

6. Explain Address sequencing in micro programmed control unit with a suitable block diagram. (15)

7. Explain in detail Control Dependency (Branch Hazards) and Data Hazards. (15)

Roll No.

Total Pages : 4

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B.Tech. (CE DS) V SEMESTER

Computer architecture (PCC-DS-503)

Time : 3 Hours]

[Max. Marks : 75

Instructions :

1. It is compulsory to answer all the questions (1.5 marks each) of Part -A in short.
2. Answer any four questions from Part-B in detail.
3. Different sub-parts of a question are to be attempted adjacent to each other.

PART-A

1. (a) What are the benefits of studying computer architecture? (1.5)
(b) Explain locality of reference principle in cache memory. Why secondary memory is used in computer system? (1.5)
(c) What is the role of control memory in micro programmed control unit? (1.5)
(d) Why registers are used in computers? (1.5)
(e) Compare register stack and memory stack . (1.5)
(f) What is bus arbitration? (1.5)

- (g) Explain direct addressing mode and indirect addressing mode. (1.5)
- (h) Let SP = 0000 in the stack. How many items are there in the stack of FULL = 1 and EMPTY = 0? (1.5)
- (i) Explain a bus system for four registers that uses multiplexers. (1.5)
- (j) Why Input-Output interface is required for peripheral devices? Explain. (1.5)

PART-B

2. (a) When do you say the floating point number is normalized? Consider two normalized floating-point numbers 0.9504×10 and 0.8200×10 Find their sum and normalized the result. (10)
- (b) (a) Specify the micro operation for the given below: (5)
- (i) $AC \leftarrow DR$
- (ii) $PC \leftarrow PC + 1$
- (b) Draw the control word format for the given instruction :
- (i) $R1 \leftarrow R2 + R3$
- (ii) $R4 \leftarrow R4 \vee R5$
3. Convert the following numerical arithmetic expression into reverse polish notation and show the stack operations for evaluating the numerical result : (5)
- (3+4) [10(2+6)+8]

- (b) A virtual memory system has an address space of 16k words, a memory space of 8k words, and page and block size of 2k words. The page address trace of a program has been found to be 7 5 3 2 1 0 4 1 6 7 4 2 0 1 3 5 . Determine the 4 pages that are resident in main memory after each page reference change if the replacement algorithm used is (10)
- (i) FIFO
- (ii) LRU.

4. Write short notes on the following : (15)
- (i) Handshaking.
- (ii) Interrupts.
- (iii) Paged segment memory.
5. (a) Describe DMA with suitable block diagram. Why does DMA have priority over the CPU when both request a memory transfer? Explain. (5)
- (b) What is hit ratio? How is it used to improve the performance of cache memory. A two-way set associative cache memory uses blocks of 4 words. The cache can accommodate a total of 2048 words from main memory. The main memory size is $128 K \times 32$.
- (i) Formulate all important information required to construct the cache memory.
- (ii) What is the size of cache memory? (10)