## Task 1 – Establishing Customer Requirements (15 Marks)

### Part A: Strategy for Establishing Business Requirements

#### Introduction

As a software development manager at Fresh Insight Technology, I have been tasked with developing a new digital canteen system for a local college. The system will allow students and staff to view the menu, place orders, and make payments from their devices. Establishing clear and precise business requirements from the client is crucial for the success of this project. This report outlines the strategy, methods, and approach to gather these requirements effectively.

#### Strategy Overview

The strategy for establishing business requirements involves multiple steps to ensure all client needs are captured accurately. The approach will be iterative and collaborative, engaging the client throughout the process to refine and validate requirements. The main components of the strategy include:

1. **Initial Client Meeting**
2. **Stakeholder Interviews**
3. **Workshops and Focus Groups**
4. **Surveys and Questionnaires**
5. **Observation and Analysis**
6. **Documentation and Validation**

#### Methods and Approach

1. **Initial Client Meeting**
   * **Objective**: To understand the client’s vision, objectives, and high-level requirements for the digital canteen system.
   * **Participants**: Key client representatives, project manager, and relevant stakeholders.
   * **Activities**:
     + Discuss project goals and scope.
     + Identify primary stakeholders.
     + Establish initial requirements and expectations.
   * **Output**: Preliminary requirement list and project scope document.
2. **Stakeholder Interviews**
   * **Objective**: To gather detailed requirements from different stakeholders who will use or be affected by the system.
   * **Participants**: College administration, canteen staff, students, IT staff.
   * **Activities**:
     + Conduct one-on-one interviews.
     + Use structured questionnaires to ensure consistency.
     + Explore specific needs, pain points, and desired features.
   * **Output**: Detailed stakeholder requirement documents.
3. **Workshops and Focus Groups**
   * **Objective**: To facilitate collaborative discussion and brainstorming among stakeholders.
   * **Participants**: Mixed groups of students, staff, and management.
   * **Activities**:
     + Conduct interactive workshops.
     + Use techniques like brainstorming, mind mapping, and scenario analysis.
     + Prioritize requirements and identify common themes.
   * **Output**: Consolidated requirement lists and prioritization matrix.
4. **Surveys and Questionnaires**
   * **Objective**: To gather quantitative data and broad input from a larger group of users.
   * **Participants**: All potential users of the system (students, staff).
   * **Activities**:
     + Design and distribute online surveys.
     + Analyze responses to identify trends and common requirements.
   * **Output**: Survey analysis report and additional requirements.
5. **Observation and Analysis**
   * **Objective**: To understand the current canteen operations and identify areas for improvement.
   * **Participants**: Canteen staff and users.
   * **Activities**:
     + Observe daily operations and user interactions.
     + Document workflows and pain points.
   * **Output**: Workflow diagrams and gap analysis report.
6. **Documentation and Validation**
   * **Objective**: To compile all gathered requirements into a comprehensive document and validate them with the client.
   * **Participants**: Project team and client representatives.
   * **Activities**:
     + Draft the Customer Requirements Report.
     + Conduct review meetings with the client.
     + Refine requirements based on feedback.
     + Obtain formal sign-off on the requirements.
   * **Output**: Final Customer Requirements Report.

#### Conclusion

This strategy ensures a thorough and systematic approach to gathering and validating business requirements. By engaging the client and stakeholders through various methods, we aim to capture all relevant details to develop a robust and effective digital canteen system. This approach will not only meet the client’s needs but also ensure user satisfaction and system efficiency.

### Part B: Collecting Customer Requirements

#### Strategy for Establishing Business Requirements

To develop a comprehensive digital menu and ordering system for the college canteen, it’s essential to gather precise and detailed business requirements. The strategy to achieve this involves a combination of methods aimed at ensuring a thorough understanding and accurate documentation of the client’s needs.

