



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

TIME: 1430 - 1630HRS

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 **[8 marks]**
- 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]**

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