



**THE UNIVERSITY OF THE WEST INDIES
FIVE ISLANDS CAMPUS**

Semester II

Examinations of April/May 2022

Course Code: COMP1210
Course Title: Computing II
Date of Assessment: 26th April, 2022
Time: 1:00 – 3:00 PM
Duration: Two (2) hours

INSTRUCTIONS TO CANDIDATES:

This paper has THREE pages and TWELVE questions.

YOU ARE REQUIRED TO ANSWER ALL QUESTIONS.

THIS ASSESSMENT IS WORTH 40 % OF YOUR FINAL GRADE.

ASSIGNMENT DETAILS FROM INSTRUCTORS:

Answer all questions in this examination

SECTION A: SHORT ANSWER QUESTIONS – 25 MARKS

ANSWER ALL QUESTIONS FROM THIS SECTION

- A) What is an overloaded function? [1 mark]
 a. Write a code segment to show an overloaded function? [2 marks]
- B) Explain what is meant by a variable-length parameter and write a function header for a method named **maximus**, that implements a variable-length parameter list of type double. [2 marks]
- c) Draw the contents of the queue after the following statements execute. Clearly label the front and back of the queue. [2 Marks]

```
QueueInterface<String> bankLine = new LinkedListQueue<>();

bankLine .enqueue("Bobby");
bankLine .enqueue("Mo");
String next = bankLine .dequeue();
bankLine .enqueue("Lad");
bankLine .enqueue("Ox");
bankLine .enqueue("S");
next = bankLine .dequeue();
```

- D) Describe what happens when the following code is executed. [2 marks]

```
QueueInterface<String> bankLine = new LinkedListQueue<>();

bankLine .enqueue("Ali");

bankLine .enqueue("Trent");

String next = bankLine .dequeue();

bankLine .enqueue("Rob");

next = bankLine .dequeue();

next = bankLine .dequeue();

bankLine .enqueue("Paolo");

next = bankLine .dequeue();

next = bankLine .dequeue();
```

- E) Given the following array elements, what does the array look like after two iterations of selection sort, arranging items in ascending order?

92 42 73 19 86 33 7 60 [3 marks]

- F) The following is a class definition of a linked list Node:

```
class Node
{
int info;

Node next;

}
```

Show the instructions required to create a linked list that is referenced by head and stores in order, the int values 3, 6 and 2.

Assume that Node's constructor receives no parameters. **[4 marks]**

G) Explain what is a ragged array and give an example of one. **[2 marks]**

H) Given the following array, show the comparisons to an array entry that are performed to search for the number 11 if you use the binary search algorithm. **[3 Marks]**

2 3 5 7 11 13 17 19 23 29 31 37

I) Many algorithmic techniques for developing efficient algorithms exist in computer science.

[4 marks]

- a. Explain what is meant by dynamic programming.
- b. Explain how dynamic programming can improve the performance of a recursive program to find the Fibonacci series.
- c. What is the time complexity of Fibonacci series using recursion, what is its complexity when using dynamic programming?

SECTION B: - 15 MARKS

ANSWER ALL QUESTIONS FROM THIS SECTION

- A) One use of a stack is to reverse the order of input. Write a method that reads a series of Strings from the keyboard (assume the Scanner class has been imported) and outputs the Strings in reverse order of how they were entered. The input will end with the String "end" but do not output the String "end". Assume that SStack is a stack that can store Strings. Remember to declare and instantiate your SStack in your method. **[7 Marks]**
- B) Assume that head references a linked list, although we don't know what is currently stored in that list. Write a block of code using a try-catch block that will work through the entire linked list, printing each element out, stopping only when we have reached the end of the list because a NullPointerException is thrown. Once the Exception is thrown, output the number of elements found in the list. **[8 Marks]**

END OF QUESTION PAPER