53 (CS 714) PRCP

2016

PARALLEL COMPUTING

Paper : CS 714

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1. *(a)* With clear diagram discuss about PRAM model.

   (b) With diagram discuss about UMA and NUMA. 10+10

2. *(a)* Write down PRAM algorithm for computing prefix sum of an array.

   (b) Apply your algorithm for the array given below. (Clearly mention each step)

A[1]	A[2]	A[3]	A[4]	A[5]	A[6]	A[7]	A[8]
2	4	1	5	6	3	7	8

5+15

Contd.

3. *(a)* Write a PRAM algorithm to merge two sorted array into a single sorted array.

(b) Apply your algorithm for the following data.

$A[1]$	$A[2]$	$A[3]$	$A[4]$
10	14	18	20

$A[5]$	$A[6]$	$A[7]$	$A[8]$
11	13	15	19

5+15

4. *(a)* Compute the diameter and bisection width for the following network :

(i) 2D Mesh without wrap around

(ii) Binary tree

(iii) Hypercube

(iv) Cube Connected Cycles.

(b) Prove the following :

(i) A binomial tree of height greater than 4 cannot be embedded in a 2D mesh without increasing the dialation 1.

(ii) A dialation-1 embedding of a complete binary tree of height n into a hypercube of dimension $n+1$ does not exist if $n > 1$.

4×3+4×2

5. (a) With an example discuss about different load balancing algorithm.

(b) With an example discuss about Coffman-Graham scheduling algorithm.

10+10

6. Consider the following data : 20

10	12	8	17	14	13	15	2

Design & apply bitonic merge-sort (clearly mention each step).

7. Write briefly on : 4×5

(a) Shuffle-exchange network

(b) Pyramid network

(c) SIMD

(d) MIMD.