



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2022/2023**

COURSE NAME : SOFTWARE DESIGN

COURSE CODE : BIE 20203

PROGRAMME CODE : BIP

EXAMINATION DATE : JULY / AUGUST 2023

DURATION : 3 HOURS

INSTRUCTIONS

1. ANSWER ALL QUESTIONS.
2. THIS FINAL EXAMINATION IS CONDUCTED VIA **CLOSED BOOK**.
3. STUDENTS ARE **PROHIBITED** TO CONSULT THEIR OWN MATERIAL OR ANY EXTERNAL RESOURCES DURING THE EXAMINATION CONDUCTED VIA CLOSED BOOK.

THIS QUESTION PAPER CONSISTS OF **FIVE (5)** PAGES

Q1 Answer **Q1(a)** and **Q1(b)**.

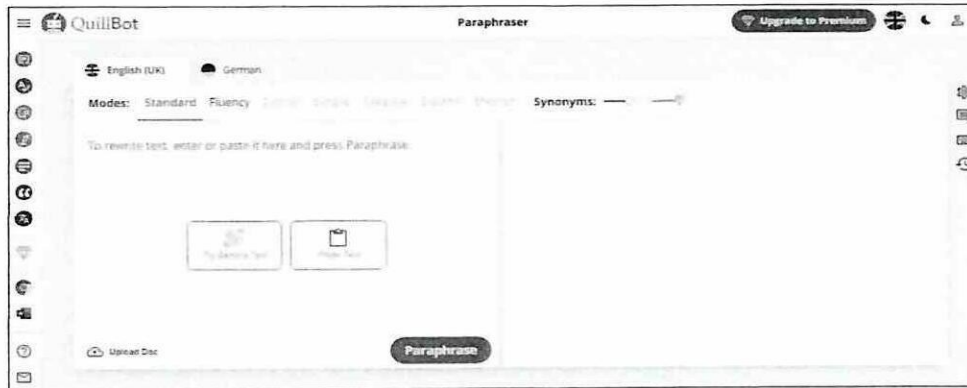


Figure Q1(a)

Table 1 : Forms of module coupling

Form	Features	Desirability
Data coupling	Modules A and B communicate by parameters or data items that have no control element	High
Stamp coupling	Modules A and B make use of some common data type (although they might perform very different functions and have no other connections)	Moderate
Control coupling		
(i) Activating	A transfers control to B in a structured manner such as by means of a procedure call	Necessary
(ii) Coordinating	A passes a parameter to B that is used in B to determine the actions of B (typically a boolean 'flag')	Undesirable
Common-environment coupling	A and B contain references to some shared data area that incorporate knowledge about its structure and organization. Any change to the format of the block requires that all of the modules using it must also be modified	Undesirable

(a) Explain how **ONE (1)** of the coupling forms in **Table 1** can be applied in **Figure Q1(a)**.

(5 marks)

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- (b) Justify whether the answer in Q1(a) helps to identify any desirable changes to the features.

(5 marks)

- Q2** Based on **Figure Q2**, suggest **FOUR (4)** software design quality aspect that should be considered to design a process control system for a chemical plant.

(10 marks)

The chemical plant produces a range of insecticides, including highly toxic ones. The production process involves mixing several chemicals in specific quantities and at precise temperatures and pressures. Any deviation from the set parameters can result in the production of a substandard or potentially hazardous product. The process control system comprises several components, including sensors, controllers, actuators, and software. The sensors collect data on the various parameters, including temperature, pressure, and chemical composition. The controllers use this data to regulate the system's operations, while the actuators adjust the process variables to maintain the desired conditions.

Figure Q2

- Q3** (a) Differentiate between dynamic view and static view of a software architecture.

(8 marks)

- (b) Based on **Figure Q3(b)**, answer **Q3(b)(i)- Q3(b)(iii)**.

XYZ Bank, a leading financial institution, is planning to upgrade its existing ATM system. The current system lacks certain functionalities and has become outdated. The bank aims to provide a modern and secure ATM experience to its customers. As a software designer, your task is to design the software for the new ATM

Figure Q3(b)

- (i) Draw a structural view.

(10 marks)

- (ii) Draw a dynamic view.

(10 marks)

- (iii) Draw a deployment view.

(10 marks)

Q4 Based on **Figure Q4**, answer **Q4(a) – Q4(c)**.

- Functional requirements for college attendance management system:
1. **Attendance Tracking:** The system must have the ability to track attendance accurately and efficiently. This can be done through various methods, including biometric scanners, RFID tags, or manual entry. The system must be able to identify and record each student's attendance for every class.
 2. **Reporting:** The system must be able to generate reports on student attendance for each class, semester, or academic year. The reports should be customizable and easy to access for faculty members, administrators, and students.
 3. **Notifications:** The system must be able to send notifications to faculty members, students, and administrators regarding attendance. For example, the system can send notifications to students who are absent from a class or notify faculty members when students are not attending regularly.
 4. **Integration:** The system must be able to integrate with other college systems, such as student information systems and learning management systems. This integration will allow for the seamless transfer of attendance data between systems and reduce the need for manual data entry.
 5. **Accessibility:** The system must be accessible to all stakeholders, including faculty members, students, and administrators. The system must be accessible through a web-based interface, and the interface must be user-friendly.
 6. **Security:** The system must be secure and protect student attendance data from unauthorized access or modification. The system must have appropriate security measures, such as password protection, encryption, and access controls.
 7. **Customization:** The system must be customizable to meet the specific needs of the college. For example, the system can be configured to support different attendance policies, such as tardiness, absences, or excused absences.

Figure Q4

- (a) Describe **THREE (3)** demographics variables of users. (6 marks)
- (b) Draw **TWO (2)** Graphical User Interface (GUI). (20 marks)
- (c) Construct **TWO (2)** types of information that can differ among locales. (4 marks)

Q5 Answer Q5(a)- Q5(b) based on Figure Q5.

Designing a Component-Based Software Architecture for an E-commerce Platform

XYZ E-commerce, a growing online marketplace, aims to revamp its existing software architecture to improve scalability, modularity, and maintainability. The company intends to migrate from a monolithic architecture to a component-based architecture to support future growth and flexibility. As a software architect, your task is to design the component-based software architecture for the new e-commerce platform.

Figure Q5

- (a) Explain **FOUR (4)** design components. (8 marks)
- (b) Identify **FOUR (4)** component interfaces. (4 marks)

-END OF QUESTIONS -