



KISII UNIVERSITY

UNIVERSITY EXAMINATIONS

SPECIAL EXAMINATION

**FIRST YEAR EXAMINATION FOR THE AWARD OF
DEGREE OF BACHELOR OF SCIENCE MATHEMATICS /APPLIED
STATISTICS
FIRST SEMESTER 2021/2022
(JULY, 2022)**

STAT 121: PROGRAMMING METHODOLOGY

STREAM: Y1 S1

TIME: 2 HOURS

DAY: THURSDAY, 11.30 AM – 1.30 PM

DATE: 21/07/2022

INSTRUCTIONS:

- 1. Do not write anything on this question paper.***
- 2. Answer Question ONE (Compulsory) and any other TWO Questions.***

QUESTION ONE (30 MARKS)

- Explain what you understand by “syntax and semantics of a programming language”. (2 marks)
- With the help of a small code for any program, explain the different elements of a java program.
(6 marks)
- Consider the code segment below.

```
int[] a;  
for (int i = 0; i < 10; i++)  
    a[i] = i * i;
```

- What is wrong with the code fragment? (2 marks)
 - Explain the kind of error that will be generated and how it can be corrected. (3 marks)
- Java is a multi-threaded programming language. Explain (2 marks)
 - Write a java program that prompts the user for the radius of a circle and uses a method called *circleArea* to calculate and display the area of the circle. (10 marks)
 - Explain the operation of a switch statement in java. Give an example. (5 marks)

QUESTION TWO (20 MARKS)

- (a) Explain operation of iteration statements in java.State the syntax of each (10 marks)
- (b) Write a program that computes and displays the area of a rectangle. The length and the width must be captured from the keyboard. (4 marks)
- (c) With a code example, explain the operation of a switch statement in java. (6 marks)

QUESTION THREE (20 MARKS)

- (a) Study the following simple Java program carefully.

```
int f = 0, g = 1;
for (int i = 0; i <= 15; i++) {
    System.out.println(f);
    f = f + g;
    g = f - g;
}
```

- (i) What does the following program print? [*Please show how you got to the answer*] (6 marks)
 - (ii) Change the **for** loop to a**while**loop. (4 marks)
- (b) Write a java program that prints the string “Hello World” ten times. [hint: implement the solution by use of a do-while loop] (4marks)
- (c) Write a program that computes and displays the area of a rectangle. The length and the width must be captured from the keyboard. (6 marks)

QUESTION FOUR (20 MARKS)

- (a) With examples, describe the different types of java operators. (5marks)
- (b) Explain the structure of a java method. (5 marks)
- (c) Write a java method that computes and returns the factorial of a positive integer n. (10 marks)

QUESTION FIVE (20 MARKS)

- (a) Explain any three concepts of Object Oriented Programming. (6 marks)
- (b) Write a program Prime Counter that takes a command line argument N and finds the number of primes less than or equal to N. Use it to print out the number of primes less than or equal to 10 million. Note: if you are not careful, your program may not finish in a reasonable amount of time! (14 marks)