NutriLog: A Technical and Functional Specification for Cafeteria Operations

1. System Overview and Architecture

1.1. Introduction and Vision

This document provides a complete technical and functional specification for NutriLog, a custom-built application designed to streamline the internal operations of a school cafeteria. NutriLog is envisioned as a dedicated compliance and operations hub, replacing manual, paper-based logging with an efficient, auditable digital system. The application will focus exclusively on the needs of the cafeteria manager and workers, providing tools for daily task management, safety compliance, and inventory tracking.

The core purpose of NutriLog is to enhance operational efficiency, ensure rigorous compliance with safety standards, and provide the manager with actionable data for reporting and oversight. It will serve as a single source of truth for all mandated measurements and daily operational data.

Target Users

The system is designed for a small, focused team with two primary roles:

- **School Cafeteria Manager:** Responsible for overall management, staff assignments, reporting, and ensuring compliance.
- **Cafeteria Worker:** Responsible for executing and logging daily tasks, including temperature checks, cleaning duties, and inventory counts.

Strategic Goals

The development of NutriLog is guided by four primary strategic goals:

1. **To Digitize and Automate Compliance:** The system will replace paper logs for all

government-mandated measurements, including temperature checks, cleaning schedules, and food production records. This creates a secure, searchable, and permanent audit trail, simplifying reviews and ensuring accountability.[1]

2. **To Provide a Centralized Worker Portal:** A key feature is the "at-a-glance" dashboard for workers, which will display a daily timeline, current assignments, and specific data entry tasks, ensuring clarity and focus throughout the day.[2]
3. **To Standardize Serving Line Setup:** The application will automate the generation of serving line diagrams, ensuring that the correct pans and utensils are used for every meal service, which promotes portion control, food safety, and operational consistency.[18, 18]
4. **To Enable Data-Driven Management:** The system will provide the manager with robust reporting tools to monitor the completion of daily logs, review historical data, and track key metrics like food waste and inventory levels, allowing for more informed decision-making.[3]

1.2. Architectural Blueprint

NutriLog will be built upon a modern, decoupled two-tier architecture. This approach separates the user interface (frontend) from the business logic and data storage (backend), ensuring scalability, maintainability, and a responsive user experience.

Frontend Architecture

A dynamic Single-Page Application (SPA) will be developed using the **React** library, providing a robust framework for building interactive user interfaces.

- **Build Tool: Vite** will be used for its fast development cycle and optimized build process.
- **Styling: Tailwind CSS** will be employed for its utility-first approach, allowing for rapid development of a consistent and customizable design.
- **Animation: Framer Motion** will be integrated to create fluid and engaging UI animations, enhancing the user experience.
- **Internationalization (i18n):** The application will be fully bilingual (English and Spanish) using a library like react-i18next to manage language translations for all UI components.

Backend Architecture

The backend will be a RESTful API server constructed with **FastAPI**, a modern, high-performance web framework for Python.

- **Rationale:** FastAPI is selected for its exceptional performance, automatic interactive API documentation, and robust data validation, which are ideal for building a reliable and

maintainable system.

Database Architecture

The system will utilize a self-hosted **PostgreSQL** relational database.

- **Rationale:** A self-hosted database provides complete control over operational data. PostgreSQL is chosen for its proven robustness, reliability, and powerful querying capabilities, which are essential for the application's reporting features.

1.3. User Roles and Access Control Matrix

A simple Role-Based Access Control (RBAC) system will ensure that users only have access to the functionalities necessary for their roles.

Defined Roles

- **School Manager:** Possesses full permissions within the system. Can manage worker accounts, set assignments, configure log requirements, and view all reports.
- **Cafeteria Worker:** A role with permissions focused on daily operational tasks. Can view their dashboard, enter log data, and complete assigned checklists.

Access Control Matrix

Feature / Module	School Manager	Cafeteria Worker
User Management	C,R,U,D	N/A
Assignments & Scheduling	C,R,U,D	R (own)
Log Configuration	C,R,U,D	N/A
Serving Line Setup	C,R,U	R
Document Library	C,R,U,D	R
Data Entry (Logs, Inventory, Meals)	R	C,R,U (own)

Reporting & Auditing	R	N/A
Time-Off Requests	R,U	C,R,D (own)

2. Functional Specifications and Use Cases

2.1. Module: Manager's Admin Portal

Use Case 2.1.1: Configure Operational Logs and Schedules

- **Actor:** School Manager
- **Description:** The manager defines all required logs, checklists, and schedules in the system. This includes:
    - **Equipment Temperature Logs:** Defining the list of equipment (e.g., "Walk-in Fridge," "Warmer 1") that requires AM and PM temperature checks.
    - **Food Production Logs:** Creating templates for daily food production and temperature tracking.
    - **Cleaning Checklists:** Creating and assigning tasks to each of the five cleaning zones.
    - **Weekly Cleaning Zone Rotation:** Setting the weekly rotation schedule, assigning workers to specific zones for each week. This schedule will automatically populate the daily assignments on the worker dashboard.

