

PROJECT AND TEAM INFORMATION

Project Title

(Try to choose a catchy title. Max 20 words).

Expiry-Alert: Food Expiry Monitoring with Alert System

Student / Team Information

<p>Team Name:</p> <p>Team member 1 (Team Lead)</p> <p>Name : Akriti Rawat University Roll no: 2318263 Student iD : 230221541 Email: akritirawat12345@gmail.com</p>	<p>Kernel Mind</p>  A portrait photograph of a young woman with long dark hair, smiling. She is wearing a black hoodie.
<p>Team member 2</p> <p>Name : Anshika saklani University Roll no : 2318420 Student iD : 23012076 Email: anshikasaklani894@gmail.com</p>	 A portrait photograph of a young woman with long dark hair, smiling. She is wearing a floral top.

PROJECT PROPOSAL

Team member 3

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PROPOSAL DESCRIPTION (10 pts)

Motivation (1 pt)

(Describe the problem you want to solve and why it is important. Max 300 words).

- **Food wastage as a global issue**
 - A large amount of food is wasted due to poor expiry date tracking in households, restaurants, and retail stores.
 - This results in financial losses, food insecurity, and environmental challenges.
- **Need for an efficient solution**
 - Manual tracking of food expiry is inefficient and prone to errors.
 - There is a need for a smart, technology-driven system that can automatically monitor and alert users about expiry dates.
- **Role of the Smart Food Expiry Date Management System**
 - Uses a structured database to store and manage food inventory.
 - Incorporates alert mechanisms to notify users before items expire.
 - Helps minimize wastage by encouraging timely consumption of food items.
- **Benefits for users**
 - Categorizes items as Fresh, Near Expiry, and Expired for better clarity.
 - Assists in effective meal planning and informed purchasing decisions.
 - Reduces unnecessary disposal of food, saving costs.
- **Benefits for businesses**
 - Restaurants and retail stores can manage bulk inventories more efficiently.
 - Prevents losses from expired stock and improves operational efficiency.
- **Overall vision**
 - To combine **technology, efficiency, and sustainability**.
 - Promote responsible food management and smarter consumption practices.

State of the Art / Current solution (1 pt)

(Describe how the problem is solved today (if it is). Max 200 words).

- ② **Household Apps**
 - Examples: **UseBy, FoodWise, Eatsoon, BEEP, PantryPal**.
 - Features: barcode scanning, receipt uploads, expiry reminders, recipe suggestions.
 - Advanced apps like **Cozzo** and **SmartJar Pro** add reporting, savings estimates, and analytics.
- ② **Commercial Systems**
 - Examples: **AppOcean, VentoRy**.
 - Features: FEFO (First-Expired-First-Out) stock rotation, batch-level expiry tracking, bulk inventory reports.
 - Suited for restaurants and retail stores.
- ② **Emerging Technologies**
 - **Smart fridges with IoT/AI:** detect items automatically and track freshness.
 - **Smart packaging:** sensors to monitor spoilage in real time.

- **Gamified platforms:** dashboards and campaigns to motivate waste reduction.

② Limitations in Current Solutions

- Dependence on manual data entry.
- Alerts often generic or poorly timed.
- Lack of predictive analytics for smarter planning.
- Household apps not scalable; enterprise systems too complex.
- Limited integration with local grocery systems and recipe suggestions.

③ Project Positioning

- Structured database with clear categorization (Fresh, Near Expiry, Expired).
- Timely, customizable alerts to minimize waste.
- Simple for households, scalable for restaurants and retail.
- Scope for recipe suggestions and future online grocery integration.

Project Goals and Milestones (2 pts)

(Describe the project general goals. Include initial milestones as well any other milestones. Max 300 words).

The **Smart Food Expiry Date Management System** is developed with the aim of reducing food wastage and improving inventory management. Its goals are closely tied to milestones that ensure systematic progress throughout the project.

Goals with Milestones

- **Centralized Database Creation**
 - Goal: Design a database to store item details (name, category, purchase date, expiry date, quantity).
 - Milestone: Complete database design with normalized tables (Users, Food_Items, Alerts) and ER diagram.
- **Expiry Tracking Mechanism**
 - Goal: Categorize items automatically into Fresh, Near Expiry, and Expired.
 - Milestone: Implement expiry date calculation logic and validate results through queries.
- **Alert System**
 - Goal: Notify users 2–3 days before expiry to encourage timely usage.
 - Milestone: Develop and test automated reminders (system-based, with optional email/SMS).
- **User-Friendly Interface**
 - Goal: Provide easy access for non-technical users to add, view, and manage inventory.
 - Milestone: Build and test a simple UI (optional) for inventory visualization and interaction.
- **Scalability**
 - Goal: Ensure the system works for both households and large-scale businesses like restaurants and retail stores.
 - Milestone: Test database with bulk data to confirm performance and scalability.
- **Future Expansion**
 - Goal: Lay the foundation for recipe suggestions and integration with online grocery platforms.
 - Milestone: Define system architecture that supports these enhancements in later versions.

- **Final Testing & Deployment**
 - *Goal: Deliver a reliable, functional DBMS project.*
 - *Milestone: Complete testing, evaluation, documentation, and project demonstration.*

Overall Objective

- *To combine technology, efficiency, and sustainability for smarter food management and reduced wastage.*

Project Approach (3 pts)

(Describe how you plan to articulate and design a solution. Including platforms and technologies that you will use. Max 300 words).

The development of the **Smart Food Expiry Date Management System** will follow a structured, end-to-end methodology, ensuring a practical, scalable, and user-friendly solution. The project will be implemented in six key phases:

1. Requirement Analysis

- Identify system objectives: tracking food items, expiry management, timely alerts, and reporting.
- Define use cases for households, restaurants, and retail stores.
- Document functional requirements and success criteria.

