TUNKU ABDUL RAHMAN UNIVERSITY OF MANAGEMENT AND TECHNOLOGY

FACULTY OF COMPUTING AND INFORMATION TECHNOLOGY

ACADEMIC YEAR 2023/2024

JANUARY EXAMINATION

AACS2204 OBJECT-ORIENTED PROGRAMMING TECHNIQUES

FRIDAY, 12 JANUARY 2024 TIME: 9.00 AM – 11.00 AM (2 HOURS)

DIPLOMA IN COMPUTER SCIENCE

DIPLOMA IN INFORMATION TECHNOLOGY

Instructions to Candidates:

Answer **ALL** questions. All questions carry equal marks.

This question paper consists of 4 questions on 4 printed pages.

AACS2204 OBJECT-ORIENTED PROGRAMMING TECHNIQUES

Question 1

a) In object-oriented programming, a class is composed of **TWO (2)** primary parts. Identify the **TWO (2)** primary parts, explain each one, and provide an example for each part. (10 marks)

b) Explain the concept of ***method overriding*** in object-oriented programming. (5 marks)

c) Define the following terms:

(i) Encapsulations (2 marks)

(ii) Inheritance (2 marks)

(iii) Polymorphism (2 marks)

(iv) Method Signature (2 marks)

(v) Formal Parameters (2 marks)

[Total: 25 marks]

Question 2

a) Visibility modifiers in object-oriented programming (OOP) are used to control access to classes, methods, and variables within a software system. Identify **FOUR (4)** types of access modifier and determine the visibility of each modifier. You are required to reconstruct the following table in your answer sheets.

Access modifier				
Same class				
Same package, subclass				
Same package, non-subclass				
Different package, subclass				
Different packages, non-subclass				

(8 marks)

b) Briefly discuss the differences between ***method matching*** and ***method binding***. (8 marks)

c) Explain the **THREE (3)** steps in the problem-solving process in an object-oriented design. (6 marks)

Question 2 (Continued)

d) Provide **THREE (3)** advantages of using constants. (3 marks)

[Total: 25 marks]

Question 3

The UML class diagram in Figure 1 represents the details of a `Smartphone` class.

Smartphone
- id : String - brand: String - model: String - storageCapacity: int - totalSmartphoneSold : int
+ Smartphone () + Smartphone (id:String, brand: String, model: String, storageCapacity: int) + Set methods + Get methods + toString(): String

Figure 1: Class Diagram

a) Based on Figure 1, construct the `Smartphone` class. The following requirement must be included in your class design.

- The constructors should increase the value of `totalSmartphoneSold` by 1.
- Fully utilize `this` keyword whenever possible.
- A `toString()` method that returns a string containing all the data field values, including id, brand, model and storageCapacity for each line.

(19 marks)

b) Construct a driver class based on the `Smartphone` class that you have created in Question 3 a). Your program should be able to do the following tasks:

- Create a `Smartphone` object by invoking a **no-arg constructor**.
- Assign this `Smartphone` object with these values:

id	brand	model	storageCapacity
A1111	Samsung	S23 Ultra	256

- Create another `Smartphone` object by invoking **parameterized** constructor and assign the following values to it:

id	brand	model	storageCapacity
B1111	Apple	Iphone 15	512

- With the help of `toString()` method, display the **TWO (2)** `Smartphone` objects information and the `totalSmartphoneSold` value. The sample output is shown in Figure 2.

Question 3 b) (Continued)

```
ID: A1111
Brand: Samsung
Model: S23 Ultra
Storage Capacity: 256

ID: B1111
Brand: Apple
Model: Iphone 15
Storage Capacity: 512

Total Smartphone Sold: 2
```

Figure 2 : Sample Output

(6 marks)

[Total: 25 marks]

Question 4

a) (i) Create an interface named `ContentManager` that contains **THREE (3)** methods: `publishContent()`, `saveDraft()` and `deleteContent()`, each of which return a string value. (4 marks)

(ii) Construct a class named `BlogPostManager` that implements `ContentManager` interface with the following requirement:

- The `publishContent()` method should return the message "`Blog post published successfully.`".
- The `saveDraft()` method should return the message "`Blog post saved as a draft.`".
- The `deleteContent()` method should return the message "`Blog post deleted successfully.`".

(8 marks)

b) Write a java main method to test the `publishContent()`, `saveDraft()` and `deleteContent()` that you've written in Question 4 a) (ii). (5 marks)

c) Define and discuss the differences between ***abstract class*** and ***interface*** in terms of variables, constructor and methods. (8 marks)

[Total: 25 marks]