



School of Computer Science Engineering and Information Systems

Fall Semester 2024-2025

CAT - I

Programme Name & Branch : M.Tech

Course Name & code: Computer Architecture and Organization and ISWE 301L

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Class Number(s) : VL2024250103032, 3040, 3046, 3024, 3015

Exam Duration: 90 Min.

Maximum Marks: 50

Answer all Questions:

- 1) Illustrate the connection between the processor and the memory with a neat sketch and discuss the operating steps.
- 2) A CPU is driven by 8 GHz clock. Compute the duration of one clock cycle. Assume that on average the execution of an instruction takes 16 clock cycles. Compute the performance of the CPU in terms of MIPS (millions of instructions per second). Assume that executing a specific program of 800 million instructions takes 8 seconds. How many clock cycles does it take on average to execute an instruction of this program?
- 3) a) How the memory allocation will be done during the function call of the program using stack frame. [5 Marks]
b) Write an Assembly Language Program to find the average of N numbers using Assembler Directives. [5 Marks]
- 4) Develop program to evaluate the arithmetic expression.
$$Y = (P * Q * R) / (W + S)$$
 - (i). Using a general register computer with three address instructions.
 - (ii). Using a general register computer with two address instructions.
 - (iii). Using an accumulator type computer with one address instructions.
 - (iv). Using a stack organized computer with zero-address operation instructions.Where P, Q, R, S, W and Y are memory addresses. In accordance with programming language practice, computing the expression should not change the original value of its operands.

- 5) Assume that an instruction is stored at the location 1000 with its address field at location 1001. The address field has the value 600. The processor register $R1 = 900$, $XR = 200$, $PC = 400$, and $BR = 700$.

Address	Value
600	700
601	800
602	900
700	950
800	990
899	980
900	1000
901	1050
1000	1150
1100	1200
1300	1700
1500	1800

Write the instruction, to evaluate the effective address and find out the content of AC for the given data if the addressing mode of the instruction is,

1. Immediate addressing mode
2. Direct addressing mode
3. Indirect addressing mode
4. Register addressing mode
5. Register indirect addressing mode
6. Pre and post increment addressing mode
7. Pre and post decrement addressing mode
8. Relative addressing mode
9. Indexed addressing mode
10. Base register addressing mode