UNIVERSITY EXAMINATIONS 2013/2014 ACADEMIC YEAR

1st YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN COMPUTER SCIENCE

COURSE CODE/TITLE: SECS 104: COMPUTER ORGANIZATION AND ARCHITECTURE I

END OF SEMESTER: I   **DURATION: 3 HOURS**

DAY/TIME: FRIDAY: 8.00 - 11.00AM   DATE: 13/12/2013 (NL3)

INSTRUCTIONS:
Attempt THREE questions. Question ONE is COMPULSORY.

QUESTION ONE

a) Define the following terms:

   i).   Interrupt   (2 Marks)

  ii).   Superscalar processing   (2 Marks)

 iii).   Multithreading (MT)   (2 Marks)

  iv).   Computer Architecture   (2 Marks)

b) Explain two major functions of registers   (4 Marks)

c) Distinguish between Memory Address Register and Memory Buffer Register   (4 Marks)

d) State two characteristics of vector processors which contribute to the high performance.

                                                                                              (2 Marks)

e) State two requirements of Multithreading   (2 Marks)

f) Identify four major characteristics that affect supercomputer architecture   (4 Marks)

g) Explain the concept of pipelining   (4 Marks)

h) Outline two limitations of VLIW Architecture   (2 Marks)

QUESTION TWO

a) Explain the process of Memory Read and Memory Write.   (4 Marks)

b) Explain the basic organization and importance of cache memory (4 Marks)

c) Explain the fetch and execute cycle (6 Marks)

d) State the stages in which Pipelining breaks an instruction execution (3 Marks)

e) Briefly describe the three common interrupts that the CPU can receive. (3 Marks)

QUESTION THREE

a) Describe the main purpose of virtual memory (4 Marks)

b) State two benefits and limitations of vector processing (4 Marks)

c) Outline three reasons why Multithreading is used in computers (4 Marks)

d) Explain the concept of VLIW Architecture (4 Marks)

e) Differentiate between Instruction level parallelism and Machine Parallelism (4 Marks)

QUESTION FOUR

a) Outline three architectures suitable for the vector processing environments (6 Marks)

b) List two Instruction set architecture attributes (2 Marks)

c) Explain the purpose of the following parts of a microprocessor

   i). Execution unit (2 Marks)

   ii). Bus interface unit (2 Marks)

d) Briefly describe the four types of segment registers (8 Marks)

QUESTION FIVE

a) Describe the following general registers

   i).Data (2 Marks)

   ii).Accumulator (2 Marks)

   iii).Base (2 Marks)

b) Explain the main purpose of symmetric multiprocessors (4 Marks)

c) State two properties that differentiate Instruction sets (2 Marks)

d) Explain the following Parallel processing Computer classification:

   i). SISD (2 Marks)

   ii). SIMD (2 Marks)

   iii). MISD (2 Marks)

   iv). MIMD (2 Marks)