CSCI910/410
Assignment 1

Individual Assignment

Marks: 10

Deadline: 23:55 pm, 14th, April, 2025

---

1. Objective

The objective of this assignment is to discover all potential requirements of the project, **Online Food Delivery System**, and write the requirements by using **the provided Requirement specification template** at the end of this document. Based on the project description, you need to discover potential functional requirements, non-functional requirements, the stakeholders, the project domain, and the constraints of the project. You also need to complete three levels of **Data Flow Diagrams** (DFD) for this project.

2. Problem Description

In this project, you are asked to model the procedure of the Online Food Delivery System. The general process is described below. You can make reasonable assumptions if they are not specified.

2.1 User Management

The **User Management** module in an Online Food Delivery System facilitates the creation, authentication, and management of user accounts for customers, restaurants, delivery agents, and administrators. Users can register by providing necessary details such as name, email, phone number, and a secure password, with optional fields like delivery addresses for customers or business details for restaurants. During login, the module validates user credentials and grants access based on roles, ensuring personalized interfaces for customers, restaurants, delivery agents, and administrators. Customers can update their profiles, manage saved addresses, and view order histories. Restaurants can update their business profiles, including contact details, operating hours, and menu information. Delivery agents can manage their profiles, including availability status and payment details. Administrators can manage user accounts (e.g., handles user account deactivation or suspension in case of violations). Password recovery is supported through email or SMS-based verification for all user roles.

2.2 Menu Management

The **Menu Management** module in an Online Food Delivery System handles the creation, updating, and display of restaurant menus. Restaurants log into the system to manage their menu, which includes adding new items, editing existing ones, and categorizing them (e.g., appetizers, main courses, desserts). Each menu item includes details such as name, description, price, availability status, and optional tags like vegetarian or gluten-free. Restaurants can also upload images to visually enhance their menu listings. The module ensures that changes to the menu are immediately reflected in the customer interface, enabling accurate real-time browsing with less than 1ms delay. Customers interact with this module by viewing the menu of a selected restaurant, filtering items based on categories, and searching for specific items. The module should retrieve the relevant menu data from the

database efficiently with less than 2ms delay. Additionally, the module allows restaurants to temporarily disable items or entire categories during high demand or stock shortages. Notifications are sent to customers when unavailable items are in their cart.

2.3 Order Placement and Tracking

The **Order Placement and Tracking** module in an Online Food Delivery System involves several steps. Customers log into the system, browse restaurant menus, and filter items by categories or sort by price or popularity. Selected items are added to a cart, where the module dynamically calculates the total cost. Customers then review the cart, confirm the order, and provide delivery details if not already saved, such as the address and preferred delivery time. Online payments are securely processed through a payment gateway, transferring funds to the restaurant and delivery agent. Once the payment is successful, a receipt is generated. The module notifies the restaurant of the new order, while the customer receives confirmation with an estimated delivery time. Restaurants mark the order as "In Progress" during preparation, and the module updates the customer with real-time order statuses. Once handed over to a delivery agent, the module assigns the order, provides real-time tracking, and updates the status upon delivery.

2.4 Payment

The **Payment** module in an Online Food Delivery System manages the secure and seamless processing of payments for customer orders. This module interacts with a third-party payment gateway to handle online transactions, supporting multiple payment methods such as credit/debit cards, digital wallets, and net banking. During the checkout process, the customer selects a preferred payment method, and the module securely transmits payment details to the selected payment gateway via encrypted communication channels. The payment gateway validates the transaction by verifying card details, available balance, and authentication credentials. Once the payment is successfully processed, the gateway sends a confirmation response to the system, which updates the order status and generates a digital receipt for the customer. In case of a failed transaction, the module provides appropriate error messages and allows customers to retry or choose alternative payment methods. Additionally, the module logs all payment transactions in a secure database for future reconciliation and dispute resolution.

2.5 Notifications

The **Notification Management** module in an Online Food Delivery System handles the delivery of timely alerts and updates to users, ensuring effective communication throughout the order lifecycle. This module supports various types of notifications, including order confirmations, status updates, delivery tracking, and system alerts. Notifications are sent via multiple channels such as email, SMS, push notifications, or in-app alerts, based on user preferences stored in their profiles. For example, when a customer places an order, the module generates a confirmation notification that includes order details and an estimated delivery time. As the order progresses, real-time status updates (e.g., "Order in Progress," "Out for Delivery") are pushed to the customer. Restaurants receive notifications for new orders and updates to existing ones. Delivery agents are notified about assigned deliveries, route updates, or customer messages. Administrators can send system-wide announcements or manage flagged issues through this module. The notification module stores logs of all notifications for troubleshooting and auditing purposes.

