



KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS FOR 2010/2011 ACADEMIC YEAR

OPEN LEARNING PROGRAMME

**EXAMINATION FOR THE DEGREE OF BACHELOR OF INFORMATION
TECHNOLOGY**

SIT 311: COMPUTER ARCHITECTURE

DATE: Tuesday 1st February, 2011

TIME: 4.30 p.m. – 6.30 p.m.

INSTRUCTIONS

- (i) ANSWER 1 AND ANY OTHER TWO QUESTIONS**
- (ii) TIME 2 HOUR**

Question 1

- a. Clearly explain the Von-Neumann architecture for computers. (6 marks)
- b. Briefly explain the need of bus hierarchy and the different types of bus standards implemented in the hierarchy. (6 marks)
- c. State the names and the purpose of the following registers: PC, MBR, MAR, CCR. (4 marks)
- d. Discuss two hard disk interface standards. (4 marks)
- e. List five important characteristics that could be used to distinguish RISC from CISC architectures. (10 marks)

Question 2

- a. What is cache? Explain how the cache memory affects the performance of the whole computer. (5 marks)
- b. In the computer several interconnections methods are available. Discuss the I/O to memory and I/O to CPU highlighting their weaknesses and strength. (6 marks)
- c. Discuss why the number of addresses per instruction is a basic design decision. (4 marks)

- d. Define the concept addressing mode. Explain the indexed mode and give an example of a data structure it can be used to reference. (5 marks)

Question 3

- a. Explain the concept instruction pipelining. Discuss how conditional branches are handled. (8 marks)
- b. Describe a typical operation performed by microinstruction. List the advantages and disadvantages of a micro programmed control unit compared with a hardwired control unit. (8 marks)
- c. SRAM and DRAM are two types of main memory. Explain where and why each is likely to be found in a computer. (4 marks)

Question 4

Complete the following RTL description of an instruction fetch cycle: (4 marks)

[MAR]	←	[]
[]	←	[PC] + 1
[MBR]	←	[M ()]
[]	←	[MBR]

With an aid of diagram explain the concept of hierarchical memory. (6 marks)

Explain the concept superscalar processors and how it used to enhance performance. (6 marks)

Question 5

Add the **signed** integers –93 and 44 using the following steps:

(i) convert both integers to 8-bit 2's complement form; (2 Marks)

(ii) add the two 8-bit 2's complement representations from (i) and calculate the N and V flags; (3 Marks)

(iii) use the 8-bit output and the flags to determine the sign of the correct answer and whether the 8-bit output needs to be extended to 16-bits; (2 Marks)

using an appropriate illustrative diagram, explain the classical internal organization of the CPU (7 marks)

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