

TECHNOLOGICAL UNIVERSITY DUBLIN
Grangegorman

TU082 – BSc (Hons) Information Systems/Information
Technology (Part-Time)

Year 2

SAMPLE PAPER

CMPU 2029 - Object-Oriented Programming

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Instructions To Candidates: Answer 3 out of 4 Questions

Exam Duration: 2 Hours

Special Instructions /Handouts/ Materials Required: None

1.
 - (a) What is *inheritance*? Provide a simple code example. (8 marks)
 - (b) What is *polymorphism*? Provide a simple code example. (8 marks)
 - (c) When developing a software system for a greengrocer, a developer decides on the following rules: Many APPLES are stored in one BARREL and many ORANGES are stored in one BASKET. APPLES have a colour and weight, and you can PICK and SQUEEZE apples. ORANGES have a WEIGHT and a DATE_PICKED, and you can also PICK and SQUEEZE them. BARRELS and BASKETS have a SIZE, and you can SELL or DISCARD either.

Draw a CLASS DIAGRAM to represent the above scenario. (8 marks)
 - (d) Develop a program in Java to calculate the average value in an integer array, creating a AvgArray method, with a main method, all enclosed in an AArray class. (9 marks)

2.
 - (a) What is *overriding*? (3 marks)
 - (b) Create a Java program including all the methods and classes to demonstrate overriding. (12 marks)
 - (c) Show how you would create two instances of the two classes you created in part (b) of this question. (8 marks)
 - (d) What is *super*? Provide a simple code example. (10 marks)

3. (a) Assuming you have a class called `Super1` that prints out the message “I am super1” show the Java syntax to create a class `MySubClass` that inherits from this class. Explain why this is useful. (10 marks)
- (b) What is an *Interface* class? Provide a simple code example. (7 marks)
- (c) There are four types of access modifiers available in Java:
- Default
 - Private
 - Protected
 - Public

Explain the meaning of each type, and provide an example of each in the context of methods, demonstrating how they work. (16 marks)

4. (a) Explain what each of the following parts of a Class Diagram does: (10 marks)
- Method, Attribute, Class, Association, Generalization.

- (b) Express the following as a Class Diagram: (10 marks)

In general, a CUSTOMER can place more than one ORDER. The CUSTOMER has a credit rating. The ORDER can dispatch and close orders. There are two specific types of CUSTOMER, a CORPORATE CUSTOMER and a PERSONAL CUSTOMER. The difference being that a CORPORATE CUSTOMER will be given a reminder to pay their invoices, and they can request a total bill for the month.

- (c) Express the following as a Class Diagram:

A STUDENT takes a specific ENROLLMENT of a given SEMINAR. Once they are enrolled the STUDENT name is added to the SEMINAR list. The STUDENT has to be eligible to enroll, and must record the number of seminars taken. The SEMINAR can add and drop students. The ENROLLMENT can get the average mark to date and get the final mark.

A PROFESSOR will give the SEMINAR, and one PROFESSOR can give zero or more seminars.

(13 marks)