Question Paper

Exam Date & Time: 25-Nov-2023 (10:00 AM - 01:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

Manipal School of Information Sciences (MSIS), Manipal
First Semester Master of Engineering - ME (Embedded Systems) Degree Examination - November / December 2023

Advanced Computer Architecture [ESD 5101]

Marks: 100 **Duration: 180 mins.**

Saturday, November 24, 2023

Answer all the questions.

1)	Apply the knowledge to explain the three types of contemporary computer groups (CO0 BL3)	(10)
2)	Consider the instruction and its relative frequency as LDA, STA, ADD, AND, NOT, RSHIFT, JUMP, HALT, 1/4, 1/4, 1/8, 1/8, 1/8, 1/16, 1/16,1/16, 1/16 respectively. With help of Huffman tree find the redundancy Evaluate the design. (CO2L4)	(10)
3)	Evaluate and justify for a given computer instruction format, the instruction length and the size of an address field are 11 and 4 bits, respectively. Is it possible to have 7 two-address instructions, 15 one-address instructions and 18 zero-address instructions using this format ? (Co3L5)	(10)
4)	Elauate and justify toDesign a 4 - bit general purpose register as follows (Co3L5) S1 S0 FUNCTION 0 0 Load external data 0 1 Rotate right (A3 <- A0, Ai <-Ai + 1 for i = 0, 1, 2) 1 0 Rotate left (A0 <- A3, Ai<- Ai - 1 for i = 1, 2, 3) 1 1 Decrement	(10)
5)	Analyse the design Using 4 x 4 bit ROM based multiplier as the building block; design an 8 x 8 bit multiplier. Use additional 4 - bit parallel adders and FAs. (C02 L4)	(10)
6)	Analyze your answer for following: (10M- CO3L5) Analyze and Evaluate the architecture by designing the processing section, sate diagram, control pints, with logic diagram of controller for performing following register transfer description. Declare registers A [8], B [8], C [8], N [4]; Declare bus Outbus [8]; START: A < - 1, B < - 1, C < - 0; N < - 10; Outbus < - A; LOOP: Outbus < -B; If N = 0 then go to HALT; C < - A + B; A < -B; B < - C; N < -N - 1; Go to LOOP; HALT: Go to HALT	(10)
7)	Apply the knowledge to explain the ARM programming model with necessary diagram (co2L3)	(10)
8)	Analyse to explain the cross compiler tool kit (co2L4)	(10)
9)	Anlayse to Write a program for multiple register transfer addressing, where address starts from 1000(16) to 100c(16) Co2L4)	(10)

10) Analyse for a ASM program for print " MSIS, MANIPAL" Co2L5) (10)

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