# Software Requirements Specification (SRS)

Project: Smart Grocery Expiry Management System  
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## 1. Introduction

### 1.1 Purpose

This document specifies the software requirements for the Smart Grocery Expiry Management System (SGEMS) version 1.0. The scope of this SRS covers the entire system including inventory tracking, expiry notifications, analytics dashboard, and recipe suggestions. The software is designed for both households and retail environments to reduce food wastage and improve inventory efficiency.

### 1.2 Document Conventions

• Headings follow the IEEE SRS standard numbering convention.  
• Requirements are uniquely identified using tags such as REQ-1, REQ-2.  
• High-priority requirements are indicated explicitly within their respective sections.  
• Bulleted lists are used for clarity and readability.

### 1.3 Intended Audience and Reading Suggestions

This document is intended for:  
• Developers – to understand the functional and non-functional requirements.  
• Project Managers – to plan, track, and manage deliverables.  
• Testers – to design test cases based on requirements.  
• End Users – for understanding the high-level features.  
It is recommended that readers first review the Introduction and Overall Description before exploring detailed requirements.

### 1.4 Product Scope

The Smart Grocery Expiry Management System aims to minimize food wastage through automated expiry date tracking and intelligent notifications. It provides barcode or RFID integration, inventory analytics, and recipe suggestions for expiring items. The system supports both households and retailers, aligning with sustainability and cost-saving strategies.

### 1.5 References

• IEEE Std 830-1998: IEEE Recommended Practice for Software Requirements Specifications  
• FAO Food Waste Reports (2023)  
• Barcode and RFID Integration Documentation  
• Web and Mobile Application Design Guidelines

## 2. Overall Description

### 2.1 Product Perspective

SGEMS is a standalone system designed to integrate with barcode scanners, RFID readers, and mobile devices. It provides an analytics dashboard for users and supports both cloud-based and local deployment. The product is a new solution addressing the limitations of manual expiry tracking.

### 2.2 Product Functions

• Register grocery items via barcode or RFID  
• Automatically fetch expiry dates from database or allow manual entry  
• Send real-time expiry alerts  
• Provide analytics dashboard for usage trends  
• Suggest recipes based on expiring items  
• Generate reports for inventory and wastage

### 2.3 User Classes and Characteristics

• Household Users: Use the system to track personal grocery inventory and receive alerts.  
• Retailers: Manage large-scale inventory and receive analytics reports.  
• Administrators: Manage users, configure the system, and maintain data integrity.  
• Developers/Support: Provide technical support and maintenance.

### 2.4 Operating Environment

• Platforms: Web browsers (Chrome, Firefox), Android, iOS  
• Operating Systems: Windows 10+, Linux, macOS  
• Database: MySQL or MongoDB  
• Cloud Hosting: AWS or Azure

### 2.5 Design and Implementation Constraints

• Must support barcode and RFID integration.  
• Must comply with GDPR and data privacy standards.  
• Limited functionality in areas with poor internet connectivity.

### 2.6 User Documentation

• User Manual (Web and Mobile)  
• Online Help Portal  
• Interactive Tutorials  
• API Documentation for developers

### 2.7 Assumptions and Dependencies

• Users have compatible devices (barcode scanner or smartphone).  
• Internet connectivity is available for real-time notifications.  
• Dependency on third-party libraries for barcode and RFID integration.

## 3. External Interface Requirements

### 3.1 User Interfaces

The UI will feature a dashboard for inventory, notifications for upcoming expiries, and a recipe suggestion panel. It will follow standard UI design principles with consistent navigation and error handling.

### 3.2 Hardware Interfaces

The system will interface with barcode scanners, RFID readers, and mobile device cameras for product registration.

### 3.3 Software Interfaces

The system will integrate with:  
• Databases (MySQL/MongoDB)  
• Notification services (Firebase or equivalent)  
• Third-party recipe APIs

### 3.4 Communications Interfaces

• Protocols: HTTPS for secure communication  
• Email and push notification support  
• Encrypted data transfer for sensitive information

## 4. System Features

### 4.1 Expiry Tracking

#### 4.1.1 Description and Priority

Automated expiry date tracking and alerts. Priority: High

#### 4.1.2 Stimulus/Response Sequences

User scans item → System fetches expiry date → System sends notification before expiry

#### 4.1.3 Functional Requirements

REQ-1: System must allow scanning items via barcode or RFID.  
REQ-2: System must generate expiry alerts.

### 4.2 Inventory Analytics

#### 4.2.1 Description and Priority

Provide analytics dashboard for tracking usage trends. Priority: Medium

#### 4.2.2 Stimulus/Response Sequences

User logs in → System displays analytics dashboard → User filters data for insights

#### 4.2.3 Functional Requirements

REQ-3: System must generate inventory and wastage reports.

## 5. Other Nonfunctional Requirements

### 5.1 Performance Requirements

System must handle up to 10,000 concurrent users with less than 2-second response time.

### 5.2 Safety Requirements

System must prevent unauthorized access to inventory data.

### 5.3 Security Requirements

All data must be encrypted using AES-256.

### 5.4 Software Quality Attributes

System must be scalable, reliable, and user-friendly.

### 5.5 Business Rules

Only registered users can add or remove inventory items.

## 6. Other Requirements

System must comply with local food safety and data protection laws.

## Appendix A: Glossary

SGEMS: Smart Grocery Expiry Management System  
RFID: Radio-Frequency Identification

## Appendix B: Analysis Models

Data Flow Diagrams and Class Diagrams will be provided in the design phase.

## Appendix C: To Be Determined List

TBD-1: Final recipe API selection.  
TBD-2: Barcode database integration service.