Open University *of* Mauritius

BSc (HONS) COMPUTER SCIENCE [OUbs033]

BSc (HONS) APPLIED ICT WITH SPECIALISATION [OUbs017]

EXAMINATION FOR: November - December 2023

MODULE : Object Oriented Programming [OUbs033213] [OUbs017214]

DATE : Tuesday 21 November 2023

DURATION : 2 Hours

INSTRUCTIONS TO CANDIDATES

1. This question paper consists of **FIVE (5) QUESTIONS**.
2. Answer **ALL questions**.
3. Always start a new question on a fresh page.
4. Total marks: **100**

This question paper contains 5 questions and 6 pages.

ANSWER ALL QUESTIONS

QUESTION 1 [20 MARKS]

a) What do each of the following print?

i) System.out.println(2 + "ru");

ii) System.out.println(2 + 3 + "ru");

iii) System.out.println((2+3) + "ru");

iv) System.out.println("ru" + (2+3));

v) System.out.println("ru" + 2 + 3);

(5 marks)

b) Name the import package required to perform input and output in Java.

(2 marks)

c) Using an example, differentiate between a local variable, an instance variable and a class variable.

(6 marks)

d) The below Java codes will test if a number is positive or negative. Write down the missing code snippets.

(7 marks)

```
public static void main(String[] args)
  {
      Scanner in = new Scanner(System.in);
      System.out.print("Input number: ");
      int input = in.nextInt();

       *Missing code snippets*

      }
```

QUESTION 2 [20 MARKS]

a) Define an array.

(2 marks)

b) When an array is created each element of the array is set to the initial value of its type. What is the initial value of each of the following types?

i) for numeric type

(1 mark)

ii) for Boolean type

(1 mark)

iii) for reference type

(1 mark)

c) In this question you will be asked to refer to the below code snippets.

```
class GFG
{
    public static void main (String[] args)
    {
      // declares an Array of integers.
       *Missing code A*
      // allocating memory for 5 integers.
       *Missing code B*
      // initialize the first elements of the array
      arr[0] = 10;

      // initialize the second elements of the array
      arr[1] = 20;

      //so on...
      arr[2] = 30;
      arr[3] = 40;
      arr[4] = 50;

      // accessing the elements of the specified array

       *Missing code C*

    }
}
```

i) Write down the missing code A that declares an array of integers.

(2 marks)

ii) Write down the missing code B that allocates memory for 5 integers.

(3 marks)

iii) Write down the missing code C that creates a loop and display the elements in the array as output in this syntax Element at index i: value.

(10 marks)

QUESTION 3 [20 MARKS]

a) Differentiate between a class and an object.

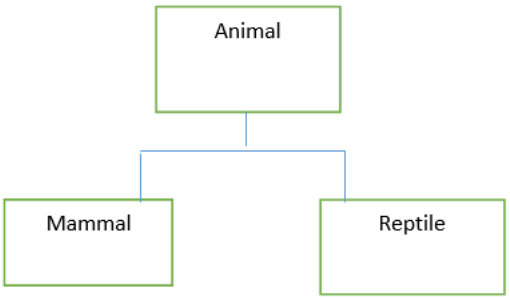
(2 marks)

b) List the principal characteristics of an object, as defined in the object model, and how are these characteristics represented in Java?

(6 marks)

c) Consider the following diagram. Describe in your own words the information contained in the diagram about the classes and their relationship.

(6 marks)



d) Write a java code example to demonstrate method overriding based on the above diagram.

(6 marks)

QUESTION 4 [20 MARKS]

In this question you will be asked to refer to the below code snippets.

```
public static void main(String a[]){
    StringBuilder sb = new StringBuilder();
    String strLine = "";
    try {
         BufferedReader br = new BufferedReader(new FileReader("/home/students/test.txt"));
         while (strLine != null)
         {
            sb.append(strLine);
            sb.append(System.lineSeparator());
            strLine = br.readLine();
            System.out.println(strLine);
        }
         br.close();
    } catch (  Exception 1            ) {
        System.err.println("File not found");
    } catch ( Exception 2   ) {
        System.err.println("Unable to read the file.");
    }
 }
```

a) Define an exception in java and how is it handle?

(5 marks)

b) What type of exception have occurred in the given code?

(2 marks)

c) Write down the missing line of codes for

i) Exception 1

(3 marks)

ii) Exception 2

(3 marks)

d) Instead of using the try catch block to handle the exception, mention another way of declaring this exception through an example.

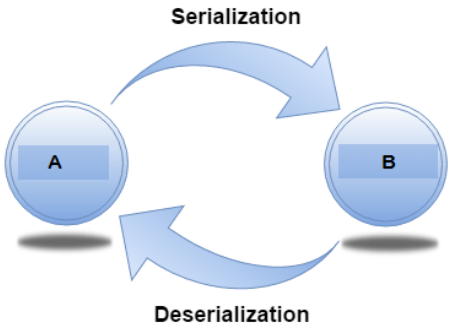
(5 marks)

e) Why is it necessary to add a finally block when handling an exception?

(2 marks)

QUESTION 5 [20 MARKS]

a) Refer to the below diagram, write down the label A and B.



(4 marks)

b) Differentiate between serialisation and de-serialisation.

(6 marks)

c) How to make a java class serialisable?

(3 marks)

d) While serialising you want some of the members not to serialise. How do you achieve it?

(3 marks)

e) Name **four (4)** Java GUI's components.

(4 marks)