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Course Code: MCA-107

Course Name: Computer Organization

Assignment 1
(Based on Unit-I & II)

- Q 1. A 36-bit floating-point binary number has eight bits plus sign for the exponent and 26 bits plus sign for the mantissa. The mantissa is a normalized fraction. Numbers in the mantissa and exponent are in signed-magnitude representation. Evaluate the largest and smallest positive quantities that can be represented, excluding zero?
- Q 2. Consider the following register transfer statements for two 4-bit registers R1 and R2.
- $xT : R1 \text{ to } R1 + R2$
- $x'T : R1 \text{ to } R2$
- Every time that variable $T = 1$, either the content of R2 is added to the content of R1 if $x = 1$, or the content of R2 is transferred to R1 if $x = 0$. Draw a diagram showing the hardware implementation of the two statements. Use block diagrams for the two 4-bit registers, a 4-bit adder, and a quadruple 2-to-1-line multiplexer that selects the inputs to R1. In the diagram, show how the control variables x and T select the inputs of the multiplexer and the load input of register R1.
- Q 3. Assume an instruction set that uses a fixed 16-bit instruction length. Operand specifiers are 6 bits in length. There are 5 two operand instructions and 33 zero operand instructions. What is the maximum number of one-operand instructions that can be encoded using the fixed 16-bit instruction length.
- Q 4. Construct a code to swap two 16-bit numbers using direct addressing mode where starting address is 2000 and the first 16-bit number is stored at 3000 and the second 16-bit number is stored at 3002 memory address.