



MAASAI MARA UNIVERSITY

REGULAR UNIVERSITY EXAMINATIONS

2018/2019 ACADEMIC YEAR

**SCHOOL OF SCIENCE AND INFORMATION
SCIENCES**

**FOURTH YEAR SEMESTER II EXAMINATIONS
FOR THE BACHELOR OF SCIENCE IN
COMPUTER SCIENCE**

COURSE CODE: COM 419

COURSE TITLE: COMPUTER SYSTEMS DESIGN

**DATE: 25TH APRIL, 2019
1630HRS**

TIME: 1430 -

INSTRUCTIONS TO CANDIDATES

ANSWER Question **ONE** and any other **TWO**

QUESTION ONE

a) Expound on the following terms in relations to computer architecture and design:

- i)** Shared memory
 - ii)** A Thread
 - iii)** Message passing
 - iv)** Parallel Data
- marks]**

[8

b) Distinguish clearly between computer “design” and computer “architecture”

[4 marks]

c) Illustrate the Von Neumann Model detailing operation of each component with respect to others and explain the idea of “stored-program” concept with respect to this architecture as opposed to the Harvard architecture.

**[8
marks]**

d) Highlight FOUR limitations of the Von Neumann Architecture

[4 marks]

e) Explain SIX benefits of parallel computers

**[6
marks]**

QUESTION TWO

a) The design of a computer system can be carried at several levels of abstraction. Discuss the principle of “abstraction” with respect to computer design and highlight the main levels in design

[6 marks]

b) Describe the general approach to the design problem for register level system.

[6 marks]

- c) At register level design, a set of registers are linked by combinational data transfer and data-processing circuits. Draw and explain how a multifunction register level system can be designed, following the approach you stated in (b) above to perform the following control function: $Cond: A = A + B, C = C + D$; and how it affects on performance and cost.

**[8
marks]**

QUESTION THREE

- a) With the aid of a diagram, discuss the different levels of the memory hierarchy.

[10 marks]

- b) Explain the operations of the following parallel processor systems:

- i. SIMD
- ii. MIMD

**[4
marks]**

- c) Discuss by comparison the conceptual difference between RISC and CISC architectures

**[6
marks]**

QUESTION FOUR

- a) Highlight the classification of parallel computers according to Flynn's classification.

[8 marks]

- b) Shared memory machines can be classified as bus-based, extended or hierarchical. Discuss each classification in clear detail.

[12 marks]

//END