

(Following Paper ID and Roll No. to be filled in your Answer Books)

PAPER ID : MC6

Roll No.

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M. TECH. (Sem.II)
THEORY EXAMINATION 2015-16
PARALLEL ALGORITHM

Time : 3 Hours

Total Marks : 100

Note : Attempt All questions.

1. Answer any **four** of the following : (5×4=20)
- (a) What do you mean by parallel computing? Give real life example.
 - (b) Discuss PRAM model of parallel computation.
 - (c) To construct 64x64 Omega network using 4x4 switch module in multiple stages, how many switches are required?
 - (d) What is Amdahl Effect? Explain. Also discuss Amdahl's Law.
 - (e) Define interconnected networks in advance computer architecture.
 - (f) Explain the following with suitable diagram:
 - (i) Barrel shifter
 - (ii) Hyper cubes

2. Answer any **four** of the following : (5×4=20)
- (a) Give the brief idea on Flynn's classification of computer architectures.
 - (b) Define speedup performance laws.
 - (c) Write short notes on:
 - (i) EREW
 - (ii) CREWComputational model.
 - (d) Discuss performance metrics and measures in computer architecture.
 - (e) What is pipeline and perform instruction pipeline operation?
 - (f) Give a d-dimensional hypercube and a designated source node s , how many nodes are distance i from s , where $0 \leq i \leq d$?
3. Answer any **two** of the following : (10×2=20)
- (a) Explain difference between:
 - (i) Low-order and high-order memory interleaving
 - (ii) Tightly and loosely coupled system
 - (iii) Paged segmentation and segmented paging
 - (iv) DRAM and SRAM

- (b) Show how the following 16 values would be sorted by Batcher's bitonic merge algorithm: 7, 9, 10, 2, 3, 6, 16, 1, 14, 5, 15, 8, 4, 11, 13, 12.
- (c) Show that procedure CREW MERGE can be simulated on an EREW computer in $O((n/p) + \log^2 n)$ time if a way can be found to distinguish between simple read operations and multiple read operations.

4. Answer any **two** of the following : (10×2=20)

- (a) Design a cost optimal parallel algorithm for matrix transposition. Compare it with its sequential version.
- (b) Let $A = \{1, 4, 6, 9, 10, 11, 13, 14, 15, 18, 20, 23, 32, 45, 51\}$ be the sequence to be searched. Illustrate the working of procedure CREW_SEARCH for $x = 45, 9, 21$.
- (c) Design a parallel algorithm for multiplying an $n \times n$ matrix with $1 \times n$ matrix for tree connected architecture.

5. Answer any **two** of the following : (10×2=20)

- (a) Illustrate the working of Moore's algorithm to find the shortest-path from source vertex to destination vertex using suitable diagram.

- (b) Why the number of trees in Sollin's algorithm is reduced by at least a factor of 2 every iteration?
- (c) Design a sequential algorithm to generate permutations. Analyse this algorithm also.

