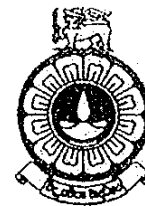THE OPEN UNIVERSITY OF SRI LANKA

DEPARTMENT OF COMPUTER SCIENCE

B.Sc. DEGREE PROGRAMME 2024/2025

FINAL EXAMINATION

CSU5310 – COMPUTER ARCHITECTURE

DURATION: TWO HOURS ONLY (02 HOURS)

Date: 30.05.2025   Time: 09.30 a.m. – 11.30 a.m.

ANSWER FOUR (4) QUESTIONS ONLY.

(1)

   i. Define the terms 'computer architecture' and 'computer organization'   (03 marks)

   ii. Briefly define the major structural components of CPU.   (08 marks)

   iii. State the functions of below registers.

       a. Memory buffer register (MBR)

       b. Memory address register (MAR)

       c. Program counter (PC)   (06 marks)

   iv. Describe four (4) special features of cache memory.   (08 marks)

(2)

   i. Represent the basic structure of von Neumann model using a diagram.   (10 marks)

   ii. Briefly describe the function of below components.

       a. Central Processing Unit (CPU)

       b. Arithmetic and Logic Unit (ALU)

       c. Data Bus   (09 marks)

   iii. Describe the term 'Von Neumann bottleneck'.   (03 marks)

   iv. What is referred to as a 'software'?   (03 marks)

(3)

i. Actions performed in the fetch cycle can be categorized into four categories. Mention those four (4) categories and describe them briefly. (04 marks)

ii. Draw a diagram to represent the instruction cycle with interrupts. (08 marks)

iii. The interconnection structure of a computer supports five (5) types of transfers. What are they? (05 marks)

iv. Quick Path Interconnect (QPI) is defined as a four-layer protocol architecture. List and briefly define those four (4) layers. (08 marks)

(4)

i. Three types of numerical data are common in computers. What are they? (03 marks)

ii. Describe the nature of finite state machines by using a real-world example. (03 marks)

iii. Briefly describe five (5) services provided by an operating system. (10 marks)

iv. The ARM architecture provides a large collection of operation types. Briefly explain three (3) out of them. (09 marks)

(5)

i. Mention five (5) advantages of solid-state drives over a hard disk drive. (05 marks)

ii. The registers in the processor perform two (2) roles. What are they? (04 marks)

iii. Explain the three (3) techniques of I/O operations. (06 marks)

iv. Briefly define the seven (7) RAID levels. (10 marks)

(6)

i. What are the three (3) types of data hazards? (06 marks)

ii. State the function of virtual memory. (05 marks)

iii. Compare volatile memory and non-volatile memory. (05 marks)

iv. In order to increase the processor speed there are three (3) approaches to achieve. Briefly describe them. (09 marks)

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