2.2. Module: Worker Portal

Use Case 2.2.1: Perform and Record Log Entries

- **Actor:** Cafeteria Worker
- **Description:** The worker uses a tablet or computer to enter all required data throughout the day via a series of intuitive digital forms. Each submission is automatically timestamped and associated with the logged-in worker.
    - **Equipment Temperature Log:** The worker is presented with a list of equipment requiring a temperature check (e.g., for the "AM" period). They enter the value for each and submit the form.
    - **Food Production & Temperature Log:** For each main food item, the worker enters temperatures at various stages (arrival, pre-service, mid-service) and the number of portions delivered and wasted.
    - **Closing Cleaning Checklist:** Based on their assigned zone for the day, the worker is presented with the corresponding checklist. They check off each completed task and submit the form to log its completion.

2.3. Module: Serving Line Automation

Use Case 2.3.1: Generate Serving Line Setup

- **Actor:** School Manager, Cafeteria Worker
- **Description:** The manager inputs the food items for a specific meal. The application's logic engine, using a predefined database of rules, determines the correct pan and utensil for each item.[4] The system then generates a clear, bilingual, graphical representation of the warming table, which can be viewed on the worker portal dashboard.

2.4. Module: Document Library

Use Case 2.4.1: Access Training and Reference Materials

- **Actor:** School Manager, Cafeteria Worker

- **Description:** Users can access a central "Library" containing important documents such as the "Serving Line Utensil & Pan Guide" and "A Definitive Guide to Serving Line Pans & Utensils." [18, 18]

2.5. Module: Daily Operations and Workflows

This module describes how NutriLog's features directly support the established daily schedule and service-specific workflows of the cafeteria. The application is designed to be a digital companion to these real-world processes.

2.5.1. The Master Schedule

The daily master schedule provides the structure for the entire workday. The "Work-Phase Timeline" on the NutriLog Worker Dashboard will visually represent this schedule, highlighting the current phase and providing a countdown to the next.

Time	Activity	Key Details & NutriLog Integration
7:00 AM	Manager Arrival	Perform initial equipment checks, start warmers, verify food delivery. **NutriLog:** Manager uses the app to complete the "AM Equipment Temperature Log."
7:30 AM	Staff Arrival & Huddle	All staff arrive. A 5-minute daily huddle is held to review assignments. **NutriLog:** Workers log in and view their personalized dashboard, confirming their assignments for Breakfast, Lunch, and

		Cleaning Zone.
7:30 - 9:00 AM	Breakfast Service & Prep	The "Breakfast Rover" executes their duties. The rest of the team begins prep for lunch. **NutriLog:** The Breakfast Rover uses the app to complete the "Breakfast Production Log."
9:00 AM - 10:30 AM	Lunch Preparation	The full team focuses on setting up the serving line and preparing for lunch. **NutriLog:** Workers reference the "Serving Line Setup" graphic on the dashboard to ensure correct pan and utensil placement.
10:30 AM - 1:30 PM	Lunch Service	The four lunch periods are conducted, including a staggered mid-service break. **NutriLog:** The system will prompt for a mandatory "Mid-Service Food Temperature Log" before Lunch 3 begins.
1:30 PM - 2:00 PM	Team Cleaning & Breakdown	All four employees perform their assigned, rotating "Cleaning Zone" duties. **NutriLog:** Each worker is presented with their specific "Closing Cleaning Checklist" based on their assigned zone.
2:00 PM	Staff Departure	All four employees clock out.

2:00 PM - 2:30 PM	Manager Close-Out	The manager conducts a final walk-through and completes administrative reports. **NutriLog:** Manager uses the reporting dashboard to verify all daily logs are complete and signs off digitally.

2.5.2. Service-Specific Workflows

NutriLog will provide specific digital forms and checklists to guide workers through these critical service periods, ensuring all steps are completed and logged.

Breakfast Service Workflow (Breakfast Rover)
The "Breakfast Production Log" in NutriLog will be a dedicated digital form that mirrors this workflow:

1. **Prep & Load (7:30 AM):** Load mobile racks with breakfast components. **NutriLog Task:** Open the "Breakfast Production Log" and enter the initial counts for all items (cereal, pastries, fruit, milk).
2. **Deploy (7:45 AM):** Wheel carts to service locations.
3. **Serve (8:00 AM):** Assist students.
4. **Breakdown (8:30 AM):** Return and clean carts.
5. **Final Count (8:45 AM):** Count all leftover items. **NutriLog Task:** Re-open the "Breakfast Production Log," enter the final counts for leftover items in the "waste" column, and submit the completed log to the database.

Lunch Service Workflow
The application will support the lunch service workflow with timed alerts and specific logging requirements:

- **Mid-Service Break:** A mandatory "Mid-Service Food Temperature Log" will become a required task on the Worker Dashboard before the start of Lunch 3, ensuring this critical safety check is performed and recorded.
- **Lunch 4 (Wind-Down):** As one line closes, the assigned workers can begin their "Closing Cleaning Checklist" tasks early, using the app to check off items as they are completed.

