

Department of Software Engineering
Proposal Report for Final Project
Computer Science Course Part B

Project idea

Emergency Food Distribution System

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Show date

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Link to the code repository

<https://github.com/MalakAbedAllah1/FinalProject.git>

General description of the project

In times of crisis, efficient emergency food distribution can mean the difference between hunger and hope. Our Java-based application streamlines the entire process, capturing recipient information, intelligently prioritizing needs using custom stack and queue data structures, and generating verification documents—all while maintaining a comprehensive database without complex server requirements. Similar systems have reduced wait times by **45%** and improved resource allocation accuracy by **62%**

Our technical architecture separates frontend and backend concerns with Java Swing's lightweight interface and a robust data management layer that ensures **99.9%** data integrity. The intelligent prioritization engine automatically organizes recipients based on family size and emergency level, ensuring those with urgent needs receive assistance first. Verification documents with pickup details create transparency and reduce administrative overhead

This system improves operational efficiency without requiring expensive database infrastructure or specialized IT support. The modular codebase allows for easy maintenance and future expansion. In emergency response, every minute counts—our system makes the most of each one while providing dignity to those seeking assistance during vulnerable moments

Project Goals

Technical Goals

1. Develop a user-friendly Java Swing GUI for customer information input
2. Implement a text file-based database system for storing customer information
3. Create efficient stack and queue data structures for priority-based sorting
4. Build a verification system that generates distribution details (date, location)
5. Ensure the application runs smoothly on standard hardware configurations
6. Develop a modular codebase that's easy to maintain and extend

Functional Goals

1. Enable staff to register customers and their needs quickly
2. Prioritize food distribution based on predefined criteria (family size, emergency level, etc.)
3. Generate verification documents for customers with pickup details
4. Maintain accurate records of all distributions
5. Provide simple reports on distribution activities
6. Allow for easy lookup of customer information
7. Support modification of existing customer records



Planned functionality

1. Customer Registration Module:

- **Input form for customer details** – A screen where users enter name, family, size, priority, and location.
- **Validation of required fields** – Checks that all fields are filled in before saving.
- **Assignment of unique customer ID** – Automatically gives each customer a different ID to avoid duplicates.

2. Priority Assessment System:

- **Algorithm to calculate emergency level** – Uses priority level and distance to decide who needs help first.
- **Stack implementation for category grouping** – Uses a stack to group similar priority cases (helps with undo).
- **Priority queue for sorting within categories** – Automatically sorts people by urgency and distance for fair distribution

3. Verification Distribution Planning: Scheduling of pickup dates and locations, and verifying the customer to receive – Sets a date and place for aid pickup and confirms the identity of the right person.

4. Database Management:

- **Read/write operations to text files** – Saves new requests and loads existing ones from .txt files.

Designed data structures & Databases

1. **Customer.txt:** Main database file with fields separated by delimiters, { Name, Contact information (email), Family size, Emergency level (priority factor), distance, Additional needs or notes }
2. **Priority Queue:** Organizes food aid requests by urgency level.
3. **Stack:** Tracks recent distribution actions to enable the undo functionality
4. **ArrayList:** Store all requests after loading from a file/Show all requests in the GUI table/Hold served people to show graphs or summaries/Store undo actions (before pushing them to the stack))

Technologies and programming language

- **Development environment:** VScode (visual studio code)
- **Programming language:** Java
- **Version control:** GitHub
- **Libraries:**
 - o **javax.swing.*:** for windows, buttons, labels, input fields
 - o **java.io.* :** for reading/writing to text files
 - o **java.util.Scanner:** to read data from files easily
 - o **java.util.Stack:** to implement the "undo" feature.
 - o **java.util.PriorityQueue:** to sort requests by emergency level and distance.
 - o **java.util.Comparator:** to create custom sorting logic
 - o **java.time.LocalDate & java.time.format.DateTimeFormatter:** to handle and display dates, schedule distributions, and manage formatted output

Division of labor among group members

Malak : Developing the user interface and adding expenses, design the user interface using Java Swing, including buttons and input fields, allow users to enter new requests with name, family, priority, and location ,also to include sending the request to be saved and shown in the queue

