positive feedback from users in the beta testing phase.
* **Regulatory Compliance:** Full adherence to **PIPEDA** and **AODA** requirements.
* **Seamless POS Integration:** Successful integration and synchronization of data with POS system of choice.
* **Project Completion:** All deliverables delivered within the allocated timeline (January–August 2025).
* **System Reliability:** Minimal downtime or disruptions.
* **Lighthouse Report Compliance:** Achieve industry-standard Lighthouse scores (performance ≥90, accessibility ≥90, best practices ≥90, SEO ≥90) to ensure the application meets benchmarks for speed, usability, and accessibility.

**Overview of System Interactions:**

ChowHub is designed as a standalone restaurant management system with the ability to integrate with third-party POS systems and supplier platforms. The system interactions will primarily focus on real-time data synchronization for inventory tracking, order management, and employee scheduling.

**Key Integrations**

1. **POS System Integration**
   * ChowHub will provide **API** to allow integration with existing **POS systems** used by restaurants.
   * Data exchanged will include **order details**, **ingredient consumption**, and **sales records**, ensuring seamless updates between ChowHub and the POS system.
   * The integration will allow for **automatic deduction of ingredients** when an order is placed in the POS system, preventing stock shortages.
   * If integration is not available, ChowHub will function independently, requiring manual inventory updates.
2. **Supplier and Inventory Management**
   * ChowHub will support **supplier tracking and reordering automation**, allowing restaurants to place new ingredient orders directly through the system.
   * Potential integration with supplier platforms could be explored in future versions for **automated restocking** based on ingredient levels.
3. **User Authentication & Access Control**
   * The system will include **role-based access control** to ensure secure access for restaurant owners, managers, and staff.
   * Secure login and **data encryption** mechanisms will be implemented to protect sensitive business information.
4. **Sales and Analytics Reporting**
   * Integration with **reporting and visualization tools** to provide real-time **business insights**, including sales trends, ingredient consumption, and revenue tracking.
   * Export options for **financial and operational reports** in formats such as CSV and PDF for easy record-keeping.
5. **System Testing & Mock POS Environments**
   * Since real POS system access may not be available during development, ChowHub will be tested using **mock POS environments** to simulate real-world integration scenarios.
   * Unit testing and performance testing will be conducted to ensure stability before deployment.

## 2.4 System Risks

|  |  |
| --- | --- |
| **Risk** | **Response** |
| Integrating with the POS system may pose a risk if the integration is not successful. | ChowHub’s features are standalone and do not require integration into the POS system. However, integration would enhance ease of use. |
| There may be compliance risks related to storing employee data. | The system will not handle sensitive data such as employee social insurance numbers. It will only manage performance data associated with employee IDs. |
| There may be technical risks if access to certain technologies, such as a POS system or cashier terminal, is unavailable. | We can create mock POS systems to simulate how we will interface with the actual POS system or cashier terminal. |
| There may be risks associated with system downtime. If the POS system is unavailable, the restaurant will not be able to process orders and could lose revenue. | We can implement unit testing and other tests to ensure compatibility. Integration can be done during off-peak hours to minimize disruptions. |
| Resource and time risks. We may not have enough time to dedicate to ChowHub, which could result in incomplete development. | We can adjust the project scope to focus on completing the core features of ChowHub, with additional features implemented in later phases. |
| There may be a risk that restaurant staff and management might be resistant to adopting the new system due to unfamiliarity or concerns about usability. | We can provide training and user-friendly documentation to ensure smooth adoption. A gradual implementation phase may also help staff adapt to the new system. |
| There could be difficulties when migrating data from existing systems to ChowHub, especially if the data is incomplete or inconsistent. | We can conduct thorough data validation and ensure a well-planned data migration strategy, including backup procedures and testing before the full implementation. |
| If ChowHub’s features grow over time, there may be risks related to system performance as the restaurant business expands or data volume increases. | We can design the system to be scalable from the start, using cloud services or modular architecture to handle increased demand as the system grows. |

## 2.5 Operating Environment

ChowHub is designed to operate in a restaurant management environment, ensuring seamless integration with existing workflows. The application will function across multiple platforms and environments, providing flexibility for restaurant owners and staff.

**Hardware Requirements**

* Client Devices: Computers, tablets, or smartphones used by restaurant owners, managers, and staff.
* POS System Compatibility: ChowHub must integrate with existing POS terminals without requiring hardware replacement.
* Server Requirements: Cloud-based or on-premise servers capable of handling database storage, analytics processing, and real-time updates.

