Technical Report - **Product specification**

FoodFlow

Course:	IES - Introdução à Engenharia de Software
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Project abstract:	This project involves the development of a real-time statistics display application for fast food chains, allowing users to monitor popular menu items and track the status of orders within specific restaurants.

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1 Introduction

In today's fast-paced world, the demand for quick-service restaurants like McDonald's and other fast-food chains have grown substantially. These restaurants thrive on efficiency and customer satisfaction, with both being directly influenced by how quickly orders are processed and how well customers are informed about the menu. However, with the vast number of outlets and frequent changes in customer preferences, it has become increasingly challenging to track the most popular menu items and the real-time status of orders at individual restaurant locations.

The objective of this project is to develop an application that provides a user-friendly interface to monitor and display real-time statistics from popular fast-food franchises. The app will allow users to view live data about the most consumed items across various fast-food chains and drill down into the specifics of individual restaurants. Users will see a breakdown of orders yet to be prepared, currently in progress, or completed. This comprehensive view will not only enhance the customer experience but also provide valuable insights into restaurant operations, helping both users and restaurant managers make informed decisions.

This project, through its real-time display and tracking features, aims to bring greater transparency to fast-food restaurant performance, providing users with up-to-date information on menu popularity and order status at any given time.

2 Product concept

Vision statement

Project Vision:

Our application is designed to offer real-time visibility into order statuses and popular menu trends within fast food restaurants, providing both customers and restaurant managers with essential data for improving efficiency and decision-making.

Functional (Black-Box) Description of the Application

The application will serve two main purposes:

1. **Customer-Facing Display**:

It will allow customers to view real-time statistics on popular menu items and track the progress of orders in fast food restaurants like McDonald's. Customers can check the number of orders currently in progress and how close their own order is to being completed (based on the order number they received at the restaurant). However, the app will not include any functionality for placing or managing orders; it is purely informational.

2. **Managerial and Administrative Tool**:

Restaurant managers will use the app to monitor the restaurant's performance in real time. They will be able to see how many orders are to be done, in progress, or completed, helping them allocate resources effectively. Additionally, administrators (like Ana Martins in the personas) will manage access for restaurant managers by creating and assigning credentials.

High-Level Business Problem Being Solved

Fast food restaurants face challenges in managing order efficiently, especially during peak hours. Customers are often left in the dark about wait times and the status of their orders, leading to dissatisfaction. Similarly, restaurant managers struggle to prioritize tasks without access to real-time data, potentially affecting service quality. The business problem being addressed by this system is the **lack of transparency and real-time operational insights**, which affects both customer experience and restaurant efficiency.

