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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

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

COURSE NAME : OBJECT ORIENTED PROGRAMMING
COURSE CODE : DAT 20303
PROGRAMME CODE : DAT
EXAMINATION DATE : FEBRUARY 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 **SIX (6)** PAGES

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SECTION A (7 MARKS)

Q1 A program can execute without the following Object Oriented Concept (OOP) except _____.

- A. abstraction
- B. class
- C. inheritance
- D. object

Q2 Exception described in the following statement represents _____.

java command line instruction requires .class bytecode file. However, an error would be prompt if the expected bytecode file is not found during program load.

- A. ClassNotFoundException
- B. IOException
- C. LinkageError
- D. NoClassDefFoundError

Q3 Invoking method in another program which does not exist would trigger _____.

- A. checked exception
- B. error
- C. runtime error
- D. runtime exception

Q4 Accessing uninitialized or unassign array element will return _____.

- A. default value of its type
- B. error
- C. null
- D. zero

Q5 ArrayList cannot be used for data of type _____.

- A. Character
- B. Double
- C. int
- D. String

Q6 Parent-child relationship is implemented by _____.

- A. extend
- B. extends
- C. specialisation
- D. generalisation

Q7 Members of a parent class can be inherited by the child class except the _____.

- A. superclass constructor
- B. superclass properties
- C. superclass public data field
- D. superclass public methods

SECTION B (73 MARKS)

- Q11** (a) Compare between method overriding and method overloading in terms of the following criteria.
- (i) Types of polymorphism
 - (ii) Speed of execution
 - (iii) Time of method invocation
- (6 marks)
- (b) Compare between inheritance and polymorphism in terms of the following criteria.
- (i) Object Oriented Concept
 - (ii) Affected code structure
 - (iii) Implementation keyword
- (6 marks)
- (c) List one real life example of a parent-child relationship.
- (1 mark)
- (d) Convert the answer in **Q11(c)** into Java code which implements inheritance.
- (2 marks)
- (e) Explain why the following code generates error.

```
class Parent
{
    String name = "Alice";

    protected void Display()
    {
        System.out.print("I am " +name);
    }
}

public class Polymorphism extends Parent
{
    public static void main (String[] args)
    {
        Parent object = new Polymorphism();

        object.Display();
    }

    @Override
    void Display()
    {
        System.out.print("I am David");
    }
}
```

(2 marks)

- Q12** (a) Explain why encapsulation is also known as information hiding. (2 marks)
- (b) Determine the class structure involved in the implementation of encapsulation. (2 marks)
- (c) Construct class `GPS` which encapsulate a string variable `location`. (2 marks)
- (d) Construct an accessor and mutator for variable in **Q12(c)**. (4 marks)
- (e) Explain why variable `location` is not a class variable. (2 marks)
- Q13** (a) Compare conventional array against array of object by their type. (2 marks)
- (b) Write a declaration statement for an array of object reference variable `obj` for `Car` type with size of 3. (1 mark)
- (c) Initialise three elements for the array of objects with different number of door. Assume that the `Car` type features `int door` and a parameterised constructor. (3 marks)
- (d) Construct class `Car` with an integer variable named `door` as the property. (2 marks)
- (e) Construct a parameterised constructor for class `Car` to initialise the array elements. (2 marks)

Q14

Upon making a purchase, 7eleven mobile apps rewards registered user with points, vouchers and e-stamps. Accumulated points can be used for cashless payment. Each purchase is recorded in the purchase history. Meanwhile, each point accumulation can be traced back in the point statement. In addition, users can enjoy discount on promotional items using vouchers. On the other hand, e-stamps let user claim free item upon series of purchase on specific item.

- (a) Identify actor(s) from the above statement. (1 mark)

- (b) Identify use case(s) from the above statement. (8 marks)
- (c) Sketch a use case diagram using actor(s) from **Q14(a)** and use case(s) from **Q14(b)** using correct relationship. (15 marks)

Q15

```

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");
    }
}
    
```

- (a) Identify instance in the above program. (1 mark)
- (b) Identify instance variable(s) in the above program. (3 marks)
- (c) Identify type of constructor in the above program. (1 mark)
- (d) Change the above program into smaller module. (5 marks)

SECTION C (20 MARKS)

- Q16** Write a program that:
- i) Add three scores (53.1, 72.3, 90.4) to an `ArrayList`.
 - ii) Total up the score, calculate and print the average score.

The program consists of the following methods:

- (a) `main()`
 - (i) invoke `addList()`.
 - (ii) invoke `countAve()`.

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- (b) `addList()`
 - (i) insert the three scores into the `ArrayList`.

- (c) `countAve()`
 - (i) total up the three scores using `for` loop.
 - (ii) prompt the average score on the console output.

Sample output is as below.

Average score is 71.93

(20 marks)

-END OF QUESTIONS -

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