#### Methods and Approach

1. **Initial Client Meeting:**
   * **Purpose:** To establish a clear understanding of the project scope and primary objectives.
   * **Participants:** Project manager, system analyst, client representatives (canteen staff, management, and a few students if possible).
   * **Activities:** Introduction, project overview, preliminary requirement discussions, and identification of key stakeholders.
2. **Surveys and Questionnaires:**
   * **Purpose:** To gather broad-based input from end-users, including staff and students.
   * **Content:** Questions focused on current issues, desired features, and potential improvements.
   * **Distribution:** Online forms sent to a representative sample of the college population.
3. **Workshops and Focus Groups:**
   * **Purpose:** To engage in detailed discussions with smaller groups of users to gain in-depth insights.
   * **Structure:** Interactive sessions where participants can provide feedback and brainstorm ideas.
   * **Outcome:** A clearer understanding of user expectations and specific requirements.
4. **Observation and Shadowing:**
   * **Purpose:** To observe the current canteen operations and identify inefficiencies.
   * **Method:** Spend time in the canteen during peak hours, noting processes, bottlenecks, and interactions.
   * **Outcome:** Real-time data on operational challenges and user behaviours.
5. **Document Analysis:**
   * **Purpose:** To review existing documentation related to canteen operations, menus, and transaction records.
   * **Documents:** Current menus, order forms, financial records, and feedback forms.
   * **Outcome:** Background information and historical data to inform system requirements.

#### Information Collection and Client Interaction

1. **Preparation:**
   * Schedule an initial meeting with the client to introduce the project team and outline the information-gathering process.
   * Develop a set of initial questions and topics to guide the discussion.
   * Prepare and distribute a survey to gather preliminary input from a broad user base.
2. **Initial Meeting:**
   * Discuss the project scope, objectives, and expected outcomes.
   * Identify key stakeholders and their roles in the project.
   * Agree on a timeline for information gathering and subsequent meetings.
3. **Workshops and Focus Groups:**
   * Organize sessions with different user groups, including canteen staff and students.
   * Facilitate discussions to capture detailed requirements and expectations.
   * Use interactive techniques such as brainstorming and role-playing to explore potential solutions.
4. **Observation and Shadowing:**
   * Schedule observation sessions during different times of the day to understand peak and off-peak operations.
   * Document processes, pain points, and user interactions in real time.
5. **Follow-up and Validation:**
   * Compile and analyze the information gathered from various methods.
   * Schedule follow-up meetings with the client to validate findings and refine requirements.
   * Ensure that all feedback is documented and acknowledged.

#### Customer Requirements Report

1. **Introduction:**
   * **Project Overview:** Brief description of the project goals and objectives.
   * **Client Information:** Details about the college canteen and its operations.
2. **Requirements Gathering Process:**
   * **Methods Used:** Detailed explanation of the strategies and methods used to gather requirements.
   * **Stakeholders Involved:** List of key stakeholders and their roles.
3. **Findings:**
   * **Functional Requirements:**
     + Digital menu accessible via mobile and desktop devices.
     + Remote ordering capability with real-time updates on order status.
     + Integration with existing payment systems for digital transactions.
   * **Non-Functional Requirements:**
     + The system must be user-friendly and accessible.
     + High availability and reliability, especially during peak hours.
     + Secure handling of personal and payment information.
   * **Constraints:**
     + Limited budget and timeframe for implementation.
     + Need to integrate with existing infrastructure (e.g., current POS systems).
   * **Suggestions for Improvement:**
     + Implementing a loyalty program to encourage repeat usage.
     + Providing real-time feedback and ratings for menu items.
     + Offering personalized menu recommendations based on past orders.
4. **Client Sign-Off:**
   * **Review Process:** Steps for the client to review and provide feedback on the requirements document.
   * **Approval:** Section for client sign-off to confirm agreement on the documented requirements.

## Task 2 – System Design Documentation (35 Marks)

### Requirement Specification

**Project Overview:** The objective of this project is to develop a remote ordering and digital menu system for the college canteen. The system will allow students and staff to view the menu, place orders, and make payments digitally from their own devices. This will enhance the canteen experience by reducing wait times, improving order accuracy, and modernizing the payment process.

**Project Scope:** - **User Interface Requirements:** - The system must have a user-friendly interface accessible via web browsers and mobile applications. - Users should be able to browse the menu and view item descriptions, and prices. - Users should be able to add items to a cart, modify the cart, and place orders. - Payment options should include credit/debit cards, digital wallets, and potentially a prepaid account system for students. - Users should receive a confirmation of their order and estimated preparation time.

* **Functional Requirements:**
  + Menu Management: The system should allow the canteen staff to easily update the menu, including item descriptions, prices, and availability.
  + Order Management: The system should handle order placements, cancellations, and modifications efficiently.
  + Payment Processing: Secure payment processing integration with multiple payment gateways.
  + Notification System: Send notifications to users about their order status and readiness for pick-up.
  + User Management: Secure user account creation, login, and profile management.
* **Non-Functional Requirements:**
  + Security: Ensure user data protection and secure transaction processing.
  + Performance: The system must handle high traffic volumes, especially during peak hours.
  + Reliability: High availability and minimal downtime.
  + Usability: Intuitive design to ensure ease of use for all users.
  + Compatibility: Support for multiple devices and browsers.

