



**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE  
AND TECHNOLOGY**

**UNIVERSITY EXAMINATION 2023/2024**

**1<sup>ST</sup> YEAR 2<sup>ND</sup> SEMESTER EXAMINATION**

**KISUMU LEARNING CENTRE**

**COURSE CODE: ICB 3103**

**TITLE: INTRODUCTION TO PROGRAMMING**

**DATE:**

**TIME:**

**DURATION: 2 HOURS**

**INSTRUCTIONS**

- 1. This paper contains FIVE (5) questions**
- 2. Answer question 1 (Compulsory) and ANY other 2 Questions**
- 3. Write all answers in the booklet provided**

### QUESTION 1 (30 MARKS)

- a) Define the following terms: (6 marks)
- i) Object Oriented Programming
  - ii) Class
  - iii) Object
- b) Distinguish between polymorphism and inheritance as applied in Object Oriented Programming (4 marks)
- c) With the aid of a diagram, distinguish between base class and derived class as applied in object oriented programming. (3 marks)
- d) Distinguish between Real, Integer and Character data types as used in programming. (3 marks)
- e) (i) What is meant by structured programming? (1 mark)
- (ii) State 3 advantages of using modules in program development. (3 marks)
- f) State how you declare a variable in Java. (2 marks)
- g) Write a simple Java program that adds two integers and returns the result. (4 marks)
- h) Describe two different ways of passing arguments to a function. (4 marks)

### QUESTION 2 (20 MARKS)

- (a) Identify any two object oriented programming languages other than Java. (1 mark)
- (b) What is modular programming? (2 marks)
- (c) Study the following Java program segment and answer the questions that follow.

```
public class Student {
```

```
    name;
```

```
    int age;
```

```
    String gender;
```

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```
    double IdNo;
```

```
    public Student (String name) {
```

```
        this.name = name;
```

```

}
public void studAge (int studAge){
age = studAge;
}
public void studGender (String studGender){
gender = studGender;
}
public void studId (double ){
IdNo = studId;
}
public void printStudent (){
System.out.println ("Name: " + name);
System.out.println ("Age: " + age);
System.out.println ("Gender: " + gender);
System.out.println ("Id Number: " + IdNo);
}
}

```

(i) Explain two access specifiers used in the program segment. (4 marks)

(ii) Explain the significance of the keyword void in the program. (2 marks)

(iii) Identify the constructor method (2 marks)

(iv) Identify any two class methods in the segment. (2 marks)

(iii) Identify two errors in the program. (2 marks)

(d) Write a Java program that implements a class named Odd with a data member named x and method named read that accepts an integer from the keyboard. The program determines whether the integer is odd or even and displays an appropriate message. Use the if statement. (5 marks)

### QUESTION 3 (20 MARKS)

(a) What is an identifier? Give the rule to define a valid Java identifier. (3 marks)

(b) Distinguish between local and global variables. (4 marks)

(c) What is a Java method? (2 marks)

(d) Write a Java program that utilizes a method called subtraction to perform subtraction on two integers and display the result. (8 marks)

(e) Briefly outline any three access specifiers you know. (3 marks)

#### QUESTION 4 (20 MARKS)

(a) What do you understand by method overloading? (2 marks)

(b) Write a Java program that accepts a pair of integers and a pair of floating point numbers and then uses an overloaded method named max to return the bigger value in each case. The program should output the bigger values. (10 marks)

(c) What single characteristic identifies an overloaded method? (2 marks)

(d) Write a Java program that would instantiate a class named TotalMark with the following properties: (6 marks)

- i) a data member named x;
- ii) a member function named input for setting the value of x to 77;
- iii) a member function named display for outputting the value of x.

#### QUESTION 5 (20 MARKS)

(a) What is an array? (2 marks)

(b) How do you declare an array in Java? (3 marks)

(c) Write a Java program segment to declare an array called marks and assign it the values 80, 55, 76, 98 and 93 which represent the marks scored by a student. (4 marks)

(d) Shown below is a program that utilizes an array. Interpret it. (8 marks)

```
public class MarksArray {  
    public static void main(String[] args) {  
        int [] marks = {16, 22, 77, 40, 75};  
        for (int i = 0; i < marks.length; i++){  
            System.out.println(marks[i] + " ");  
        }  
        int total = 0;  
        for (int i = 0; i < marks.length; i++){  
            total += marks[i];  
        }  
        System.out.println("Total is " + total);  
    }  
}
```

```
int max = marks[0];  
for (int i = 0; i < marks.length; i++){  
    if (marks[i] > max) max = marks[i] ;  
}  
System.out.println("Max is " + max);  
}  
}
```

(e) Illustrate with an appropriate simple code fragment how an array is passed to a method as a parameter in Java. (3 marks)