

Dr. Hasi Singh

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION - February 2020

M.Tech 2nd Semester

COURSE CODE: 14M1WCI431

MAX. MARKS: 15

COURSE NAME: Parallel Programming Techniques

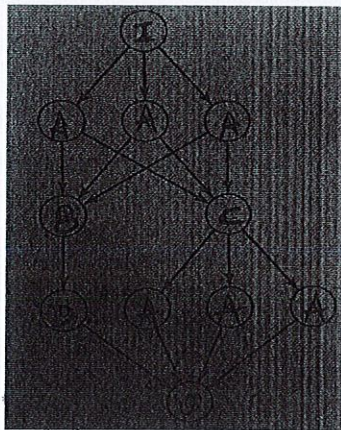
COURSE CREDITS: 03

MAX. TIME: 1 Hrs

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

Note: Each question carries 3 marks (3x5=15)

- Q1.** Consider the data dependence graph in the figure below. Identify all sources of data parallelism. Identify all sources of functional parallelism.



- Q2.** Draw a butterfly network of 16 processor nodes. Show routing a message from processor 0100 to processor 1010 in this network.
- Q3.** Draw hypercube of the following sizes, labeling the nodes:
- 16 nodes
 - 32 nodes
- Q4.** Give an example of how increasing processor utilization increases interprocessor communication.
- Q5.** Write a parallel program that computes the sum $1+2+3+\dots+p$ in the following manner: Each process i assigns the value $i+1$ to an integer, and then the processes perform a sum reduction of these values. Process 0 should print the result of the reduction. As a way of double-checking the result, process 0 should also compute and print the value $p(p+1)/2$.

OR

The gap between consecutive prime numbers 2 and 3 is only 1, while the gap between consecutive primes 7 and 11 is 4. Write a parallel program to determine, for all integers less than 1,000,000, the largest gap between a pair of consecutive prime numbers.