**BSc in Science in Computing & Multimedia**

**Semester 1**

**2021**

**Sample Practical Laboratory Examination**

**Module Title** Programming Essentials

**Module Code**

**Assessment Type** **SAMPLE**

**Weighting** 10%

**Maximal Possible Mark:** 100 marks

**Submission Date:** N/A

**Duration: 3 hours**

**Instructions**:

* Internet is not allowed
* Students can use their own notes and the course Moodle page.
* Both algorithm and Java code needs to be submitted.
* Algorithm needs to be submitted through Moodle.
* Java source code (must be .java or .txt) needs to be submitted through Moodle.
* Student ID must be used as part of the file names for both files submitted.

1. Explain what is type casting in Java programming language? (5 marks) And describe a scenario when type casting should be used. (5 marks)
2. What is a compiler and interpreter? (6 marks) And explain the main differences between them. (4 marks)
3. What are pre-incremental and post-incremental operators, give an example of each. (6 marks) What are the differences between the two. (4 marks)
4. Describe the two phases in a typical programming task. (6 marks) And given an example of each. (4 marks)
5. Describe the usage of the Selection logic in Java programming language. (5 marks). Give an example of Selection using flowchart. (5 marks)

**Section 2: (50 Marks)**

A town runs a lottery for its residence. You have been asked to write a simple lottery program for them to calculate the winnings. Here is how the lottery system works:

*A winning tickets consists of 3 different numbers between 1 and 24, and they are secretly selected. Then the lottery program will ask a player to input 3 different numbers between 1 and 24. (NOTE, it is important that each numbers in the winning numbers or player’s numbers are unique). The winnings are calculated based on the following:*

|  |  |
| --- | --- |
| ***Conditions*** | ***Results*** |
| *All 3 numbers have matched* | *Tell the player that she/he has won the first prize.* |
| *2 numbers have matched* | *Tell the player that she/he has won the second prize.* |
| *Only 1 number has matched* | *Tell the player that she/he has won the third prize.* |
| *None of numbers has matched* | *Tell the player good luck next time.* |

This is how your program should work:

**(i) Create winning ticket numbers**

You program will assign randomly 3 unique numbers between 1 and 24 as the winning numbers.

**(ii) Input customer name, and 3 numbers between 1 and 24**.

Ask a customer to input 3 unique numbers between 1 and 24.

**(iii) Calculate the winnings.**

After the data is entered, the program calculate the winnings and print out the result on the screen.

***Example***:

|  |
| --- |
| **Input**  Enter the first number for your lottery ticket: 23  Enter the second number for your lottery ticket: 5  Enter the third number for your lottery ticket: 6 |

|  |
| --- |
| **Output**  *Your lotter ticket number is: 23, 5, 6*  *Congratulations! You have won the first prize!* |

(a) Using either a flowchart or an algorithm for the problem.

**[14 marks]**

(b) Create two sets of test data in order to test your program.

**[6 marks]**

(c) Implement the algorithm in (a) above in Java.

**[30 marks]**