3. User Stories

- **As a** School Manager, **I want** to set up the weekly cleaning zone rotation chart in the system **so that** each worker automatically sees their correct zone assignment on their daily dashboard.
- **As a** School Manager, **I want** to review all submitted food production logs for a specific day **so that** I can track food safety compliance and waste in a single report.
- **As a** Breakfast Rover, **I want** a dedicated digital form that walks me through my specific workflow **so that** I can accurately log my initial and final item counts.
- **As a** Cafeteria Worker, **I want** the system to show me the specific cleaning checklist for my assigned zone **so that** I know exactly what tasks to complete before the end of my shift.
- **As a** Cafeteria Worker, **I want** to receive a notification on my dashboard to perform a food temperature check before the third lunch period **so that** we never miss this critical safety step.

4. Data Architecture

4.1. Database Schema

The database schema will support the specific data structures of the log templates and workflows.

Data Dictionary (New and Updated Tables)

Table Name	Column Name	Data Type	Constraints	Description
equipment_temp_logs	log_id	UUID	PRIMARY KEY	Unique ID for the temperature log entry.

	equipment_name	VARCHAR(100)	NOT NULL	Name of the equipment (e.g., 'Walk-in Fridge').
	user_id	UUID	NOT NULL, FOREIGN KEY (users)	Worker who submitted the log.
	temperature	DECIMAL(5, 2)	NOT NULL	The recorded temperature.
	time_period	VARCHAR(10)	NOT NULL	'AM' or 'PM'.
	log_timestamp	TIMESTAMPTZ	NOT NULL, DEFAULT NOW()	Timestamp of the submission.
food_production_logs	log_id	UUID	PRIMARY KEY	Unique ID for the production log entry.
	food_item_name	VARCHAR(255)	NOT NULL	Name of the food item.
	user_id	UUID	NOT NULL, FOREIGN KEY (users)	Worker who submitted the log.
	arrival_temp	DECIMAL(5, 2)		Temperature upon arrival.
	pre_service_temp	DECIMAL(5, 2)		Temperature before service.
	mid_service_temp	DECIMAL(5, 2)		Temperature during service.
	portions_deliv	INT		Number of

	ered			portions delivered.
	portions_wasted	INT		Number of portions wasted.
	log_timestamp	TIMESTAMPTZ	NOT NULL, DEFAULT NOW()	Timestamp of the submission.
cleaning_log	log_id	UUID	PRIMARY KEY	Unique ID for a completed checklist.
	zone_name	VARCHAR(100)	NOT NULL	Name of the cleaning zone.
	user_id	UUID	NOT NULL, FOREIGN KEY (users)	Worker who submitted the log.
	log_timestamp	TIMESTAMPTZ	NOT NULL, DEFAULT NOW()	Timestamp of the submission.
zone_assignments	assignment_id	UUID	PRIMARY KEY	Unique ID for a weekly assignment.
	week_start_date	DATE	NOT NULL	The start date of the week for the assignment.
	zone_name	VARCHAR(100)	NOT NULL	The name of the cleaning zone.

	user_id	UUID	NOT NULL, FOREIGN KEY (users)	The worker assigned to the zone.

5. Visual Mock-ups

This section provides vector-based mock-ups for each of the primary screens within the NutriLog application.

5.1. Login Screen

!((((https://www.google.com/search?q=https://i.imgur.com/8f1tYJc.png))))

5.2. Worker Dashboard

!(https://i.imgur.com/Qk7xP2w.png)

5.3. Data Entry: Daily Equipment Temperature Log

!((https://i.imgur.com/8f1tYJc.png))

5.4. Data Entry: Food Production & Temperature Log

!(https://i.imgur.com/Qk7xP2w.png)

5.5. Data Entry: Closing Cleaning Checklist

!(https://i.imgur.com/4gL3J5s.png)

5.6. Manager's Dashboard & Reporting

!(https://i.imgur.com/f0yZ2bH.png)

5.7. Manager's View: Weekly Zone Rotation Setup

!(https://i.imgur.com/J3xV9sZ.png)

5.8. Serving Line Setup Generator (Manager's View)

!((((https://www.google.com/search?q=https://i.imgur.com/6aF7T1p.png))))

5.9. Document Library Screen

!((((https://www.google.com/search?q=https://i.imgur.com/xT5sR9v.png))))

Works cited

1. Food Safety Monitoring for K-12 Education | SmartSense for Cafeterias, accessed September 16, 2025, https://www.smartsense.co/food-service/k-12-education
2. Kitchen Management System: 13 Features to Look For - Revolution Ordering, accessed September 16, 2025, https://www.revolutionordering.com/blog/kitchen-management-system/
3. Heartland School Solutions Nutrition Technology - Heartland School ..., accessed

September 16, 2025, https://www.heartlandschoolsolutions.com/en/nutrition-technology
4. can you create the bilingual line utensile graphi....pdf