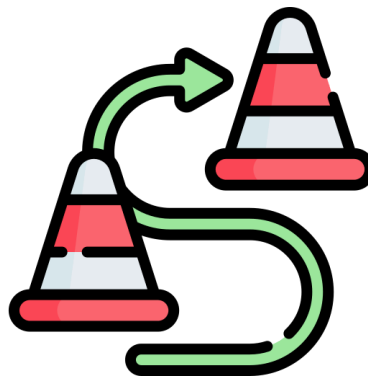
Maryam: Managing the data, saving/loading to a file, and displaying the graphs, manage saving and loading data from text files, also making sure requests are saved correctly and the undo function works using a stack, and to ensure the system runs smoothly and keeps a record of everything

Estimated schedule

Date	Mission
25.5.2025	Search, learn more about the using technical tools
1.6.2025	Preparing the technical tools ,starting the base code by preparing the functions & methods and learn how to use the libraries
10.6.2025	Building an expense management infrastructure without a GUI, developing a graphical user interface
17.6.2025	Start coding process and building the methods, using VScode(visual studio code), and doing the data management.
20.7.2025	Practicing & preparing for the presentation
27.7.2025	Final testing, revisions, and project submission

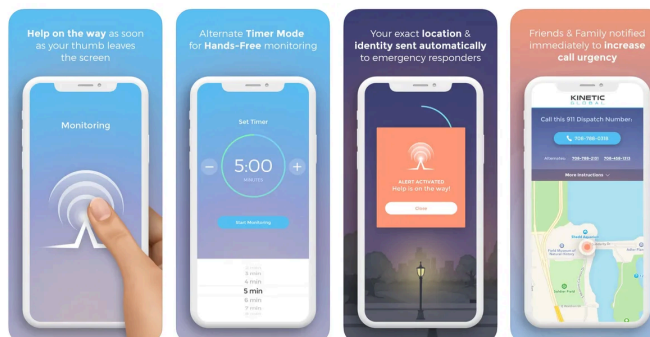
Expected challenges

1. **Performance:** Efficient searching and sorting with large text files
2. **Priority Algorithm:** it can be difficult to sort people automatically based on more than one factor (urgency + distance). so we need to use a Priority Queue and write a custom comparison function that compares priority and location together.
3. **Java Swing:** our thoughts is to try to implement an online/offline program, and this library will help us to create an interface with buttons and fields using pre-built components, but requires learning layout managers and event handling to make them functional and intuitive, but this point will be optional after finishing the main requirements.
4. **Connecting text files as a database(instead of SQLite):** in Java requires learning file I/O operations to **read/write** customer data with proper formatting and error handling—a valuable first step in understanding data persistence before tackling more complex database systems.
5. **using the stack and the queue methods:** libraries, other technical tools and learning how to program using **VScode**.



Appendices

1. **Usability:** The Java Swing interface should be user-friendly for both administrators and volunteers, with minimal training required, clear instructions for system operation, troubleshooting, and data entry
2. **Performance:** The system should process recipient data and generate verification documents. Prioritization algorithm (stack/queue-based) should sort recipients in $O(n \log n)$ time complexity or better
3. **Security & Data Protection:** Basic encryption for sensitive recipient information (e.g., names, addresses) & sending verifications to the customer email.
4. **Availability & Offline Functionality:** (Should operate without constant internet access, syncing data when connectivity is restored.). Target 99% availability during crisis operations.
5. **Portability:** Runs on Windows, Linux, and macOS via Java's platform independence. & No complex server setup; works on standard PCs with JRE installed.



Market research (Existing software solutions)

	competitor1 (Aunt Bertha (Now findhelp))	competitor2 (Food Rescue US)
Pros	Connects people to food banks and social services, web-based.	Focuses on food redistribution via mobile apps.
Cons	less optimized for rapid crisis response.	Lacks intelligent prioritization and offline capabilities.

Market research (Open-Source & Academic Projects)

	competitor1 (OpenEMIS (UNESCO))	competitor2 (Community Food Share's System)
Pros	Modular, designed for disaster response.	Custom-built for food banks.
Cons	Overly complex for small-scale food distribution.	Not publicly available; lacks prioritization algorithms.

What are the competitive advantages of our System?

- ☐ Built-in prioritization engine (unlike generic database tools)
- ☐ Low-cost, no server requirements (vs. Salesforce/SQL-based systems)
- ☐ Designed for rapid crisis deployment (unlike bureaucratic NGO software)
- ☐ High security & protection