SUNWAY UNIVERSITY

FACULTY OF ENGINEERING AND TECHNOLOGY

FINAL EXAMINATION FOR THE BACHELOR OF SOFTWARE ENGINEERING (HONOURS)

ACADEMIC SESSION : APRIL 2025 SEMESTER

CSC3209: SOFTWARE ARCHITECTURE AND DESIGN PATTERNS

EXAMINATION : AUGUST 2025

TIME ALLOWED : 2 HOURS AND 10 MINUTES READING TIME

INSTRUCTIONS TO CANDIDATES

This exam contains FIVE questions.

Answer **ALL** questions.

All answers must be written in the answer booklets provided using blue or black INK.

IMPORTANT NOTES TO CANDIDATES

Materials Allowed

Standard Items: Pen, Pencil, Eraser or Correction Fluid, Ruler
Special Items : Non-Programmable Calculators, Computer, Tablet,
Notes (Compiled in one Folder)

It is your responsibility to ensure that you do **NOT** have in your possession any unauthorized notes or any other means that would improperly help you in your work. If you have any unauthorized materials with you, hand it to the invigilator BEFORE reading any further.

DO NOT REMOVE THIS QUESTION PAPER FROM THE EXAMINATION HALL

[This paper contains **FIVE** questions printed on **THREE** pages, including cover page]

Question 1 **(Total: 17 marks)**

a) What is the primary role of the process photosynthesis? (2 marks)

The primary role of photosynthesis is to convert light energy (usually from the sun) into chemical energy (glucose/sugar), which the plant uses as food/fuel.

b) Write down the two main reactants that a plant needs for photosynthesis to occur. (2 marks)

The two main reactants are carbon dioxide (CO_2) and water (H_2O).

c) Understanding Web 3.0

i) Briefly explain the core concept of Web 3.0 and name the key foundational technology that enables its vision of decentralization. (3 marks)

Web 3.0 (or Web3) is the envisioned third generation of the internet, aiming to make the web more decentralized, open, and user-centric. It moves away from data and content being controlled by large, centralized "Big Tech" companies. The key foundational technology enabling this decentralization is the Blockchain, which provides a transparent, tamper-proof, and distributed ledger for recording data and transactions.

ii) Explain how Web 3.0 is fundamentally different from the current internet (Web 2.0) in terms of data ownership and control. (3 Marks)

In Web 2.0, users create content, but the centralized platforms (like social media sites) own and control the data, often monetizing it through advertising. In Web 3.0, the vision is for users to own and control their own data (often through a digital wallet/identity) and the assets they create. This shift aims to empower individuals and allow them to transact and interact directly without needing a trusted intermediary.

Question 2 **(Total: 13 marks)**

This question assesses your understanding of SDLC and Maintenance

a) Identify and briefly describe the **first three sequential phases** of the classic Software Development Life Cycle (SDLC) model (e.g., Waterfall). (8 marks)

Requirements Analysis: This phase involves gathering, documenting, and analysing the needs and expectations of the users and stakeholders to define what the software system must do. Design: In this phase, the system and software architecture is planned. This includes defining the overall structure, modules, interfaces, data, and procedures to specify how the requirements will be met. Implementation (Coding): This is the phase where the design specifications are translated into actual working code by the programmers.

b) Explain why the **Maintenance** phase is considered a critical and often the **longest** phase in the overall life cycle of a successful software product.

(2 Marks)

Fixing defects (bugs) discovered by users. Adapting the software to new operating environments (e.g., new OS versions). Enhancing the software by adding new features based on user feedback or changing business needs, ensuring the product remains relevant and functional over many years.