



UNIVERSITI  
TEKNOLOGI  
PETRONAS

## FINAL EXAMINATION MAY 2024 SEMESTER

**COURSE : TEB2014 - SOFTWARE ENGINEERING & HCI**  
**DATE : 9 AUGUST 2024 (FRIDAY)**  
**TIME : 9:00 AM - 12:00 NOON (3 HOURS)**

### INSTRUCTIONS TO CANDIDATES

1. Answer **ALL** questions in the Answer Booklet.
2. Begin **EACH** answer on a new page in the Answer Booklet.
3. Indicate clearly answers that are cancelled, if any.
4. Where applicable, show clearly steps taken in arriving at the solutions and indicate **ALL** assumptions, if any.
5. **DO NOT** open this Question Booklet until instructed.

**Note :**

- i. There are **SIX (6)** pages in this Question Booklet including the cover page
- ii. **DOUBLE-SIDED** Question Booklet.

Universiti Teknologi PETRONAS

1. a. Differentiate between plan-driven and agile processes.

[4 marks]

- b. Differentiate functional and non-functional requirements using examples.

[6 marks]

- c. Describe the model of the "4 + 1" architectural view.

[5 marks]

- d. The waterfall model is a plan-driven model used in the system development life cycle to create a system using a linear and sequential approach. This model is known as a 'waterfall' because of the cascade from one phase to another.

Describe **FIVE (5)** phases of the waterfall model.

[5 marks]

2. a. Differentiate between use-case diagram and class diagram. [5 marks]
- b. List **FIVE (5)** factors that lead to imprecise requirements [5 marks]
- c. Draw a sequence diagram describing data collection in a weather forecast management system.  
[NOTE: A weather station is a package of software-controlled instruments that collects data, performs some data processing and transmits this data for further processing. The instruments include air and ground thermometers, an anemometer, a wind vane, a barometer and a rain gauge. The data is collected at regular intervals. When a command is given to transmit the weather data, the weather station processes the collected data, summarises it and then transmits it to the mapping computer on request] [5 marks]
- d. Draw a class diagram for the student registration system.  
[NOTE: A student registration system in which students register for a semester. Each course has a title and a course code. The course can be registered, cancelled, withdrawn, passed, or failed by the student. In addition, a semester can be frozen or attended. There are two types of students: Undergraduate students and Postgraduate students.] [5 marks]

3. a. Differentiate between data-driven and event-driven models.

[5 marks]

- b. Define and construct an event-driven model for the microwave oven.

[NOTE: A microwave oven heats food using microwaves, a form of electromagnetic radiation like radio waves. Microwaves have three properties that enable their use in cooking: they are reflected by metal; they penetrate glass, paper, plastic and similar materials; and they are absorbed by food]

[5 marks]

- c. Define and draw a pipe-and-filter architectural model for a compiler.

[5 marks]

- d. Draw a repository architecture model for an Integrated Development Environment (IDE).

[5 marks]

4. a. Differentiate between software verification and software validation.  
[4 marks]
- b. List **FOUR (4)** advantages of test-driven development in software testing.  
[4 marks]
- c. Given the following user requirements in plain English for a banking system:
- An account has an 8-digit number and can be a savings or current account.
  - An account holder has a name, an ID card number/passport number, a date of birth and an address.
  - Each account holder receives a bank card with a unique 12-digit number and a 6-digit secret personal identification number (PIN).
  - To use an ATM, the account holder must insert their bank card and the correct PIN.
  - A bank card is linked to one or more accounts of an account holder.
- Propose **TWO (2)** black-box and white-box test cases for the above scenario.  
[6 marks]
- d. List the **SIX (6)** stages in the acceptance testing process.  
[6 marks]

5. a. Differentiate between Graphical User Interface (GUI) and Command Line Interface (CLI) using examples.

[4 marks]

- b. Describe **FOUR (4)** pillars of a successful user interface development.

[8 marks]

- c. List **FOUR (4)** of the golden rules of HCI design.

[4 marks]

- d. HCI is based on human psychological factors. Justify.

[4 marks]

-END OF PAPER-