**Software Requirements**

* Operating Systems: ChowHub will be compatible with Windows, macOS, iOS, and Android.
* Web Browser Support: The platform will run on modern browsers such as Google Chrome, Mozilla Firefox, Microsoft Edge, and Safari.
* Database Management: ChowHub will use **PostgreSQL** or **MongoDB** for efficient data storage and retrieval.

**Network Requirements**

* Internet Connection: Required for real-time updates, cloud synchronization, and remote access.
* Local Network Support: Restaurants with on-premise servers can operate within a local network in case of internet disruptions.

**Security Considerations**

* Data Encryption: Strong encryption will protect sensitive information such as payroll and sales data.
* Access Control: Role-based access ensures that only authorized users can modify critical data.
* Data Storage: Sensitive data can be stored locally within the restaurant to enhance privacy and security.

## 2.6 Functional Requirements

## **Registration & Authentication of User Accounts:**

## User registers for a new account.

## User logs in securely using a username and encrypted password.

## User resets password if password is forgotten.

## Administrator assigns and updates user roles and permissions.

## Administrator deletes users restricting access.

## **Track & Manage Ingredient Inventory:**

## Staff views current ingredient inventory levels.

## System updates ingredient quantities in real time when orders are processed.

## System sends low-stock alerts to designated users.

## Staff manually update ingredient quantities when purchases are made from suppliers.

## Staff update multiple ingredient quantities (batches) at once, streamlining large restocks or supplier deliveries.

## Staff records ingredient wastage with reasons, for example, spoilage, over-preparation, expired stock.

## The system tracks inventory based on purchases, sales, and wastage.

## **Manage Menu Items:**

## The manager adds new items on the menu with images, descriptions, pricing, ingredients and their quantities.

## Manager assigns menu items to categories for ease in navigation

## Manager hides or makes menu items visible to customers.

## Manager updates existing menu items. For e.g., price changes, ingredient updates etc.

## System automatically updates menu item availability based on current ingredient inventory.

## Manager applies promotion/discount to menu items

## **Supplier Coordination:**

## Manager views supplier contact details and order history.

## Manager sets low-inventory thresholds to trigger automated reorder alerts.

## Manager assigns suppliers to specific ingredients.

## Manager manually creates and tracks purchase orders to suppliers.

## Manager manually sets and updates order status.

## **Create and Manage Employee Schedules:**

## Manager creates and manages employee schedules.

## The system only allows managers to assign shifts based on Employee availability, position and business demand (e.g, peak hours or holidays).

## Staff view their assigned shifts via the system.

## Staff request shift change, swap or break (needs manager approval).

## System enforces labor laws and restaurant policies to prevent overtime violations.

## **Manage Staff Timesheets and Payrolls:**

## Staff will clock in and clock out using the system.

## The system records work hours, including break times.

## Manager reviews and approves timesheets before payroll processes.

## Overtime will automatically be calculated according to the restaurant policy.

## The manager sets hourly rates and overtime rates for staff.

## The system generates payroll reports with employee hours, pay rate, overtime compensation.

## **Place and Process Orders:**

## Staff will place customers’ orders through an interface

## Orders are sent to the kitchen upon submission.

## System updates and track inventory based on ingredient usage from orders (Track & Manage Ingredient Inventory).

## Order modifications or cancellation are allowed before kitchen preparation starts.

## The system notifies staff when orders are ready to deliver.

## Staff change order status through the order lifecycle (e.g. Order Placed, Preparing, Fulfilled, Cancelled)

## **Managing POS Integrations:**

## The system integrates with existing POS systems (sale transaction, order details, payment processing).

## System deducts inventory based on ingredient usage from orders.

## Ensures real-time synchronization of menu items and availability.

## Generate detailed sale reports from POS data.

## If POS integration is unavailable, staff can manually process orders, and the inventory will be adjusted by the system

## **Generate Reports & Analytics:**

## Managers use the system to generate inventory reports, showing stock levels, usage trends, and wastage details.

## System tracks wastage reasons (e.g., spoilage, over-preparation, expired stock) and compiles reports for cost analysis.

## The system provides manager sales reports, including total revenue, top-selling items, and daily/weekly/monthly sales trends.

## Managers use the system to generate employee performance reports, tracking work hours, sales contributions, and attendance records.

## Managers use the system to generate payroll reports, including employee hours, pay rates, overtime compensation, and approved timesheets.

