

RUAHA CATHOLIC UNIVERSITY
RCS 122/RAF128 - OBJECT ORIENTED PROGRAMMING I
INDIVIDUAL ASSIGNMENT II

Instructions:

1. This is an individual assignment, copying from someone else's work will lead to a penalty.
2. The assignment is divided into two sections. Answers for Section A should be handwritten. In Section B, you have to write Java programs and send the java files to the email address **samson.josiah@rucu.ac.tz**. Observe the following during submission of the files through the email address.
 - 2.1 Write your name and registration number in the subject section of the email.
 - 2.2 Your files should also contain your name and registration number (as comments) on top of every program you've written.
 - 2.3 Organize all your files in a single zipped folder (the zipped folder is what you will be sending through the email address).
3. Submit your work (both Section A and B) on or before **9th June 2023 15:00 Hrs**. Make sure you sign when submitting the hardcopy.
4. Late submission will be penalized 1.5 mark each day.

SECTION A

Question One:

Java is case-sensitive. What does this statement mean?

Question Two:

Discuss any five advantages of object-oriented programming.

Question Three:

What is the advantage of having different types of access modifiers?

Question Four:

Karunguyeye works in a software development company. He is a programmer working in a team of 100 programmers. Karunguyeye and his co-workers are now developing a CRM software for their client company. Since they do it teamwise, there is a risk of naming conflicts on variables and methods they use. Formulate an example (a Java program) in which there is a naming conflict of variables/methods used by different programmers in the team, and explain how this problem can be resolved.

Question Five:

Consider the following Java code:

```
import java.util.Scanner;
public class MyScannerClass {
    public static void main(String[] args) {
        System.out.print("Enter your full name:");
        Scanner scn = new Scanner(System.in);
        String firstName = scn.next();
        String lastName = scn.next();
        System.out.println("First Name is"+" "+firstName);
        System.out.println("Last Name is:  "+lastName);
        scn.close();
    }
}
```

After being executed, the above code will prompt a user to enter his/her full name.

- a) What will happen if the user enters "Masanja Peter Kulwa" and then presses the Enter key once?
- b) What will happen if the user enters "MasanjaPeterKulwa" and then presses the Enter key once?
- c) What will happen if the user enters "Masanja" and then presses the Enter key once?

Question Six:

Write the output for each of the following Java programs (Note: Try to write the output before typing and compiling the code. Remember you won't have a compiler in exam).

a)	<pre> public class FirstProg { public static void main(String args[]) { int x = 30, y = 10; if(x == 30) { if(y == 10) { System.out.print("X = 30"+" ", " "); System.out.println("Y = 10"); } if((x == 30) && (y == 30)) System.out.println("value1 is 1 AND value2 is 2"); if((x == 30) (y == 30)) System.out.println("value1 is 1 OR value2 is 1"); } } } </pre>
b)	<pre> public class Increment_decrement{ public static void main(String args[]) { int x = 30, y= x++; y = x--; y = --x; System.out.print(y); System.out.println("x : " + y + "x : "); System.out.print(y); System.out.println("x : " + --x); System.out.print(x); System.out.println("x : " + x--); } } </pre>
c)	<pre> class Rucu{ public static void main(String args[]) { int x = 10, y = 1; if((x <= 30) && (y <= x)) { if(y/y >= y) { System.out.print("X = 30"); System.out.print(", "); System.out.println(); System.out.print("Y = 10"); } } } </pre>
d)	<pre> class ControlStructures{ public static void main(String args[]) { int x = 10, y = 30; if((x == 30) (y == 30)) { if(y/2 >= y) { System.out.print("X = 30"+" ", " "); System.out.print("Y = 10"); } } } </pre>
e)	<pre> class FeiToto { public static void main(String args[]) { int x = 30; String y=method1('F'); if(x > (90/3)) { System.out.print("x: " + x); System.out.print("y: " + y); } if(x > (90/3)) System.out.print("x: " + x); System.out.print("y: " + y); System.out.print("."); String middlename = "salum"; System.out.print("middlename"); System.out.print(x); } private static String method1(char the_char_var){ String theString = the_char_var+"eisal"; return theString; } } </pre>

	<pre> } f) class Simplest{ public static void main(String args[]) { int x=15; System.out.print(x); } } </pre>
g)	<pre> public class SwitchExample{ public static void main(String args[]) { char letter = 'B'; switch(letter) { case 'A' : System.out.println("Algeria!"); break; case 'B' : case 'C' : System.out.println("Burundi and China"); break; case 'D' : System.out.println("Denmark"); case 'F' : System.out.println("France"); break; default : System.out.println("Unknown Country"); } System.out.println("The letter was" + letter); } } </pre>
h)	<pre> class StringConcatenationEg{ public static float q() { float q = 25; return q; } public static void main(String args[]) { String q = "my Method"; StringConcatenationEg obj = new StringConcatenationEg(); System.out.print("The product is: "); System.out.print(q()+q.concat(q)); System.out.print("10 X 10"); } } </pre>
i)	<pre> public class SimpleProg { public static void main(String args[]) { int x = 78; int y = 7; double z = 7.8; double rucu; rucu = x / z; System.out.println("The value of RUCU is: "+ rucu); z = x / z; System.out.println("The value of z is: " + z); double num = z + 4; System.out.println("The value of num is " + num); System.out.println("The value of num is " + num + num); System.out.println("The value of num is " + (num + num)); } } </pre>
j)	<pre> public class Simple2 { public static void main(String args[]) { int x = 78; double z = 7.8; int useless1 = 7; double useless2; useless2 = x / z; z = x / z; System.out.println("The value of num is: " + z); } } </pre>


```

double num = z + 4;
System.out.println("The value of z is " + num + num);
System.out.println("The value of z is " + num + " " + num);
System.out.println("The value of z is " + num * num);
System.out.println("The value of z is " + (num + num));
}