**Constraints:** - Budget constraints as specified by the client. - The project must be completed within six months starting from June 2024. - Compliance with data protection regulations and PCI DSS for payment processing.

**Assumptions:** - All users will have access to the internet and compatible devices. - The college IT infrastructure will support the new system.

### Logical Designs

**System Architecture:** - **Client-Side:** - Web Application (HTML, CSS, JavaScript) - Mobile Application (React Native or Flutter)

* **Server-Side:**
  + RESTful API (Node.js/Express or Django)
  + Database (PostgreSQL or MySQL)
  + Authentication and Authorization (JWT, OAuth)
* **Data Flow:**
  + User requests to view the menu -> API fetches menu data from the database -> Data displayed on the user interface.
  + User adds items to cart -> Cart data stored in session/local storage.
  + User places order -> Order data sent to server -> Server processes order and updates database -> Order confirmation sent to user.

**Entity-Relationship Diagram (ERD):** Entities: - User (userID, name, email, password, accountType) - MenuItem (itemID, itemName, description, price, availability) - Order (orderID, userID, totalAmount, orderStatus, orderTime) - OrderItem (orderItemID, orderID, itemID, quantity) - Payment (paymentID, orderID, paymentMethod, paymentStatus)

Relationships: - One User can place multiple Orders. - One Order can have multiple OrderItems. - Each OrderItem is associated with one MenuItem. - One Order has one Payment.

### Physical Designs

**Database Schema:** - **Users Table:**

CREATE TABLE Users (  
 userID SERIAL PRIMARY KEY,  
 name VARCHAR(100) NOT NULL,  
 email VARCHAR(100) UNIQUE NOT NULL,  
 password VARCHAR(100) NOT NULL,  
 accountType VARCHAR(50) NOT NULL  
);

* **MenuItems Table:**

CREATE TABLE MenuItems (  
 itemID SERIAL PRIMARY KEY,  
 itemName VARCHAR(100) NOT NULL,  
 description TEXT,  
 price DECIMAL(10, 2) NOT NULL,  
 availability BOOLEAN DEFAULT TRUE  
);

* **Orders Table:**

CREATE TABLE Orders (  
 orderID SERIAL PRIMARY KEY,  
 userID INT REFERENCES Users(userID),  
 totalAmount DECIMAL(10, 2) NOT NULL,  
 orderStatus VARCHAR(50) NOT NULL,  
 orderTime TIMESTAMP DEFAULT CURRENT\_TIMESTAMP  
);

* **OrderItems Table:**

CREATE TABLE OrderItems (  
 orderItemID SERIAL PRIMARY KEY,  
 orderID INT REFERENCES Orders(orderID),  
 itemID INT REFERENCES MenuItems(itemID),  
 quantity INT NOT NULL  
);

* **Payments Table:**

CREATE TABLE Payments (  
 paymentID SERIAL PRIMARY KEY,  
 orderID INT REFERENCES Orders(orderID),  
 paymentMethod VARCHAR(50) NOT NULL,  
 paymentStatus VARCHAR(50) NOT NULL  
);

**User Interface Wireframes:** 1. **Login Screen:** - Fields: Email, Password - Buttons: Login, Register

1. **Menu Screen:**
   * Menu categories are listed on the left side.
   * Menu items displayed with name, description, price, and add-to-cart button.
   * Search functionality.
2. **Cart Screen:**
   * List of selected items with quantity adjustment options.
   * Total price calculation.
   * Checkout button.
3. **Order Confirmation Screen:**
   * Order summary with item details and total amount.
   * Payment options selection.
   * Confirm payment button.
4. **Order Status Screen:**
   * Display the current status of the order (e.g., Preparing, Ready for Pickup).

**Implementation Timeline:**

1. **June 2024:** Initial meetings with the client to finalize requirements.

2. **July 2024:** Completion of requirement specification and initial design phase.

3. **August 2024:** Development of the backend system and database setup.

4. **September 2024:** Development of the front-end interfaces.

5. **October 2024:** Integration of payment systems and order management.

6. **November 2024:** Testing phase, including unit, integration, and user acceptance testing.

7. **December 2024:** Deployment and initial training for canteen staff.