Programme Code: TU082
Module Code: CMPU 2029
CRN: 30385

TECHNOLOGICAL UNIVERSITY DUBLIN

Grangegorman

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

Year 2

SAMPLE EXAM PAPER

CMPU 2029 - Object-Oriented Programming

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Instructions To Candidates: Answer 3 out of 4 Questions. All questions carry equal marks.

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.
- `BARREL`s and `BASKET`s have a `SIZE`, and you can `SELL` or `DISCARD` either.

(8 marks)

Draw a CLASS DIAGRAM to represent the above scenario.

(d) Develop a program 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 program including all the methods and classes to demonstrate overriding. (12 marks)

(c) Show how you would create two instances of the two classes (the parent and child) you created in part (b) of this question. (8 marks)

(d) What is meant by the keyword *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 syntax to create a class `MySubClass` that inherits from this class. Explain why this is useful.

(10 marks)

(b) What is an *Interface*? Provide a simple code example.

(7 marks)

(c) There are four types of access modifiers available:

- 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:
   - Method
   - Attribute
   - Class
   - Association
   - Generalization.

(10 marks)

(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 CORPRATE CUSTOMER and a PERSONAL CUSTOMER. The difference being that a CORPRATE 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)