```

Question Seven

State the **syntax** errors found in each of the following programs (Note: Some programs have multiple errors).

a)	<pre> public class MyClass{ public void MyClass(int x, float y){ float z; z = x+y; System.out.print(z); } public static void main(String[] args) { MyClass x = new MyClass("5","5"); } } </pre>
b)	<pre> class New-Class{ public static void main(String[] args) { int result, n, m; n = 3; result = square(n); System.out.println("Square of 3 is: " + result); System.out.println("Square of 4 is: " + result); n = 4; result = square(n); } static int square(int i) { return i + i; } } </pre>
c)	<pre> private class AnotherClass { AnotherClass(int value){ System.out.println(value); } Anotherclass(int anotherValue, int y){ int x = value; System.out.println(x); } Anotherclass(){ value = 10; System.out.println(value); } public static void main(String[] args) { AnotherClass x = new AnotherClass(5,5); } } </pre>
d)	<pre> public class JavaExample{ public static void main(String[] args) { Scanner input = new Scanner(System.in); System.out.println("Enter a line of text "); String character = input.nextLine(); System.out.println("Your input was: "+ character); } } </pre>

*)	<pre> class Programming{ public static int multiplyInteger (int x, int y) { return (x * y); } public static int getIntegerSum (int i, int j) { return (i + j); } public static void main(String[] args) { System.out.println(getIntegerSum(10, 20)); System.out.println(multiplyInteger(20, 40)); } } </pre>
f)	<pre> class classA{ private int data=40; private void msg(){ System.out.println("Hello java"); } } Public class My Class{ public static void main(String args[]){ classA obj=new classA(); System.out.println(obj.data + "The message is:"); obj.msg(); } } </pre>
g)	<pre> import java.util.Scanner public class Example{ public static void main(String[] args) { scanner input = new scanner(System.in); System.out.println("Enter a line of text "); String character = input.nextLine(); System.out.println("Your input was: "+ character); } } </pre>
h)	<pre> class int{ public static void main(String args[]) { //int x = 10; System.out.print(x); System.out.print("."); System.out.println(x);}} </pre>
i)	<pre> class Demonstrate{ public static void main(String args[]) { String var = "Java is case-sensitive"; System.out.print(var.charAt(4)); } } </pre>
j)	<pre> class MyClass{ public static void main(String args[]) { String s; s = "Strings are immutable"; String x = s.charAt(0); System.out.print(x); } } </pre>
	<pre> class NewClass{ private A(){} //private constructor void msg(){ System.out.println("java Hello"); } public static void main(String args[]){ A obj=new A();//Compile Time Error obj.msg(); } } </pre>

1)	<pre> class X{ int data=40 public void msg(){ System.out.println("Hello java"); } } protected class E{ public static void Main(String args[]){ X obj=new X(); System.out.println(obj.data); obj.msg(); } } </pre>
m)	<pre> class MYCLASS{ static double salary; private static final String D = "D"; public static void main(String args[]) { salary = 1000; System.out.println(D + "salary"); } } </pre>
n)	<pre> class X{public static void main(String args[]){short x = 50000;System.out.println(x);}} public class Employee2{ public static void main(String args[]) { String x = "x"; int t = 75; double u; u = 900; System.out.print("The output" + x); System.out.println(" are " + t + " and " + u); } } </pre>
o)	<pre> class NewClass{ public static void main(String args[]) { int nums[] = new int[3]; nums[0] = -3; nums[0] = -2; nums[1] = 0; nums[2] = 1; int min, max; min = nums[0]; max = nums[0]; for(int i=1; i < 10; i++) { if(nums[i] < min){ min = nums[i]; } if(nums[i] > max){ max = nums[i]; } } System.out.print("Min is: " + min + "," + " and max is: " + max); } } </pre>

SECTION B

Question Eight

With an example of a Java program for each, explain the following concepts as used in OOP (the explanations should be in comments):

- a) Instantiation
- b) Scanner
- c) BufferedReader
- d) method overriding
- e) method overloading
- f) ternary operator
- g) built-in methods
- h) encapsulation

Question Nine

Write any Java program with the following:

- two classes
- three constructors
- three instance methods
- two static methods. (i.e. the main method, and one other static method).

NOTE: You can place your methods and constructors in any of the classes, just make sure your program works, and every constructor and method is called.

Question Ten

To calculate area of a triangle, we need values of its height and base. Write a Java program to accept these values from user and calculate and print area of the triangle. The program should contain at least three methods, including the main method.

Question Eleven

There are 750 students in the *Social Ethics* class at Ruaha Catholic University. Write a Java program to accept scores of these students for the final exam of *Social Ethics*, and print out these scores. Your program should store these scores in an array before printing them out. The program should also calculate the sum and average of all these scores and print it out. Further, the program should find the largest score and print it out. Hint: The program should be able to reject any erroneous inputs (e.g. non-numeric inputs, numbers greater than the highest possible score, numbers less than the least possible score etc.)

HINTS ON THE FINAL EXAM

- The final exam will cover all the topics: Introduction to Programming, Introduction to OOP, Introduction to Java, Data Types, Identifiers and Reserved Words, Methods, Variables, Constructors, Operators, Control Structures, Access Modifiers, Packages, An Overview of Input-Output, An Overview of Strings, and Arrays.
- Study all these lectures, including those we've not discussed much in classroom (Operators, Control Structures, Input/Output, Strings and Arrays). For example, the Input/Output topic will weigh at least 12 marks.