TEB2014 **Software Engineering & HCI / Software Engineering**	
PROJECT **SEPTEMBER 2025** **Lecturer: Ts Dr Yew Kwang Hooi**	
Student names & IDs:	
1. **2.** **3.**	**4.** **5.** **6.**
Instruction: 1. Form a group of 5, any extra requires permission. Elect a project manager. 2. Prepare the report in a group, then pitch the solution. 3. The final submission should be a single Word document containing all answers, diagrams, and links to prototypes. 4. The console-based prototype from Section 1.3, if any should be submitted as a separate ZIP file containing the source code.	

Project Title: Fuel Subsidy Management System

User Story

As a Malaysian Government Administrator, I want to accurately verify a citizen's eligibility for fuel subsidies at the point of sale in real-time, so that subsidies are channelled efficiently to the correct recipients, preventing leakage and ensuring fiscal responsibility, while providing a seamless and trustworthy experience for citizens and gas station attendants.

Section 1: Software Engineering (70% of Total Grade)

Your primary goal is to architect, design, and plan the development of a robust, secure, and scalable backend system that powers the subsidy platform.

1.1 Requirements Specification (15%)

a.   **Task:** Create a Software Requirements Specification (SRS) document that satisfies questions in this project.

b.   **Question 1.1.1:** Identify and list all functional and non-functional requirements. Prioritize them using the MoSCoW method.

c.   **Question 1.1.2:** Develop a Use Case Diagram and write two detailed use case descriptions for: "Citizen Registration & Verification" and "Purchase Fuel with Eligibility Check."

1.2 System Architecture & Design (25%)

a. **Task:** Design the high-level and low-level blueprints for the system.

b. **Question 1.2.1:** Propose a high-level system architecture (using a diagram). Justify your choice (e.g., Microservices) based on the Non-Functional Requirements of scalability, security, and reliability.

c. **Question 1.2.2:** Design a detailed database schema (ER Diagram or other suitable schema). Your design must efficiently support user profiles, vehicle linkages, transaction records, and gas station data.

1.3 Implementation Plan & Prototyping(if any) (20%)

a. **Task:** Develop a proof-of-concept for the core system logic.

b. **Question 1.3.1:** Develop a working console-based or simple web-based prototype that simulates the citizen verification process. It must take a MyKad number as input, check against a simulated database, and return an eligibility status.

c. **Question 1.3.2:** Implement a core algorithm (in pseudocode or code) for a simple fraud detection rule (e.g., flagging if the same ID is used at two stations more than 100km apart within 1 hour).

1.4 Testing & Quality Assurance (10%)

a. **Task:** Ensure the system's reliability and security.

b. **Question 1.4.1:** Create a test plan. Outline specific unit tests for the verification module and integration tests for the payment processing flow.

c. **Question 1.4.2:** Identify three potential security threats (e.g., data breach, QR code spoofing) and propose a mitigation strategy for each.

Section 2: Human-Computer Interaction (30% of Total Grade)

Your goal is to design a user-centric, accessible, and efficient interface for the key front-end users: the **Citizen** and the **Gas Station Attendant**.

2.1 User Research & Analysis (10%)

a. **Task:** Understand the needs and limitations of your end-users.

b. **Question 2.1.1:** Create two distinct personas:

    i. **Persona A (Citizen):** Siti, a 60-year-old teacher who is not comfortable with new technology but needs to use the system for her daily commute.

    ii. **Persona B (Attendant):** Adam, a 22-year-old gas station attendant who needs to process transactions quickly during the morning rush hour.

c. **Question 2.1.2:** For Siti's persona, conduct a task analysis for the "Registering for the Subsidy" process. Identify the top 3 potential pain points she might face.

2.2 Interface Design & Prototyping (15%)

a. **Task:** Translate user needs into a tangible design.

b. **Question 2.2.1:** Using a tool like Figma or Adobe XD, create low-fidelity wireframes for the key screens of the **citizen's mobile app**, focusing on the onboarding and the "Fuel QR Code" display screen.

c. **Question 2.2.2:** Develop a high-fidelity, interactive prototype for the **attendant's POS interface**. The prototype must visually demonstrate the entire flow from "Scan QR Code" to displaying a clear "Eligible - Subsidized Price" or "Not Eligible - Market Price" message.

2.3 Usability Evaluation (5%)

a. **Task:** Evaluate and improve your design based on feedback.

b. **Question 2.3.1:** Plan a usability test for your high-fidelity POS prototype. Describe the scenario and tasks you would give to a test participant (e.g., "Process 3 customers in a row; one is eligible, one is not, and one's QR code fails to scan").

c. **Question 2.3.2:** Based on a hypothetical test run, list two design improvements you would implement in the next iteration and explain why.

-End of Project Instruction-