



THE OPEN UNIVERSITY OF SRI LANKA
 BSc (IT) DEGREE PROGRAMME: LEVEL 03
 FINAL EXAMINATION: 2026/2027
 COU3304: FUNDAMENTALS OF PROGRAMMING
 DURATION: TWO HOURS (2 HOURS)

Date: 22.06.2026

Time: 1.30 p.m. – 3.30 p.m.

Answer Four (04) questions only.

Q1.

- (i) Determine whether the following statements are true or false.
- a) Variables must be declared before they are used in Java.
 - b) The keyword `final` can be used to make a variable constant.
 - c) Arrays in Java start with index 1.
 - d) The `throw` keyword is used to declare exceptions.
 - e) The JVM converts bytecode into machine code during execution.

[5 marks]

- (ii) Explain the importance of loops in programming and describe how they help in solving real-world problems.

[10 marks]

- (iii) What is the output of the code given below?

[10 marks]

```
import java.util.*;

public class Main {

    public static void printPattern(int n) {

        int i, j;

        for (i = 0; i < n; i++) {

            for (j = 0; j < n; j++) {
                System.out.print("1");
            }

            System.out.println();
        }

        public static void main(String args[]){

            int n = 6;
            printPattern(n);

        }
    }
}
```

Q2.

A Java programmer has written the following code to perform a repetitive operation. Answer the questions from (i) to (iii).

```
int count = 5;
do
    count++;
    System.out.println("Count = " + count);
while (count < 10);
```

- (i) What will be the output of the given program? Explain your answer step by step.
[5 Marks]
- (i) Rewrite the program using a while loop instead of a do-while loop, ensuring the same output is produced.
[10 Marks]
- (ii) What is the importance of using proper loop selection (for, while, do-while) in Java programs. State the situations in which a do-while loop is more appropriate? -
[10 Marks]

Q3.

A student wrote the following program:

```
public class Main {
    static void printLength(String s) {
        System.out.println(s.length);
    }

    public static void main(String[] args) {
        printLength("Hello World");
    }
}
```

- (i) What is the error in the program?
[5 Marks]
- (ii) Rewrite the program to correct error and, then it compiles and executes successfully.
[10 Marks]
- (iii) What is recursion in Java? Explain with an example.
[10 Marks]

Q4.

- (i) Explain the difference between **single-dimensional** and **multi-dimensional** array in Java.

[5 Marks]

A Java program is required to solve a real-life problem involving arrays. Study the following scenario and write **Java code** for questions (ii) and (iii).

A university maintains a record of student marks for a programming module. The marks of 8 students are stored in an array. The system needs to analyze the marks to identify performance trends such as the highest mark, lowest mark, and average mark of the class. This helps lecturers to understand overall student performance and provide academic support where needed.

- (ii) Find and display the highest and lowest marks in the class.

[10 Marks]

- (iii) Calculate and display the average mark of the class.

[10 Marks]

Q5.

- (i) Explain the purpose of the `return` statement in Java method.

[5 Marks]

- (ii) Create a function that accepts the radius of a circle as a parameter and calculates the area of the circle. Call the function from the `main()` method and display the result.

[10 Marks]

- (iii) Extend the circle area program by adding exception handling to:

- Catch invalid radius values such as negative numbers,
- Display an appropriate error message if the radius is invalid,
- Ensure the program handles the unexpected user inputs gracefully.

[10 Marks]

Q6.

- (i) Explain the purpose and three (3) advantages of file handling in Java applications.
[5 Marks]
- (ii) Write a Java program that takes user input (student name and marks) and writes the data into a file named "results.txt". Each record should be stored in a new line.
[10 Marks]
- (iii) Extend the program in part (ii) to read the data from "results.txt". Calculate the average marks, and display the result along with all stored records.
[10 Marks]

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