

**Islamic University of Technology**Department of Computer Science and Engineering

CSE 4408 : System Analysis & Design

Lab 3

**Project Management**

**Group Members** Shadab Bin Habib (220041201)  
Tashan Ferdous Lihan (220041203)  
 Nafiz Zia (220041245)

**Problem Definition and Project Selection Justification**

**Problem Statement**

The IUT Cafeteria currently relies on manual methods for managing its food inventory. This approach often results in inaccurate stock tracking, delayed updates, and inefficient resource usage. These issues lead to food shortages or overstocking, disrupting cafeteria services and reducing customer satisfaction. A digital solution is required to automate inventory tracking and enhance operational efficiency.

**Key Issues (Pain Points)**

* **Manual tracking** leads to human error and outdated records.
* **Lack of real-time updates** causes delays in identifying stock shortages.
* **Inventory mismatches** result in food waste or unavailability.
* **No automated alerts** for low stock or critical thresholds.
* **Inefficient reporting** makes it difficult to analyze usage patterns.

**Project Objectives**

* **Automate inventory updates** to ensure real-time accuracy.
* **Send alerts when stock is low** to avoid shortages.
* **Reduce manual data entry** to minimize errors.
* **Provide dashboards and reports** for improved decision-making.
* **Ensure easy tracking** of daily stock usage and consumption trends.

**High-Level Requirements (Must-Have Features)**

* Inventory tracking with real-time updates.
* Daily input form for recording stock usage.
* Threshold-based alert system for restocking.
* Financial documentation and report generation.
* Dashboard to visualize inventory status.

**Project Constraints**

* **Budget limitations**: Must rely on free or low-cost tools.
* **Time constraints**: Must be developed within a short academic timeline.
* **Technical limitations**: Dependent on reliable internet connectivity.
* **Scope restrictions**: No integration with meal preparation, supplier systems, or payroll.
* **Adoption challenges**: Staff may require training and may resist transitioning from manual methods.

**Project Justification (Based on Five Criteria)**

1. **Management Backing**  
   Cafeteria staff and IUT administration acknowledge the need for automation and support the initiative due to repeated issues with the manual system.
2. **Appropriate Timing**  
   With growing expectations for efficiency and digital transformation in campus services, now is the ideal time to modernize cafeteria operations.
3. **Improves Strategic Goals**  
   The system enhances operational transparency, reduces food waste, and supports sustainable and data-driven practices.
4. **Practical in Terms of Resources**  
   The system uses open-source tools (React, Node.js, MongoDB), minimizing costs while aligning with the development team’s skill set.
5. **Worthwhile Investment**  
   Though initial setup requires effort, the long-term benefits—improved service, reduced wastage, and better data—offer a strong return on investment.

**Preliminary Feasibility Assessment (TEO)**

**Technical Feasibility**

The proposed Food Inventory System is technically feasible due to the availability of modern web technologies and the team’s familiarity with full-stack development. The chosen tech stack includes:

* **Frontend**: React – ideal for building responsive, browser-based interfaces.
* **Backend**: Node.js with Express – ensures a scalable, fast, and efficient API service.
* **Database**: MongoDB Atlas – a cloud-hosted NoSQL database that handles dynamic, unstructured data effectively.
* **Hosting/Deployment**: Firebase or Render – reliable cloud platforms that support free tiers for academic-scale projects.

The system is designed to be browser-based, ensuring cross-platform compatibility with minimal local system dependencies. This aligns well with the existing cafeteria infrastructure, where PCs, laptops, or mobile devices are already in use.

**Economic Feasibility**

From a cost perspective, the project is highly economical. The full system study does not require external consultancy or expensive data collection. Insights were derived from internal interviews and observations of current cafeteria operations.

* **Software tools**: All core development tools and frameworks are open-source and free. Firebase and MongoDB Atlas provide generous free tiers suited for small to mid-sized systems.
* **Hardware requirements**: No new hardware investment is necessary. The system works on existing machines with internet access.
* **Training and transition**: Minimal training is needed due to the intuitive web-based interface. Staff can be trained through short, hands-on sessions or via a basic usage manual.

There are no licensing fees or infrastructure purchases required, reducing upfront and recurring expenses significantly.

**Operational Feasibility**

The system is expected to fit seamlessly into existing workflows. It supports daily stock routines and is intended to reduce the burden of manual inventory tracking. Staff are likely to accept the system, as it simplifies their tasks and minimizes repetitive work.

Basic onboarding and a phased rollout strategy will be adopted as part of the change management plan. This will ensure minimal resistance and allow feedback-driven refinement during implementation.

**Tangible Costs vs. Benefits**

| **Costs** |
| --- |
| Software development & testing |
| Internet subscriptions  Minimal hardware setup |
| **Benefits** |
| Reduced food wastage |
| Faster, more accurate stock updates |
| Time saved in report generation |

**Intangible Costs vs. Benefits**

| **Costs** |
| --- |
| Possible resistance to change |
| Risk of incorrect data entry |
| Temporary productivity drop during training |
| **Benefits** |
| Improved morale and role clarity among staff |
| Better decision-making by cafeteria management |
| Enhanced customer satisfaction and smoother operations |