THE OPEN UNIVERSITY OF SRI LANKA
BSc (IT) DEGREE PROGRAMME: LEVEL 03
FINAL EXAMINATION: 2024/2025
COU3304: FUNDAMENTALS OF PROGRAMMING
DURATION: **TWO HOURS (2 HOURS)**

Date: **19.06.2025** Time: **1.30 p.m. – 3.30 p.m.**

Answer 4 questions only.

Q1.

(i) Determine the following statements are true or false.

a) All bitwise operations are carried out with the same level of precedence in Java.

b) An individual array element from an array of type `int`, when passed to a method is passed by value.

c) A break statement must always be present in the default case of a "switch" selection structure.

d) Java program processing always starts with main() method.

e) Java is case sensitive language.

[5 marks]

(ii) "Programming languages are like interpreters between two worlds translating human intentions expressed in readable code into exact instructions a machine can follow, just as a translator converts one spoken language into another to enable understanding." Explain this statement using a comparison between natural language and machine language.

[10 marks]

(iii) What is the purpose of the throw and throws keywords in Java exception handling?

[10 marks]

Q2.

The loop shown below has been written by an inexperienced Java programmer. The behaviour of the loop is not correctly represented by the formatting. Answer the questions from (i) to (iii).

```
int n = 10;
while (n > 0)
   n /= 2;
   System.out.println(n * n);
```

(i) What is the output of the loop as it is written?

[5 Marks]

(ii) Modify the code so that it also prints whether n was even or odd at each step before updating it.

[10 Marks]

(iii) How nested conditionals within loops can impact readability and performance. Suggest best practices to handle such cases.

[10 Marks]

Q3.

```
class MyClass {
    public void secretMethod() {
        System.out.println("Accessing private method");
    }
}

public class MainClass {
    public static void main(String[] args) {
        MyClass obj = new MyClass();
        obj.secretMethod();
    }
}
```

(i) What is the output of the loop as it is written?

[5 Marks]

(ii) What is the difference between private, default, protected, and public access modifiers?

[10 Marks]

(iii) What is the difference between a static variable and a static method in Java?

[10 Marks]

Q4.

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

[5 Marks]

(ii) Write a java program to declare an array to store marks of the module of 20 students. Input marks into array and display the average mark and highest mark

[10 Marks]

(iii) Explain how Java arrays help in efficient memory allocation for fixed-size collections. Explain with the help of code examples.

[10 Marks]

Q5.

(i) Explain how using functions in Java promotes code reusability and modular design.

[5 Marks]

(ii) Create a function which accept the integer as a parameter (User input) and display the factorial value of the number. Then call it from inside the main method.

[10 Marks]

(iii) Extend the factorial program by adding exception handling to:

- Catch invalid inputs such as negative numbers,
- Display an appropriate error message if the input is invalid,
- Ensure the program does not crash when the user enters unexpected values.

[10 Marks]

Q6.

(i) Explain the difference between `FileReader` and `FileWriter` in Java.

[5 Marks]

(ii) Write a java program function with user inputs. which accepts a temperature level in Fahrenheit as a parameter and displays the level of fever. The levels are defined as follows.

Low-grade fever	100F – 101F
Intermediate fever	102F
High-grade fever	103F – 104F
Dangerous fever	105F – 107F
Below 100°F or above 107°F	Normal or out of range

[10 Marks]

(iii) Modify your program to write the fever level result into a text file named `fever_report.txt`.

[10 Marks]

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