2. System Design

- Create the **ER diagram** to represent entities (*Users, Food_Items, Alerts*) and their relationships.
- Normalize database tables for efficient storage and retrieval.
- Define workflows for adding items, expiry calculation, and alert generation.

3. Database Development

- Implement database using **MySQL / PostgreSQL / SQLite**.
- Write SQL queries for CRUD operations and expiry tracking logic.
- Ensure referential integrity and optimize queries for bulk data.

4. Backend Implementation

- Develop backend services using **Python Flask / Node.js / PHP**.
- Implement business logic for expiry categorization (*Fresh, Near Expiry, Expired*).
- Integrate alert services (local notifications, with scope for email/SMS APIs).

5. Frontend Development (Optional)

- Build a simple interface using **HTML, CSS, and JavaScript**.
- Provide user-friendly forms for adding items and categorized views of inventory.
- Display alerts in an intuitive format.

6. Testing, Deployment & Documentation

- Test system accuracy with sample data from household and business use cases.
- Validate expiry tracking, alerts, and system scalability.
- Deploy locally or on a cloud server for demonstration.
- Deliver full documentation: ER diagram, schema design, source code, queries, and user guide.

End-to-End Outcome

A complete DBMS project capable of reducing food wastage by combining structured database design, automated expiry tracking, timely alerts, and a scalable system architecture.

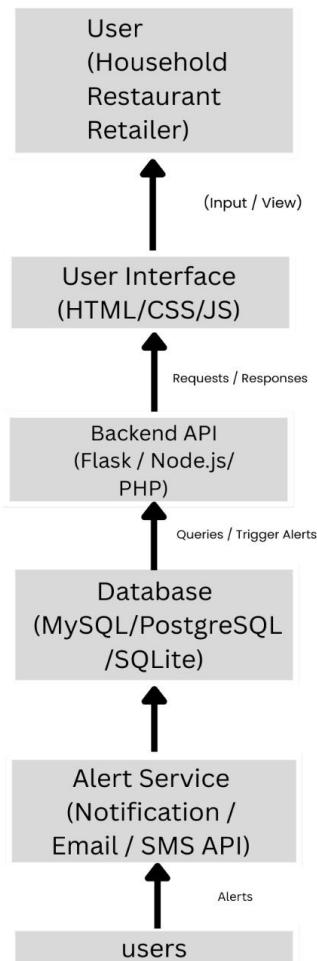
System Architecture (High Level Diagram)(2 pts)

(Provide an overview of the system, identifying its main components and interfaces in the form of a diagram using a tool of your choice).

It shows:-

- **User:** Interacts with the system (households, restaurants, retail stores).
- **User Interface (UI):** Provides an easy way to add food items, view expiry status, and receive alerts.
- **Backend API:** Manages business logic — calculates expiry, categorizes items (Fresh, Near Expiry, Expired), and triggers alerts.
- **Database:** Stores user profiles, food items, expiry dates, and alert data.
- **Alert Service:** Sends reminders via notifications, email, or SMS before items expire.

This architecture ensures **end-to-end flow**: from item entry → expiry calculation → timely alerts → reduced wastage.



Project Outcome / Deliverables (1 pts)

(Describe what are the outcomes / deliverables of the project. Max 200 words).

Project Outcome / Deliverables

- **Centralized Database - Structured DB (MySQL/PostgreSQL/SQLite) for storing users, food items, expiry dates, and alerts.**
- **Expiry Tracking - Automatic categorization into Fresh, Near Expiry, and Expired.**
- **Alert System - Notifications 2-3 days before expiry (system alerts, extendable to email/SMS).**
- **Inventory Management Interface (Optional) - Simple UI for adding and viewing items.**
- **Reports & Insights - SQL queries for analysis of frequently wasted or near-expiry items.**
- **Documentation - ER diagrams, schema design, queries, source code, and user guide.**

Final Deliverable: A complete DBMS-based solution that reduces food wastage with efficient tracking, timely alerts, and easy usability.

Assumptions

(Describe the assumptions (if any) you are making to solve the problem. Max 100 words)

- Users will enter correct and complete details (item name, purchase date, expiry date, and quantity).
- Expiry dates provided on food packaging are accurate and reliable.
- Users will regularly update their inventory (adding new items and removing consumed ones).
- The alert system will have access to either system notifications or an email/SMS API.
- The database will be accessed by a limited number of users at a time, so concurrency issues are minimal.
- Internet connectivity may be required for email/SMS alerts.

References

(Provide a list of resources or references you utilised for the completion of this deliverable. You may provide links).

1. [Graphviz Documentation - Graph Visualization Software](https://graphviz.org/)
<https://graphviz.org/>
2. [MySQL Official Documentation - Relational Database Management](https://dev.mysql.com/doc/)
<https://dev.mysql.com/doc/>
3. [PostgreSQL Documentation - Open Source Relational Database](https://www.postgresql.org/docs/)
<https://www.postgresql.org/docs/>
4. [SQLite Documentation - Lightweight SQL Database](https://www.sqlite.org/docs.html)
<https://www.sqlite.org/docs.html>
5. [Flask Documentation - Web Framework for Python](https://flask.palletsprojects.com/)
<https://flask.palletsprojects.com/>
6. [W3Schools - HTML, CSS, JavaScript Tutorials](https://www.w3schools.com/)
<https://www.w3schools.com/>

PROJECT PROPOSAL

7. [MDN Web Docs – Frontend Web Development Resources](https://developer.mozilla.org/)
<https://developer.mozilla.org/>
8. [Research Article – Food Waste Management and Technology](https://www.sciencedirect.com/science/article/pii/S0959652621002562)
<https://www.sciencedirect.com/science/article/pii/S0959652621002562>