**University Examinations 2012/2013**

FIRST YEAR, SECOND SEMESTER, EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN COMPUTER SCIENCE

**ICS 2103: INTRODUCTION TO SYSTEMS PROGRAMMING**

DATE: DECEMBER 2012                                                                 TIME: 2 HOURS

**INSTRUCTIONS:** *Answer question **one** and any other **two** questions*

**QUESTION ONE – 30 MARKS**

a.  Define the following:                                                                (6 Marks)
    i.    Segmentation
    ii.   Fragmentation
    iii.  Partitioning

b.  Differentiate the following:                                                         (4 Marks)
    i.    Pre-emptive and non-preemptive
    ii.   Program and process
c.  Describe an operating system and give relevant examples.                             (2 Marks)
d.  Describe the four major structures of the OS.                                        (8 Marks)
e.  Describe the scheduling algorithms used by the OS.                                   (10 Marks)

**QUESTION TWO – 20 MARKS**

a.  Explain the following:                                                               (4 Marks)
    i.    Execution gap
    ii.   Interpreter
    iii.  Phases of compiler
    iv.   Language migratory
b.  Explain memory allocation in block structured language.                              (3 Marks)
c.  Explain the role of Mnemonic Opcode Table, Symbol Table, literal Table and POOL table in assembling process of assembly language program.                                              (7 Marks)
d.  Compare the features of sub-routine and macros with respect to the following :       (6 Marks)

    i.     Execution speed

    ii.    Processing requirement by assembler

    iii.   Flexibility and generality

## QUESTION THREE – 20 MARKS

a.  Explain three reasons on why there is need to use arrays as opposed to using primitive variable in regard to the performance of your program.        (6 Marks)

b.  Demonstrate your knowledge of the application of strings and pointers by:    (9 Marks)

    i.     Allocate and initialize a string to declare an array of type char

    ii.    Accomplish the same as above by declaring a pointer to type char

    iii.   Briefly explain why manipulating the array of pointers is easier than manipulating the string themselves.

    iv.   Write a program that stores the marks of ten students, returns their average marks and the address where these marks are stored.       (5 Marks)

## QUESTION FOUR – 20 MARKS

a.  The C programming language employs the use of a standard definition of a library.  Outline three advantages that make C a programmer's choice in system programming.    (6 Marks)

b.  Explain why it is necessary to organize C header files at the beginning of every program.    (4 Marks)

c.  What is the significance of storage classes in C        (2 Marks)

d.  Write a C programming code and illustrate your knowledge of the following storage classes:

    i.     Storage class auto        (2 Marks)

    ii.    Storage class extern       (2 Marks)

    iii.   Storage class static        (2 Marks)

    iv.   Storage class register      (2 Marks)

## QUESTIIN FIVE – 20 MARKS

a.  In C programming language memory for dynamic data structures is allocated at run time.  Give two reasons why this is the case.        (4 Marks)

b.  Explain the difference between singly linked list and a doubly linked list.    (2 Marks)

c.  Explain two circumstances under which the linked lists in (b) are desirable.    (4 Marks)

d.  Write a snippet of a code that demonstrate how you add data to the head of a linked list.   (10 Marks)