## Manager exports reports in multiple formats (CSV, PDF, Excel) for further analysis.

## The system visualizes reports with charts and graphs for better insights.

## Managers apply filters and date ranges to get custom reports.

## **Administer System Settings:**

## Administrator/manager configures user roles and permissions for different levels of access.

## Administrator/manager sets low-inventory warning thresholds for ingredient tracking.

## The administrator/manager manages employee settings, such as overtime policies and shift scheduling rules.

## The administrator/manager defines menu categories and updates system-wide pricing settings.

## Administrator/manager sets business hours and holiday closures for scheduling automation.

## Administrator/manager manages notification preferences, such as alerts for low inventory, order status updates, and payroll processing reminders.

## Administrator/manager updates security settings, including password policies and session timeouts.

## **Support Multi-Platform Access:**

## Users can access ChowHub via web browsers on desktops, laptops, and tablets.

## The system is optimized for responsive design, ensuring usability across different screen sizes.

## All features are accessible without requiring installation of additional software.

## Secure login and authentication ensure safe access across multiple devices.

## The system maintains consistent data synchronization across devices to prevent conflicts.

## 2.7 Nonfunctional Requirements

The ChowHub system will be compatible with most operating systems

The ChowHub system will be compatible with most web browsers

The ChowHub system will be compatible with existing POS system.

The ChowHub system will be scalable.

The ChowHub system will use 256 AES Encryption

The ChowHub system will use local storage for data compliance.

The ChowHub system will be reliable.

The ChowHub system will be adjustable.

The ChowHub system will be usable.

## 2.8 UI/UXD Interface Mock-ups

# Process and Data Modeling

## **3.1 UML/DFD Modeling and Data Modeling**

**Data Flow Diagram (DFD)**

A diagram of a company

AI-generated content may be incorrect.

The Data Flow Diagram (DFD) illustrates the flow of information between different stakeholders and system components in ChowHub, ensuring efficient restaurant management. This diagram represents how ChowHub processes and manages data related to inventory, orders, employee management, and reporting.

**Key Components:**

1. External Entities:

* Customer: Places an order through restaurant waitstaff.
* Restaurant WaitStaff: Inputs customer orders into the system.
* Restaurant Manager: Manages the restaurant menu, updates employee information and shifts, orders restocking upon notification and receives insights for decision-making.
* Supplier: Handles restocking requests from ChowHub.

2. Processes & Data Flow:

* Orders & Menu Management:
  + The restaurant waitstaff places orders in ChowHub, which processes them.
  + The menu database is updated when items become unavailable due to ingredient shortages.
* Inventory Management:
  + ChowHub tracks ingredient levels through the inventory database.
  + If stock is low, a notification is sent to the restaurant manager.
  + Restocking requests are sent to suppliers when necessary.
* Employee & Payroll Management:
  + ChowHub stores and processes employee information.
  + It generates payroll data for the employee management system.
* Sales & Reporting:
  + ChowHub generates insights and reports for restaurant managers to track performance and make business decisions.

**Purpose of the DFD:**

This DFD highlights how different stakeholders, databases, and processes interact with ChowHub, ensuring seamless restaurant operations. It also emphasizes key functionalities like order processing, inventory tracking, payroll generation, and reporting, making it a vital reference for system implementation.

### Activity Diagrams

## **3.2 Business Rules**

|  |  |  |
| --- | --- | --- |
| Business Rule Number | Business Rule Description | Related UC |
| BR01 | User must provide a username, email and password to register for the app. | UC01 |
| BR02 | Post length can be no longer than 300 characters | UC02 |
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## **3.3 Use Case Specifications with corresponding interface mockups:**

**Each use case needs to have the following:**

1- **Business Rules.**

**2- System Use Case Diagrams.**

**3- Use Case Descriptions.**

**4- Corresponding Mockups**

# Domain Class Diagram

# Database

# Work Breakdown Structure (WBS)

## 

## Work Breakdown Structure

Sample WBS:

Diagram

Description automatically generated

# Milestones and Acceptance Criteria

* 1. Milestone one

Definition

Acceptance Criteria

* …
* ….
* ….
  1. Milestone Two
  2. Milestone Three
  3. ..
  4. …
  5. …
  6. ..
  7. ..
  8. ...etc.

# Implementation Schedule

Implementation Schedule using MS Project (Waterfall)

OR

Product Backlog (Agile-Scrum)

# Client / Faculty Sign-off

**Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

X .

Name of Client/Rep/Professor