53 (CS 714) PRCO

2014

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 a diagram discuss about PRAM model of parallel computation. 10

   (b) With suitable example discuss EREW, CREW and CRCW PRAM. 2+3+5

2. (a) Write a PRAM algorithm to compute prefix sum of an array consisting *n* elements.
   10

   (b) Compute the time complexity of your algorithm. 5

(c) Apply your algorithm on the following data elements 5

7	3	8	1	4	9

3. (a) Write a PRAM algorithm to merge two sorted array into a single sorted array. 10

(b) Apply your algorithm on the following data elements : 10

1	3	5
$A[1]$	$A[2]$	$A[3]$

2	4	6
$A[4]$	$A[5]$	$A[6]$

4. (a) Define the terms : 2+2
   (i) diameter
   (ii) Bisection width

(b) Compute diameter and bisection width for the following networks 4×4
   (i) 1 D Mesh
   (ii) 2 D Mesh
   (iii) Binary tree
   (iv) Cube Connected cycles

5. (a) Define the terms :   2+2+2

     (i) embedding

     (ii) dialation

     (iii) load

  (b) Prove that a mesh with an odd number of rows and odd number of columns cannot be embedded into ring without increasing dialation by 1.   8

  (c) Prove that a binomial tree of height greater than 4 cannot be embedded into 2D mesh without increasing the dialation beyond 1.   6

6. (a) What is bitonic sequence ? Discuss with an example.   5

  (b) Consider the following array :

7	10	6	9	12	3	4	8

Perform bitonic merge sort on any network.   15

7. (a) Design a parallel quick sort algorithm.

10

(b) Write short notes on : 5+5

(i) Shuffle exchange network

(ii) Load balancing algorithm