Catholic University Institute of Buea (CUIB)
2018/2019 ACADEMIC YEAR
First Semester Examinations – February 2019

EoC

School		INFORMATION TECHNOLOGY			
Course Code	**SIT 113**	Course Title	**Computer Programming I**		
Status	**C**	Credit Value	**6**	Dept	**Software Engineering**
Date	**26 February, 2019**	Venue	**LH2**	Time	**11:30AM – 2:30PM**
Course Instructor(s)		**Mr. Achankeng Peter**			

Instructions: Answer **ALL** questions in Section A, Any 2 in Section B, Q8 from Section C and any one other in Section C.

SECTION A: GENERAL CONCEPTS   (Total 15 Marks)
(Answer Q1 – Q4)

N×b

Q1. Four important properties of a good algorithm include: Generality, Effectiveness, Definiteness, and Finiteness. Explain in at most two lines each these four properties.   (1 x 4 = **4 marks**)

Q2. Distinguish clearly between the following terms:
    a) Algorithm   b) Program   c) Software   (1 x3 = **3 marks**)

Q3. What is the meaning or use of the following:

    a) Compiler   b) Debugger   c) IDE   (1 x 3 = **3 marks**)

Q4. What is a recursive algorithm? Propose a recursive algorithm using pseudocodes to find a^n, where **a** is any real number, and **n** is a positive integer.   (1 + 4 = **5 marks**)

SECTION B: ALGORITHM REPRESENTATION (Total 20 Marks)
(Answer any 2 from Q5, Q6 and Q7)

Q5.

   Fibonacci sequence was used to model the population of rabbit pairs within a given period.
   The first few terms of this sequence are **1, 1, 2, 3, 5, 8, 13, 21**

   i.   Suggest the next 3 terms of this sequence.

   ii. Draw a flowchart that displays the first N terms of this sequence?
   iii. Is your algorithm iterative or recursive. Justify your answer.   (2 + 6 + 2 = **10 marks**)

Q6.
The non-trivial factors of a number are all whole numbers greater than 1, and less than that number, which can divide exactly that number (without a remainder). For example the non-trivial factor of 12 is 2, 3, 4, and 6.

   i.   Propose a flow chart for the algorithm above to find the non-trivial factors of a positive whole number **N**.
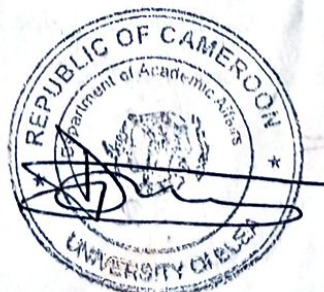
ii. Using the pseudocode convention, propose the pseudocode for the flow chart in (i).

(6 + 4 = **10 marks**)

Q7.

Consider the flow chart in **Figure 1** below.

   i.   Using a table to show how variables and Boolean expressions change values in the chart, what will be the output of this algorithm if the input A=48 and B=16?

  ii.   What exactly does this algorithm seek to obtain?

 iii.   What is the advantage of flow charts over pseudocode representation for algorithms?
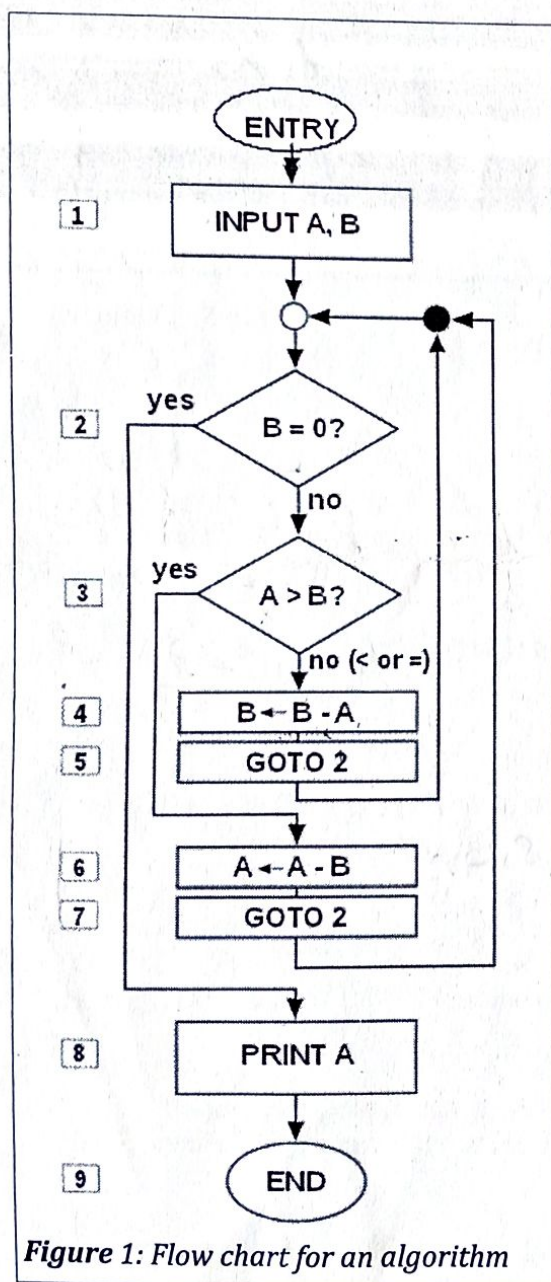
(6 + 2 + 2 = **10 marks**)

Figure 1: *Flow chart for an algorithm*

SECTION C: C CODING (Total 15 Marks)
(Answer Q8 and any one from Q9 or Q10)

Q8.

How would you achieve the following using the C Programming language. Write code fragments ONLY and not a complete C program.

   i.   Declare a constant **g**, which takes the value 9.8.

(**1 mark**)

  ii.   Import a file containing some C functions found in the file **mylib.c**   (**1 mark**)

 iii.   Declare a variable **Gender,** and set a default value to the letter **M**, in one line of code).   (**1 mark**)

 iv.   Display on the standard output the phrase in bold: **"Time flies like an arrow" is an important programming phrase.**   (**2 marks**)

  v.   Read from the keyboard one real numbers, and one integer number, and store in two variables **r** and **i** , using a single line of code. (Assume **r** and **i** have been declared).   (**1 marks**)

 vi.   Display "Even" if a number **N** is divisible by 2, and "Odd" otherwise.   (**2 marks**)

vii. Assuming **p=3.142**, display the value in **p** on the standard output correcting your value to 2 decimal points of accuracy.

(**1 mark**)

viii.   Divide two integer numbers and have the result as a real number.   **(1 marks)**

Q9.

Write a COMPLETE C program which can be used to find the sum $1 + 2 + 3 + ... + N$. Where N must be a positive integer, and is to be provided by the user. If a negative integer is entered, display "Invalid Input" and exit the program.   **(5 marks)**

Q10.
Consider the following C function, which is used to find the Factorial of a number.

```
float Factorial(integer N);
{
  if(N=0 OR N=1) {
    display 1
  }
  else{
  display N x Factorial(N-1);
  }
```

i. Rewrite this C function above, correcting all syntax errors.
ii. Assuming that the function above already exist in one of the header files that you have included in your C project. Propose a C code snippet that you will use to read a number from a user, and then call the factorial function to find the factorial of the entered number, then display this result on the monitor.   **(3 + 2 = 5 marks)**

Good Luck!!!   END!!!!