Planned vs. Actual Features

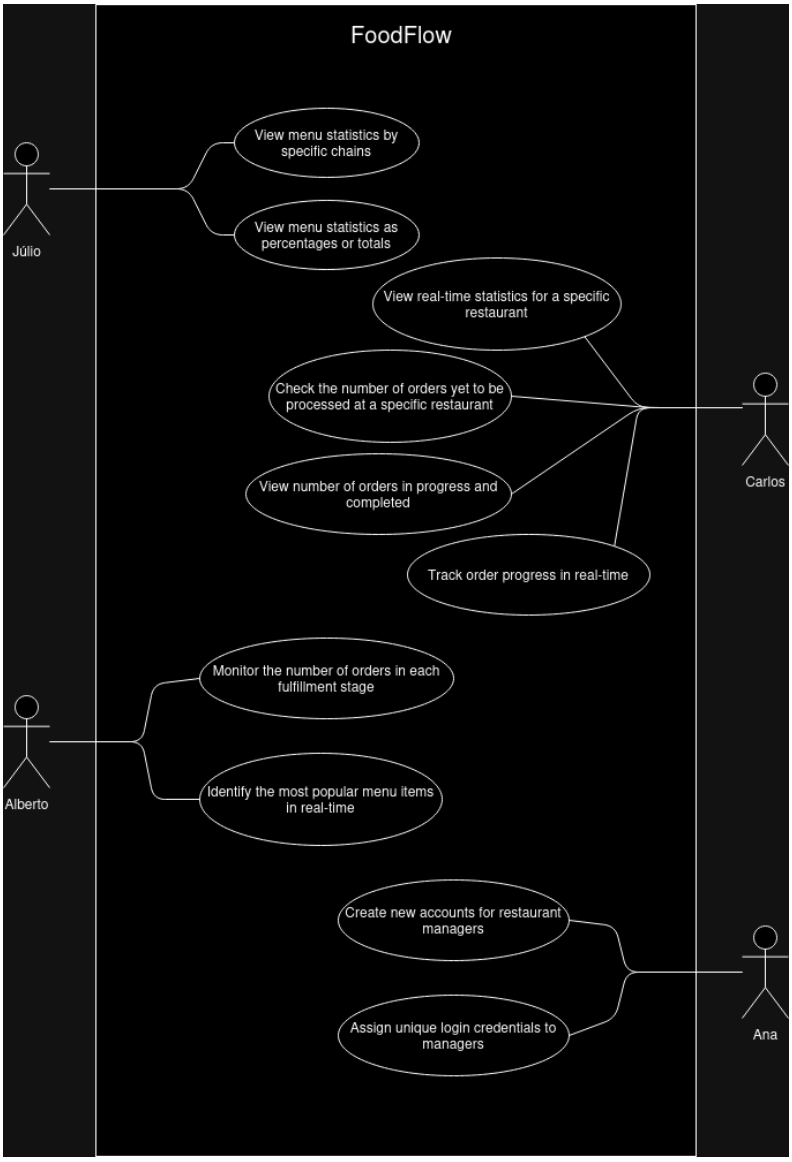
Originally, the system was envisioned to include functionalities for customers to place orders directly through the app. However, we shifted away from this concept and chose a **non-interactive, display-only model**. Now, the app serves as an informational tool, offering real-time order statuses and statistics without the capability to process orders.

Comparison to Other Products

While there are existing apps that allow customers to place orders and track them, such as the McDonald's app or UberEats, our system is **unique** in that it focuses solely on providing **real-time insights into restaurant operations** and does not involve order placement. Apps like these tend to prioritize customer interaction through orders, while our solution focuses purely on giving users (both customers and managers) information about **order status and**

menu popularity without the need for an account or order linkage.

UML Use Case Diagram



Personas and Scenarios

Persona – Carlos Fernandes

Carlos is a 19-year-old Economy student studying in Aveiro's University. With the constant growth of the university and with the existence of only two canteens on the campus, eating in the university can be a time-consuming activity. As a student, Carlos must be time-efficient because he does not have much time in between classes or because he has schoolwork to do. Because of this, he occasionally resorts to fast food chains to hurry himself. Despite being a quick solution, sometimes it is not the most effective, since the time he takes to arrive at the restaurant, order, eat and return to the university are not enough.

Motivation: Carlos would like an easy solution to help him understand if he has enough time to go to a certain restaurant.

Persona – Alberto Joaquim

Alberto is a 40-year-old lawyer and owner of a fast-food restaurant. Despite his time-consuming and successful path in advocacy, he has always been keen on having a business in the restaurant industry. He wants to keep track of his restaurant performance efficiently, comparing it with other restaurants from his or other chains. He needs a place where he can visualize the most sold menus, the clients preferred items and the waiting time of given orders. He wants to maximize his restaurant efficiency and take informed decisions to be able to provide the best experience possible.

Motivation: Alberto wants to understand the habits of the public, optimize the response time and improve the financial results, all while he keeps his work as a lawyer. He is looking for an easy-to-use system that provides useful and easy-to-see data, so he can improve his decisions.

