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Paper Id: 110228 Roll No.

B TECH

(SEM VI) THEORY EXAMINATION 2018-19

PARALLEL ALGORITHM

Time: 3 Hours *Total Marks: 100*

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 10 = 20**

a. Explain matrix operations in parallel algorithm.

b. What is sequential bottleneck in Amdahl's law

c. What is parallel- backtracking ?

d. Write two approaches used for dimensionality reduction.

e. Show the difficulties of solving linear equation on parallel machine in brief.

f. What is sequential alpha-beta search ?

g. What is SIMD ?

h. Explain hyper cube connection.

i. What is the complexity of prefix sum in PRAM model ?

j. How long does the parallel version of Prim's minimum spanning tree finding algorithm require for a graph with n nodes using p processors

SECTION B

2. Attempt any *three* of the following: **10x3=30**

a. What do you mean by parallel sorting networks? Also discuss the enumeration sort algorithm?

b. Explain Bitonic merge sort. Sort a list (C, D, B, H, E, G, F, A) using bitonic merge sort.

c. Describe the Butterfly Model with suitable diagram

d. Explain PRAM Computational model. Along with brief explanation of EREW and CREW computational model.

e. Explain even-odd transposition sort and shear sort algorithm with neat and clean diagrams.

SECTION C

3. Attempt any *one* part of the following: **10 x 1 = 10**

a. Write and discuss Cost-optimal Parallel algorithm to find prefix sums and explain Brent's theorem ? Write its statement and proof.

b. Explain parallel merging. Also explain merging on EREW model.

4. Attempt any *one* part of the following: **10 x 1 = 10**

a. Describe a quicksort algorithm suitable for implementation on hypercube multi-computers.

b. Explain the following

i. Contrasting pipelining and data parallelism

ii. scalability

5. Attempt any *one* part of the following: **10 x 1 = 10**

a. Discuss the vector-matrix multiplication with the help of example.

b. What is data parallelism? Explain difference between Data Parallelism Vs Task Parallelism and Data Parallelism and Model Parallelism.

6. Attempt any *one* part of the following: **10 x 1 = 10**

a. A p-processor PRIORITY PRAM can be simulated by a p-processor EREW PRAM with time complexity increases by a factor of Θ (log p). Prove it

b. Explain parallel Branch and Bound search?

7. Attempt any *one* part of the following: **10 x 1 = 10**

a. What is combinational search problem ? Describe a combinatorial searching problem solving methodology that can be represented by tree. Also explain the breadth search and depth search algorithm with example.

b. Explain the following

i. Parallel version algorithm for all pair shortest paths.

ii. Parallel Kruskal's algorithm for MST.

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