Open University of Mauritius

BSc (HONS) APPLIED ICT WITH SPECIALISATION [OUbs017]

EXAMINATION FOR: November/December 2018

MODULE : Object Oriented Programming [OUbs017214]

DATE : Wednesday 12 December 2018

DURATION : 2 Hours

INSTRUCTIONS TO CANDIDATES

1. This paper consists of **FOUR (4)** questions.
2. Answer **ALL** questions on the Answer Booklet provided.
3. Always start a new question on a fresh page.
4. Calculator is allowed. Such calculator should not be programmable and should not contain any storage data.
5. Total marks: **100**

This question paper contains 4 questions and 5 pages.

ANSWER ALL QUESTIONS

QUESTION 1 [25 MARKS]

(a) State the use of UML diagrams, and describe briefly any **three (3)** of them.

(5 marks)

(b) Draw a UML Class diagram for a simplified employee management system. The scenario is as described below:

A company has a name and a list of employees.

Each employee has the following attributes: employeeNumber, name, salary and is assigned to a Manager

Each Manager can manage multiple employees (as a team) and can also add new employees to the team

The company also employs Contractors on fixed duration contracts. Each contractor has the following attribute: lengthOfContract.

The class diagram needs to include the Set and Get methods for each of the attributes mentioned in the scenario.

(10 marks)

(c) Draw a UML Sequence Diagram to model the behavior of an ATM machine that has **four (4)** functions namely deposit, withdrawal, balance and transfer.

(10 marks)

QUESTION 2 [25 MARKS]

(a) Define the following terminologies as used in Object Oriented Programming and provide a simple example of each:

(i) this keyword

(ii) Local variables

(iii) Instance variables

(iv) Instantiation

(v) super keyword

(10 marks)

(b) How is Object Oriented Programming different from Structured Programming?

(4 marks)

(c) Name any **three (3)** primitive data types in Java, and state their range of values.

(6 marks)

(d) Explain the concept of polymorphism with the help of an example.

(5 marks)

QUESTION 3 (25 MARKS)

The following is an extract of a Java OO program. Refer to it to answer the following questions:

```
public class Vehicle {

        String name;

        public Vehicle(String name) {
                System.out.println("Passed Name is:" + name);
        }

        public display(String name) {
                System.out.println("Name is:" + name);
        }

}
```

Figure 1: code snippet for class Vehicle

(a) Define inheritance. Show how a child class “Motorcar” can inherit from the “Vehicle” class.

(5 marks)

(b) Define method overriding. Show how the method “display” can be overridden in the child class.

(5 marks)

(c) Define method overloading. Show how the method “display” can be overloaded in the child class.

(5 marks)

(d) What are getters and setters? Write the Java codes for getters and setters for the variable “name” in the “Vehicle” class.

(7 marks)

(e) Write the Java codes to create a new object from the “Vehicle” class.

(3 marks)

QUESTION 4 [25 MARKS]

(a) Explain the use of the try-catch-finally block for exception handling.

(6 marks)

(b) Complete the code below, so that an exception is caught when a file runtime error occurs.

```
File f1 = File("c:/test/");
f1.mkdir();
File f2 = File("c:/test/test.txt");
PrintWriter pw1 = null;
pw1 = new PrintWriter(F2);
pw2.println("hello world");
```

(6 marks)

Figure 2: code snippet for file handling exemption

(c) Define Object Serialisation.

(3 marks)

(d) What is the purpose of Object Serialisation?

(3 marks)

(e) Java is a multithreaded programming language which means we can develop a multithreaded program using Java. What is a multithreaded program?

(3 marks)

(f) Collections, such as LinkedLists, are Java classes developed to efficiently store multiple elements of a certain type.
State the difference between an Array and a LinkedList.

(4 marks)