Persona – Júlio Rodrigues

Júlio is a 27-year-old Civil Engineer based in Porto. He has taken a small vacation in Aveiro, and he has the will to go and try a new fast-food chain that previously did not operate in Portugal, and that just opened a restaurant in Aveiro. Since it is a new and unknown restaurant he wants to try the most famous order. He would like to have an application to choose the most desired option from the public, so he can see a real-time graph of the orders that are being requested, which helps him identify the order he wants to place.

Motivation: He wants to be sure that he tries the most popular menu, fulfilling his experience in a new restaurant.

Persona – Ana Martins

Ana Martins is a 45-year-old system administrator responsible for managing access to the restaurant management system across multiple fast-food chains. Ana's primary responsibility is to ensure that restaurant managers have secure and appropriate access to the system so they can view the real-time statistics for their respective locations. Daily, Ana creates new accounts for managers, assigns login credentials, and manages any security issues such as resetting or revoking access when needed.

Motivation for Ana: Ana is motivated by the need to maintain security and organization within the system. She wants to ensure that only qualified managers have access to the app. Ana's focus is on safeguarding restaurant data while making the system easy to use for managers.

Scenario – Carlos Fernandes

Carlos checks if it is profitable to go to a McDonald's - Carlos opens the app, where he can observe a list of fast-food chains. From this list, he chooses the one he desires (McDonald's). After he does this, he can observe a map centered on his location and where he can see nearby restaurants from that chain. He clicks on the closest one and he will be able to see what the current order flow is, i.e., if that certain restaurant has a lot of orders at that moment or not. This allows him to decide whether it is profitable or not to go to that restaurant, timewise.

Scenario – Alberto Joaquim

Alberto checks on his app while he is at work – Since Alberto is a lawyer and has responsibilities as a lawyer, he cannot always be present at his restaurant. Despite this, he can use the app to check how the restaurant is doing, if everything is working as intended. By seeing the graphs disponible, he can observe that there are orders being taken and served to the customers, which allows him to be more relaxed and focused on his duties as a lawyer.

Scenario – Júlio Rodrigues

Júlio checks the most famous menu in a new chain - Júlio opens the app, where he can observe a list of fast-food chains. From this list, he chooses the one he desires (a brand-new chain that just opened in Aveiro). After he does this, he can observe a map centered on

his location and from that map choose the restaurant from that chain. After this, he is presented with a live-time graph that shows what the trending menus have been for the past days. With this graph, he can clearly see what the most famous menu is.

Scenario – Ana Martins

Ana starts her workday by checking that a new manager is set to start at one of the McDonald's branches today, so Ana opens the app's administrative interface to create a new account. She generates login credentials for the manager, assigns the correct permissions for accessing the restaurant's statistics, and sends the credentials to the manager.

Product requirements (User stories)

Epics

Epic 1: Real-Time Menu Statistics

- **Description:** This epic focuses on displaying real-time statistics of the most consumed menu items across various fast-food chains. The goal is to give users access to live data on menu trends and popularity to inform their dining decisions.

Epic 2: Restaurant-Specific Insights

- **Description:** This epic involves providing users with the ability to view statistics for individual fast-food restaurants, such as the number of orders in the queue, orders in progress, and completed orders. This helps users choose locations based on service efficiency.

Epic 3: Order Status Tracking

- **Description:** This epic covers the functionality for users to track the status of their own orders in real-time. Users will be able to follow the progress of their order from the moment it is placed until it is ready.

Epic 4: Restaurant Management Dashboard

- **Description:** This epic addresses the needs of restaurant managers, offering a management dashboard that displays restaurant-specific operational data.

Managers can track order fulfillment status, view which items are popular, and adjust resources accordingly.

Epic 5: Administration Management

- **Description:** This epic addresses the needs of restaurant managers, offering a management dashboard that displays restaurant-specific operational data. Managers can track order fulfillment status, view which items are popular, and adjust resources accordingly.

