CATHOLIC UNIVERSITY INSTITUTE of BUEA
2020/2021 ACADEMIC YEAR
FIRST SEMESTER EXAMINATIONS – FEBRUARY/MARCH 2021

School	INFORMATION TECHNOLOGY				
Course Code	SIT 113	Course Title	COMPUTER PROGRAMMING I		
Status	C	Credit Value	6	Dept	Software Engineering
Date	24/02/2021	Venue	Ngongi H. / LH 5/6	Time	1:30 – 3:30PM
Course Instructor (s)	Dr. Felicitas Mokom/ Mr. Gilemond Nchiwo				

INSTRUCTIONS: ANSWER ALL QUESTIONS.

Read through each question thoroughly before you start answering.

Penalty for poor presentation of answers. Calculators and phones are not allowed.

Question 1: (20 marks)

i. State four properties of a good algorithm and any two ways of representing an algorithm. **(3 mks)**

ii. Distinguish between a Program and Software. **(1 mk)**

iii. What is a recursive algorithm? **(1 mk)**

iv. Explain why the best case performance for binary search is O(1) and the worst case performance is O(log n). **(2 mks)**

v. State one difference between a compiler and an interpreter. **(1 mk)**

vi. State the two main categories of computer programming languages and give an example of each. **(2mks)**

vii. Like all languages, programming languages are defined by syntax and semantics. Explain the difference between the words "syntax" and "semantics". **(2 mks)**

viii. What kind of error is produced when your program runs to completion but does not produce the desired result? **(1 mk)**

ix. All programs are written in terms of three control structures. State any two of them **(1 mk)**

x. Give an example of a preprocessor directive in the C programming language. **(1 mk)**

xi. What is the purpose of the main() function in C? **(1 mk)**

xii. State the three elements of a C function. **(1.5mks)**

xiii. What are the three main components that make up a C function header? **(1.5mks)**

xiv. What is the alternative of an if statement in C, that allows a variable to be tested for equality against a list of values called cases? **(1 mk)**

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Question 2: (15 marks)

i. Propose a flowchart for an algorithm that inputs a number N, then prints the square of all odd numbers between 1 and N. You must use the % operator to figure out if the number is odd. **(6 mks)**

ii. Modify the flowchart in (i) such that it prints the square of all odd numbers between M and N. Your flowchart should make sure that M < N. If the user enters a value for M that is greater than or equal to N, then your flowchart should alert the user and ask that they re-enter valid numbers for M and N. **(3 mks)**

iii. Propose a corresponding pseudocode for the flowchart in (ii) **(4 mks)**

iv. What is the name of the shape used by your flowchart to indicate input and output? **(1 mk)**

v. Explain what you would need to change in (ii) if you were asked to print the square of all even numbers instead. **(1mk)**

Question 3: (15 marks)

A)

How would you achieve the following using the C programming language? Propose code fragments ONLY, not entire C programs.

i. Declare a function calcInterest with a parameter list of one integer and a return type of float. **(1 mk)**

ii. Print the string stored in the variable **hello**. **(1 mk)**

iii. In one line, declare the variable **grade** then obtain the character in the 4th position of the array **letters** and assign to it. **(1 mk)**

iv. Provide two possible ways to decrease the integer **count** by 1. **(2 mks)**

v. Declare an integer array called **values** of 5 numbers set to 5, 10, 15, 20, 25 using one line of code. **(1 mk)**

vi. Use a loop to add 5 to each of the elements of the array **values** declared in (v) **(3 mks)**

B)

Write a complete C program that will prompt the user to enter their age. Depending on the age entered, the program prints "I am a teen" or it prints "I am not a teen". The program must provide a user-defined function called **isTeen** that takes as parameter one integer and returns 1 if the integer is between 13 and 19 (*indicating a teenager*), and returns 0 otherwise. The *isTeen* function must appear after the *main* function in your code. **(6 mks)**

GOOD LUCK!