SE 216 – SOFTWARE PROJECT MANAGEMENT
PROJECT NEEDS DOCUMENT

PROJECT NAME: SHARPFRİDGE

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#	SOFTWARE NEEDS	DESCRIPTION
1	Operating System	• Embedded OS: Provides the foundational software environment for running the refrigerator's control systems and user interface.
2	Application Software	• Control Software: Manages sensor data, adjusts cooling and humidity levels, and generates real-time alerts and notifications. • User Interface Software
3	Networking Software	• Security Software: Encrypt communication channels and implement authentication mechanisms to secure user data and system access.
4	Firmware	• Device Firmware: Develop firmware for embedded systems to control hardware components, manage sensor data, and execute system logic.
5	Analytics and Reporting Software	• Data Analysis Tools: Analyze sensor data trends, identify patterns, and generate insights to optimize cooling and humidity settings. • Reporting Software: Generate reports on temperature/humidity conditions, food storage durations, and system performance for compliance and decision-making purposes.
6	Integration Software	• API Integration Tools: Develop APIs to integrate SharpFridge with external systems such as inventory management software or smart home platforms. • Middleware: Facilitate communication and data exchange between different software components within SharpFridge architecture

#	HARDWARE NEEDS	DESCRIPTION
1	Sensors	• Temperature Sensors: Monitor internal temperature to ensure optimal cooling conditions. • Humidity Sensors: Measure humidity levels to maintain proper moisture content for stored food items. • Infrared Sensors: Detect presence and movement of objects within the refrigerator for efficient energy usage and inventory management.

2	Cooling System	• Compressor: Provides the cooling mechanism necessary to maintain low temperatures within the refrigerator. • Evaporator: Facilitates the transfer of heat from the interior of the refrigerator to the external environment. • Condenser: Converts refrigerant vapor into liquid to release heat outside the refrigerator.
3	User Interface	• Display Panel: Provides a user-friendly interface for monitoring temperature, humidity, and system alerts. • Input Devices: Allow users to input information such as food type, mass, and buying date for accurate monitoring and management.
4	Communication Equipment	• Wi-Fi Module: Enables connectivity for real-time monitoring, remote access, and data transmission to user devices. • Ethernet Port: Provides wired network connectivity for reliable communication with external systems or servers.
5	Supporting Equipment	• Power Supply: Provides electrical power to operate the refrigerator system. • Cooling Fans: Assist in maintaining airflow and temperature regulation within the refrigerator.
6	Data Storage	• Memory Modules: Store system configurations, user preferences, and historical data for analysis and optimization. • ROM (Read-Only Memory): Utilized for storing system configurations, firmware, and critical software components that do not require frequent modification. ROM ensures data integrity and system stability. • Disks: Hard disk drives (HDDs) or solid-state drives (SSDs) are employed for data storage, including logging sensor data, system logs, and user preferences. These disks provide non-volatile storage with varying capacities to accommodate historical data for analysis and optimization, as well as system backups.
7	Environmental Monitoring Equipment	• Air Quality Sensors: Monitor air quality to ensure freshness and prevent odors or contamination. • Light Sensors: Detect ambient light levels to optimize energy usage and prevent food spoilage due to light exposure.
8	Power Management	• Voltage Regulator: Stabilize incoming power supply to ensure consistent operation of electronic components. • Battery Backup: Provide backup power in case of power outages to maintain critical system functions and data integrity.
9	Physical Infrastructure	• Shelving Units: Organize food items within the refrigerator and optimize storage space. • Door Seals: Ensure proper sealing to prevent temperature leakage and maintain consistent cooling efficiency.

10	Safety Features	• Door Alarm: Alert users when the refrigerator door is left open for extended periods to prevent temperature fluctuations and food spoilage. • Emergency Shut-off Switch: Enable immediate power cut-off in case of malfunction or safety concerns.

#	SUPPORT NEEDS	DESCRIPTION
1	Technical Support	• Assistance with hardware setup and integration. • Guidance on software development and debugging. • Troubleshooting assistance for sensor calibration and data interpretation.
2	Procurement Support	• Assistance in identifying reputable suppliers for hardware components. • Support in negotiating contracts and securing favorable pricing for equipment procurement. • Coordination with vendors to ensure timely delivery of hardware components.
3	IT Support	• Provision of network infrastructure for data transmission and remote access. • Configuration of network security measures to protect sensitive data. • Assistance with setting up cloud storage or server infrastructure for data storage and backup.
4	Training and Education:	• Training sessions for end users on how to operate SharpFridge effectively. • Educational materials and documentation to assist users in understanding system functionalities and troubleshooting common issues. • Ongoing support and updates to keep users informed about new features and best practices.
5	Maintenance and Service	• Scheduled maintenance services to ensure the continued functionality and efficiency of SharpFridge. • Rapid response service in case of hardware or software malfunctions to minimize downtime. • Warranty support for hardware components and repairs as needed.
6	Regulatory Compliance Support	• Guidance on regulatory requirements related to food safety and storage standards. • Assistance in ensuring compliance with relevant industry regulations and standards. • Documentation support for audits and inspections to demonstrate adherence to regulatory requirements.