

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.

**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)

**AACS2204 OBJECT-ORIENTED PROGRAMMING TECHNIQUES****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.

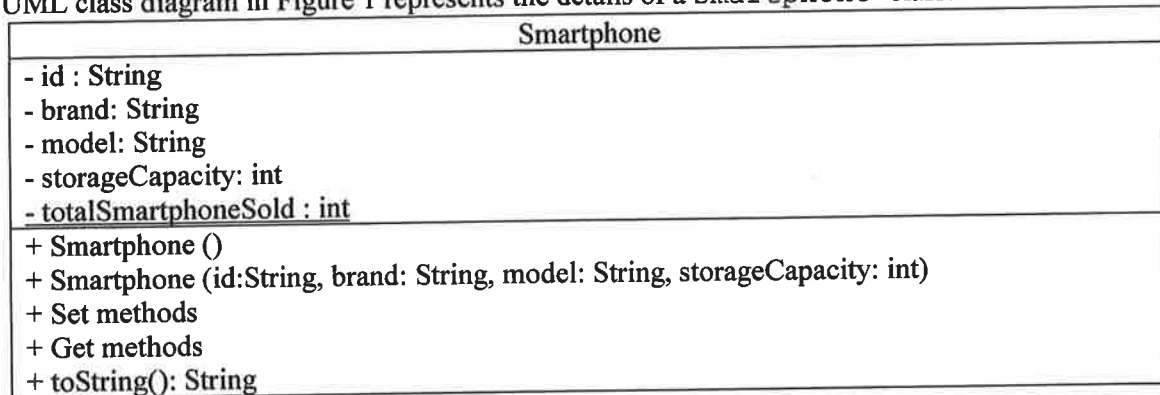


Figure 1: Class Diagram

- 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.

AACS2204 OBJECT-ORIENTED PROGRAMMING TECHNIQUESQuestion 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]