UTHM
Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESSION 2023/2024

COURSE NAME	:	OBJECT ORIENTED PROGRAMMING
COURSE CODE	:	DAT 20303
PROGRAMME CODE	:	DAT
EXAMINATION DATE	:	JANUARY / FEBRUARY 2024
DURATION	:	2 HOURS 30 MINUTES
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 (7)** PAGES

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Q1 (a) Briefly explain the Class Diagram and the Sequence Diagram.

(4 marks)

(b) Describe **FIVE (5)** symbols used in Sequence Diagram.

(10 marks)

(c) Differentiate between the Use Case Diagram and the Activity Diagram.

(6 marks)

Q2 (a) Explain the following OOP jargon:

(i) Classes

(ii) Objects

(iii) Behaviours

(6 marks)

(b) Write an OOP program to declare class and its members based on the following details:

(i) Class: Car

(ii) States: color, doors

(iii) Method: honking

(4 marks)

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(c)
```
class Methods
{
        double bmi, weight, height;

        public static void main(String[] args)
        {
              Methods obj = new Methods();

              obj.weight = 45.3;
              obj.height = 1.52;
              obj.bmi = obj.weight/(obj.height*obj.height);

              System.out.println("    The    calculated    BMI    is    "    +
              (int)obj.bmi);
              System.out.print(" This BMI in normal range");
        }
}
```

(i)   Identify an instance in the above program

(1 mark)

(ii)   List instance variable(s) in the above program.

(3 mark)

(iii)   Name the type of constructor used in the above program.

(1 mark)

(iv)   Change the above program into a smaller module.

(5 marks)

3

Q3   (a)   Write a program to:

         (i)   Add three scores (50.1, 60.3, 30.4) to an `ArrayList`.

         (ii)   Total up the score, calculate and print the average score.

The program consists of the following methods:

`main()`	invoke `addList()`. invoke `calAve()`.
`addList()`	insert the three scores into the `ArrayList`.
`calAve()`	total up the three scores using `for` loop and prompt the average score on the console output.

The sample output is as follows.

> Average score is 46.93

(20 marks)

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Q4   Based on guideline below:

```
public class Book {
    // TODO: Implement encapsulation for the attributes
    // Attributes: title, author, ISBN, and quantity

    // TODO: Implement the constructor to initialize the book
     details

    // TODO: Implement methods for checking out and returning
     a book

    // TODO: Implement a method to display book details
}
```

Write a program to:

(i) Provide encapsulation for the attributes (title, author, ISBN, and quantity).

(4 marks)

(ii) Implement a constructor to initialize the book details when an object is created.

(4 marks)

(iii)Create a method called checkoutBook that allows a user to check out a book. Ensure proper error handling for cases such as requesting more copies than available.

(4 marks)

(iv)Create a method called returnBook that allows users to return a book, updating the quantity.

(4 marks)

(v) Create a method called displayBookDetails to print the details of the book.

(4 marks)

Q5   (a)   Inheritance is a kind of OOP concept that allows the inherits the attributes and methods of another class. Define the main purpose of the Inheritance concept.

(2 marks)

(b)   You are given a guideline below:

```
// TODO: Implement the Vehicle, Car, and Motorcycle classes
with appropriate attributes and methods.
class Vehicle {
    // TODO: Declare attributes for the Vehicle class
    // TODO: Implement a constructor for the Vehicle class
    // TODO: Implement a method to display information about
the vehicle
}
// TODO: Implement the Car class, inheriting from Vehicle
class Car {
    // TODO: Declare attributes specific to the Car class
    // TODO: Implement a constructor for the Car class
    // TODO: Implement a method to display information about
the car
}
// TODO: Implement the Motorcycle class, inheriting from Vehicle
class Motorcycle {
    // TODO: Declare attributes specific to the Motorcycle class
    // TODO: Implement a constructor for the Motorcycle class

    // TODO: Implement a method to display information about
the motorcycle
}
// Example Usage
public class Main {
    public static void main(String[] args) {
        // TODO: Create instances of the Car and Motorcycle
classes and demonstrate inheritance.
    }
}
```

Write program to:

(i) Implement the Vehicle class with attributes common to all vehicles and a method to display information about the vehicle.

(3 marks)

6

(ii) Implement the Car class, inheriting from Vehicle, with attributes specific to cars and a method to display information about the car.

(4 marks)

(iii) Implement the Motorcycle class, also inheriting from Vehicle, with attributes specific to motorcycles and a method to display information about the motorcycle.

(4 marks)

(iv) In the Car and Motorcycle constructors, demonstrate the use of the super keyword to call the constructor of the base class (Vehicle).

(3 marks)

(v) In the Main class, create instances of the Car and Motorcycle classes and demonstrate the use of inheritance.

(4 marks)

-END OF QUESTIONS –

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