User Stories for Each Epic

Epic 1: Real-Time Menu Statistics

- **User Story 1.1:** As Júlio, I want to view menu statistics by specific chains (e.g., McDonald's, Burger King), so I can focus on the popularity of items from my favorite restaurants.
- **User Story 1.2:** As Júlio, I want to see menu statistics displayed as percentages or totals, so I can easily compare the popularity of different items.

Epic 2: Restaurant-Specific Insights

- **User Story 2.1:** As Carlos, I want to view real-time statistics for a specific fast-food restaurant, so I can see how busy the location is before placing my order.
- **User Story 2.2:** As Carlos, I want to see how many orders are yet to be processed at a specific restaurant, so I can assess how long I might have to wait.
- **User Story 2.3:** As *Carlos*, I want to know the number of orders that are currently in progress and completed, so I can estimate when my order will be finished.

Epic 3: Order Status Tracking

- **User Story 3.1:** As Carlos, I want to track my order's progress in real-time, so I know whether it's in the "to-do," "in-progress," or "done" stage.

Epic 4: Restaurant Management Dashboard

- **User Story 4.1:** As Alberto, I want to view how many orders are in each stage of fulfillment (to-do, in progress, done), so I can manage staff and resources more effectively during peak hours.
- **User Story 4.2:** As Alberto, I want to see which menu items are the most popular in real-time, so I can adjust kitchen priorities and ingredient stock levels.

Epic 5: Administration Management

- **User Story 5.1:** As Ana, I want to create new accounts for restaurant managers, so that each manager has individual access to the system.
- **User Story 5.2:** As Ana, I want to assign unique login credentials (username and password) to each manager, so they can securely access the restaurant's statistics and operational data.

3 Architecture notebook

Key requirements and constrains

<Identify issues that will drive the choices for the architecture such as: Will the system be driven by complex deployment concerns, adapting to legacy systems, or performance issues? Does it need to be robust for long-term maintenance?

Identify critical issues that must be addressed by the architecture, such as: Are there hardware dependencies that should be isolated from the rest of the system? Does the system need to function efficiently under unusual conditions? Are there integrations with external systems? Is the system to be offered in different user-interfacing platforms (web, mobile devices, big screens,...)?

E.g.: (the references cited in [XX] would be hypothetical links to previous specification documents/deliverables)

There are some key requirements and system constraints that have a significant bearing on the architecture. They are:

- The existing legacy Course Catalog System at Wylie College must be accessed to retrieve all course information for the current semester. The C-Registration System must support the data formats and DBMS of the legacy Course Catalog System [E2].
- The existing legacy Billing System at Wylie College must be interfaced with to support billing of students. This interface is defined in the Course Billing Interface Specification [E1].
- All student, professor, and Registrar functionality must be available from both local campus PCs and remote PCs with internet dial up connections.
- The C-Registration System must ensure complete protection of data from unauthorized access. All remote accesses are subject to user identification and password control.
- The C-Registration System will be implemented as a client-server system. The

client portion resides on PCs and the server portion must operate on the Wylie College UNIX Server. [E2]

- All performance and loading requirements, as stipulated in the Vision Document [E2] and the Supplementary Specification [15], must be taken into consideration as the architecture is being developed.>

Architetural view

- Discuss architecture planned for the software solution.
- include a diagram

Module interactions

- explain how the identified modules will interact. Use sequence diagrams to clarify the interactions along time, when needed
- dicuss more advanced app design issues: integration with Internet-based external services, data synchronization strategy, distributed workflows, push notifications mechanism, distribution of updates to distributed devices, etc.>

4 Information perspetive

<which concepts will be managed in this domain? How are they related?>

<use a logical model (UML classes) to explain the concepts of the domain and their attributes>

5 References and resources

<document the key components (e.g.: libraries, web services) or key references (e.g.: blog post) used that were really helpful and certainly would help other students pursuing a similar work>