



THE PAPUA NEW GUINEA UNIVERSITY OF TECHNOLOGY
DEPARTMENT OF MATHEMATICS & COMPUTER SCIENCE
SECOND SEMESTER EXAMINATIONS – 2022
FIRST YEAR BACHELOR OF SCIENCE IN COMPUTER SCIENCE

CS125 – PROGRAMMING II

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 six (6) 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 90

QUESTION	1	2	3	4	5	6	TOTAL
MARK	14	16	16	16	10	18	90

Question 1 [3 + 3 + 2 + 2 + 2 + 2 = 14 marks]

- (a) Software objects also have the same characteristics of real-world object. Explain the characteristics in terms of software objects in programming.
- (b) What is the difference between an object reference and an object reference variable?
- (c) What is a constructor?
- (d) What is a static method?
- (e) What is an **alias** with regard to reference variables?
- (f) An object that has no reference is referred to as _____.

Question 2 [1 + 1 + 2 + 2 + 2 + 2 + 3 + 3 = 16 marks]

- (a) Create a `String` object using the short-cut way in Java. The reference is called `str1` and the string is "Unitech".
- (b) Create a `String` object using the standard way in Java. The reference is called `str2` and the string is "Unitech".
- (c) Given two `String` objects above, how do you check if the string are identical or same? Show the expression.
- (d) What will the expression below evaluate to with reference to (a) and (b) above?
`str1 == str2`
- (e) What does it mean when `null` is assigned to a reference variable?
- (f) What does it mean by "String objects are immutable"? Explain.
- (g) Given the statement `String myStr = "University of Technology";`, evaluate the following expressions and determine the output:
 - (i) `myStr.indexOf("y")`
 - (ii) `myStr.charAt(14)`
 - (iii) `myStr.substring(6)`
- (h) Given the string object created above (g), construct a statement using string methods `substring()`, `toLowerCase()` and `concat()` that will result with an output "Unitech". Note that 't' is in lowercase.

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

- (a) What is the name for the methods that responds to events?
- (b) What is a container object in GUI programming?
- (c) List four graphical components in Graphical User Interface.
- (d) Create a `JFrame` object called `frmStudent` and the title header is "Student Details". Set the size of the frame to 600 pixels by 400 pixels.
- (e) Invoke the method to show the frame when the program running.
- (f) Create a `JButton` called `btnClose` with the label "Close" and add it onto the frame above.
- (g) What is the name of the method that receives an `ActionEvent` when a button is clicked?

Question 4 [8 + 4 + 4 = 16 marks:]

- (a) Complete the following program so that it computes and writes out the two largest elements in the array.

```
import java.io.* ;

class TwoLargest
{
    public static void main (String[] args)
    {
        int[] data = {3, 1, 5, 7, 4, 12, -3, 8, -2};

        // declare and initialize variables for the two largest
        →
        // compute the two largest
        for(int index=__;index < data.length; index++)
        {
            →
        }

        // write out the two largest
        System.out.println(_____);
    }
}
```

Hint: Use the two initialized variables with an if else if inside the for loop body to compare the two initial largest element with the remaining elements.

- (b) Briefly explain how a **binary search** algorithm works.
- (c) Given the list of values in the specified order {39, 88, 23, 19, 61, 11, 53}, sort the list using **insertion sort** by showing the progressive result from the initial list until the list is sorted.

Question 5 [2 + 2 + 2 + 4 = 10 marks]

- (a) What is a stream in IO Streams?
- (b) What is a pipe in IO Streams?
- (c) What would be the most likely IOException when dealing with disk file?
- (d) Write a segment of code to create a FileWriter object with the filename "exam.txt". Write the string "What is a stream?" onto the file. Then close the file.

Question 6 [2 + 2 + 2 + 4 + 2 + 6 = 18 marks]

- (a) What is an array?
- (b) Declare an array of characters named `gender` with 8 cells.
- (c) Set the first 5 element as `'M'`, `'F'`, `'F'`, `'M'` and `'M'` respectively into the above array named `gender`.
- (d) Given the array `gender` above, construct a `for` loop to sum the number of M and F in the list.
- (e) Create a one-dimensional array named `town` that looks like the table below using the **initializer list**:

Lae	Goroka	Madang	Kokopo	Wewak	Vanimu
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- (f) Given the array `town` above, fill in the missing expressions to search for the town "Wewak". If the town exist, the program displays the output "Town exist". If the town does not exist, the program display the output "Town does not exist".

```
String target = _____ ;
int _____;
for(index = 0; index < _____; index ++){
    if (town[index].equals(target)){
        System.out.println("_____");
        _____;
    }
}
if (index == _____)
    System.out.println("Town does not exist");
```

**** END OF EXAMINATION ****