2.6 Delivery management

The **Delivery management** module in an Online Food Delivery System coordinates the assignment, tracking, and fulfillment of orders by delivery agents. When a customer places an order, the module identifies available delivery

agents based on location, availability, and workload. The order is then assigned to a suitable agent, who is notified through the system. Delivery agents can accept or decline the assignment, and the module reassigns declined orders to another agent. Once accepted, the system provides the agent with the order details, pick-up location, customer delivery address, and an optimized route using integrated mapping services.

During delivery, the module tracks the agent's real-time location and updates the order status for the customer (e.g., "Pickup in Progress," "On the Way"). Customers can monitor the delivery agent's progress through live tracking. In case of delays or issues, the delivery agent can communicate with the restaurant or customer via in-app messaging or calls facilitated by the system. Upon successful delivery, the agent marks the order as completed, and the module updates the status for the customer while logging the delivery record for future reference.

2.7 Ratings and Feedback

The **Ratings and Feedback** module in an Online Food Delivery System allows customers to evaluate their experiences with restaurants and delivery agents, fostering transparency and service improvement. After an order is delivered, customers are prompted to rate the restaurant and delivery agent on a scale (e.g., 1 to 5 stars) and provide optional feedback. Ratings for restaurants may consider factors such as food quality, packaging, and order accuracy, while ratings for delivery agents focus on punctuality, professionalism, and communication.

The module aggregates these ratings to calculate average scores for restaurants and delivery agents, which are displayed on their profiles for future customers to review. Restaurants and delivery agents can view anonymized feedback to address complaints or improve services.

2.8 Extra Requirements

The system should be available 24 hours per day and 7 days per week. The system should support up to 100,000 people to use concurrently, and the system delay shall be no more than 10 seconds. If a customer/librarian disconnects from the system accidentally, the system should automatically log out. If the system is down, a backup system should be activated and take over the original system automatically. This procedure shall be completed within 60 minutes.

3. Tasks

Task 1. Write a Requirement Specification for the system. The requirement specification document shall clearly define the functional and non-functional requirements of the system, the project domain, the stakeholders, and the constraints of the project. Please refer to the **Requirement Specification Template at the end of this document**. (5 marks)

Task 2. Design and draw a Data Flow Diagram to clearly show the procedure and data flows between different users and the system, as well as the internal data flows of the system. Your DFD shall contain at least three levels. The **Level 0 DFD** shows the interaction between the system and different users. The **Level 1 DFD** shall expand the system to seven sub-systems, i.e., (1) User management, (2) Menu management, (3) Order placement and tracking, (4) Payment, (5) Notification, (6) Delivery management, (7) Rating and feedback. The data flow between the seven sub-systems shall be displayed at Level 1. As for the **Level 2 DFD**, students can select and expand two sub-systems to show the detailed procedures. (5 marks)

4. Submission

Students must submit solutions to **Moodle Assignment 1**.

1. For the requirement specification, please use the **Template at the end of the document** and create a PDF file named ***specification.pdf***.

2. For the Data Flow Diagram (DFD), students can draw it using Lucid Chart, Microsoft Word, or other professional tools (no hand drawing). Finally, students shall create a PDF file (named ***dfd.pdf***) to include everything about the DFD.

3. Wrap up these two files into one single zip file and submit it via Moodle. The zip file name should be your student number e.g., "123456.zip" where "123456" is the student number. Email submissions will not be accepted.

4. Please note that penalties apply for late submissions. For detailed information, refer to the Subject Outline (Section B: Submission and Return of Assessments).

5. The template of requirement specification

1. Introduction
   - 1.1 Purpose
   - 1.2 Scope
   - 1.3 Product Overview
     - 1.3.1 Product perspective and functions
     - 1.3.3 User characteristics
     - 1.3.4 Product limitations
2. Specific requirements
   - 2.1 Domain requirements
   - 2.2 Functional requirements
   - 2.3 Non-functional requirements
     - 2.3.1 Usability requirements
     - 2.3.2 Performance requirements
     - 2.3.3 Logical database requirements
     - 2.3.4 Design constraints
     - 2.3.5 Other software system attributes
   - 2.4 Supporting information
3. Appendices
   - 3.1 Assumptions and dependencies
   - 3.2 Acronyms and abbreviations