



THE PAPUA NEW GUINEA UNIVERSITY OF TECHNOLOGY

DEPARTMENT OF MATHEMATICS & COMPUTER SCIENCE

FIRST SEMESTER EXAMINATIONS – 2023

**FIRST YEAR BACHELOR OF SCIENCE IN COMPUTER SCIENCE
SECOND YEAR BACHELOR OF SCIENCE IN APPLIED MATHEMATICS**

CS115 – PROGRAMMING I

TIME ALLOWED: 3 HOURS

INFORMATION FOR CANDIDATES:

1. Write your name and student number clearly on the front of the examination answer booklet/s.
2. You have 10 minutes to read this paper. You must not begin writing during this time.
3. This paper contains five (5) questions. You should attempt all the questions.
4. Ensure you have 4 pages, including cover page.
5. All answers must be written in examination answer booklets provided. No other written materials will be accepted.
6. Start the answer for each question on a new page.
7. Do not use red ink or pencil.
8. Notes, textbooks, mobile phones and other recording devices are not allowed in the examination room.
9. Scientific and business calculators are allowed in the examination room.

MARKING SCHEME

Marks are indicated at the beginning of each question. Total mark is 88.

QUESTION	1	2	3	4	5	TOTAL
MARK	14	18	14	20	18	84

Question 1 [2 + 2 + 2 + 2 + 2 + 2 + 2 = 14 marks]

- (a) What is a source program?
- (b) What does a computer language *compiler* do?
- (c) What is an interpreter?
- (d) What is a Syntax Error?
- (e) What is a data type?
- (f) Name the four integer primitive data types in Java.
- (g) How many bytes of data can a data type `double` hold?

Question 2 [2 + 2 + 2 + 2 + 3 + 4 + 3 = 18 marks]

- (a) What is a variable?
- (b) There are several ways to declare variables. Show a syntax to declare multiple variable of the same type.
- (c) State two rules you must abide to when naming a variable to avoid compile-time error.
- (d) What is an assignment statement?
- (e) Describe the two steps in which the assignment statement does its work.
- (f) Determine the result for each of the following expressions in Java context:
 - (i) `25 / 3*2`
 - (ii) `8-3 % 3`
- (g) Given the segment of code below, what will be the **exact output** on the monitor?

```
int unitCost = 12;
int item = 6;
System.out.println("Total Cost: K" + unitCost*item );
```

Question 3 [2 + 4 + 2 + 2 + 2 + 4 = 18 marks]

- (a) What is an expression?
- (b) Evaluate (to true or false) each of the following four expressions:
`14 <= 14` `14 < 14` `-9 > -25` `-25 > -9`
- (c) Determine the output of the fragment of code below:

```
int sum = 7;
if ( sum > 20 )
    System.out.print("You win ");
else
    System.out.print("You lose ");
System.out.println("the prize.");
```
- (d) Create a flowchart for the above fragment of code.
- (e) Define a condition (boolean expression) that will determine a number (n) whether it is even.
- (f) Evaluate the following expressions:
 - (i) `1+2 > 4-2 && 12 < 23`
 - (ii) `1+2 > 4-2 || 12 < 23`
 - (iii) `1+2 > 4-2 && 12 > 23`
 - (iv) `1+2 > 4-2 || 12 > 23`

Question 4 [10 + 4 + 6 = 20 marks]

- (a) The following program asks the user for two integers, X and Y, and then adds up all the integers (inclusive) between them. Fill in the blanks.

```
import java.util.Scanner;
class AddRange
{
    public static void main (String[] args)
    {
        Scanner scan = new Scanner( _____ (i) _____ );
        int sum = _____ (ii) _____ ; // current sum
        System.out.println("Enter start of range:");
        int start = scan._____ (iii) _____ ;

        System.out.println("Enter end of range:");
        int end = scan._____ (iv) _____ ;

        while ( _____ (v) _____ (vi) _____ (vii) _____ )
        {
            sum = sum + _____ (viii) _____ ;
            _____ (ix) _____ = _____ (x) _____ + 1 ;
        }
        System.out.println("sum is:" + sum);
    }
}
```

- (b) Sketch out a flowchart of the above program.
- (c) Write a complete java program called `FourSidedShape` class to calculate the area of any square or rectangular shape. The program should ask the user to input the length and the width of the shape and then calculate its area. The program should be able to check whether the shape is a rectangle or a square and then produce output like one of those shown below.
- Hint: Use the IF statement to check the length and the width.

Output 1:

Length : 12.1
Width: 7.3
Area: 88.33

The shape is a Rectangle

Output 2:

Length : 6.5
Width: 6.5
Area: 42.25

The shape is a Square

Question 5 [2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 = 18 marks]

- (a) What is an object in Java Programming?
- (b) When and where can you use the dot notation (.) in Java Programming?
- (c) What is another term in programming for "Calling" a method?
- (d) What is the difference between the `equals (String)` method and the `==` operator when comparing object references?
- (e) The `Point` class from our study has 3 **constructors** defined. Explain why having 3 constructors than just one.
- (f) What is a parameter?
- (g) What is **type cast** in Java?
- (h) How can I convert a floating point value (13.5601F) of type `float` to an `int` data type?
- (i) What is implicit cast?

**** END OF EXAMINATION ****