VIT
Vellore Institute of Technology

Final Assessment Test – November 2018

Course: CSE4001 - Parallel and Distributed Computing

Class NBR(s): 5871 / 5880 / 5883 / 5885 / 5890 / 5893 / 5896 / 5899 / 6380 Slot:B1

Time: Three Hours Max. Marks: 100

Answer ALL Questions
(10 X 10 = 100 Marks)

1. a) Identify the scope of parallel computing in Engineering and Design. [4]

   b) Let a program have a portion f_E of its code enhanced to run 4 times faster (so $f_I = 4$) to yield a system speedup 3.3 times faster (so $S = 4.3$). What is the fraction enhanced f_E? Substitute f_E in System Speedup to justify whether the system speedup i.e. 3.3 is obtained or not. [6]

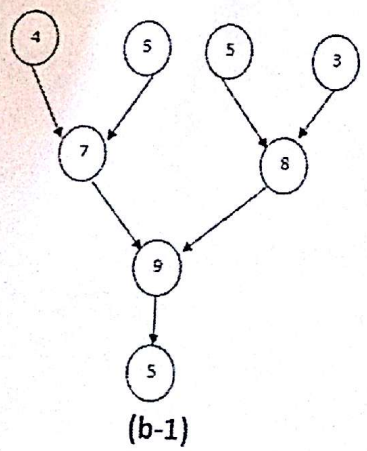
2. a) Describe the architecture of an Ideal Parallel Computer (PRAM). [7]

   b) Of the four PRAM models (EREW, CREW, ERCW, and CRCW), which model is the most powerful? Why? [3]

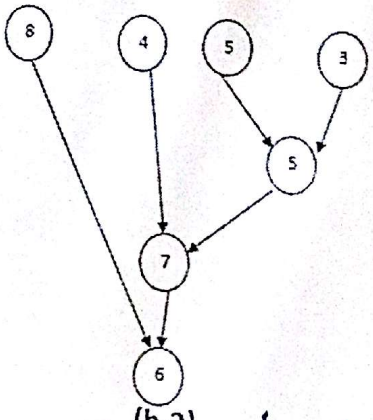
3. a) Write short note on following terms with respect to parallel computing: [4]
   i) Granularity- Fine Grained and Coarse grained
   ii) Decomposition
   iii) Degree of concurrency
   iv) Critical path length

   b) For the weighted task-dependency graphs given below, determine the following for each graph: [6]

   i) Maximum degree of concurrency
   ii) Critical path length
   iii) Average degree of concurrency



(b-1)



(b-2)

4. a) Explain RPC mechanism clearly, with the help of suitable diagram. [7]

   b) Compare and contrast OPENMP with MPI. [3]

5. Explain distributed algorithm for Mutual Exclusion. What are the advantages and disadvantages of centralized algorithm? [10]

6. a) Explain the following two distributed Web-based architecture of with suitable diagram. [6]
   i) Client- Server
   ii) Multitiered Architecture

   b) "SOAP is often said to adhere to RPC semantics". Is this really true? Justify. [4]

7. a) How does cloud architecture overcome the difficulties faced by traditional architecture? [5]

   b) What are the three differences that separates cloud architecture from the tradition one? [5]

8. a) Illustrate the programming model of MapReduce. [6]

   b) Provide an example of an distributed computation that would be difficult to implement in MapReduce, Give full reasons for your justification. [4]

9. Design Reduce communication (MPI_Reduce) using MPI_Send and MPI_Recv primitives. [10]

10. a) Define cluster computing. [2]

    b) Explain how the two-phase commit protocol for nested transactions ensures that if the top-level transaction commits, all the right descendants are committed or aborted. [8]

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