

ME Software Engg 1st Year 2nd Sem Examination, 2018**DISTRIBUTED SOFTWARE ARCHITECTURE**

TIME: 3 Hours

FULL MARKS: 100

Answer Any FIVE Questions

1.a) Explain your understanding about Tightly Coupled System(TCS) and Loosely Coupled System(LCS). How they are similar and how they are different?

b) List down the possible characteristics of an 'Ideal Distributed System'.

c) List down 4 goals of a Distributed System.

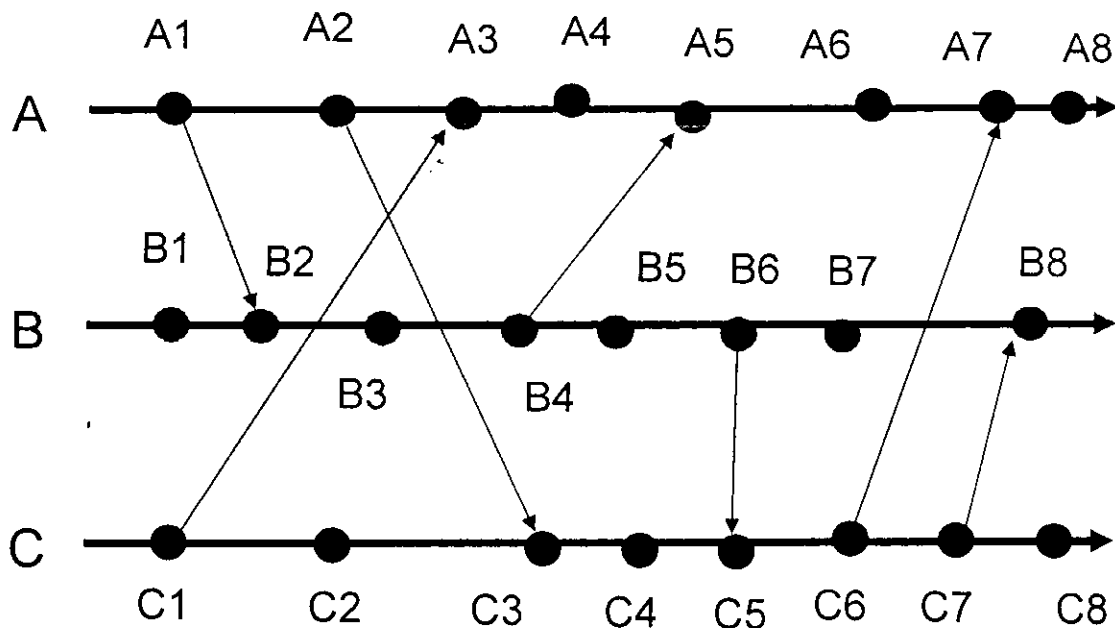
d) Explain your understanding about Scalability with respect to a Distributed System.

(5+5+4+6)

2.a) Explain why maintaining global clock is impossible in a Distributed Systems.

b) Illustrate your understanding about 'Clock Skew' and 'Clock Drift'.

c) A, B and C are 3 independent systems connected over Ethernet. Their event timelines are given in the figure below. Here the arrows represent different message transmissions among these three systems. Study the diagram and then indicate True/False about each of the statement mentioned thereafter. In those statements, the symbol " \rightarrow " represents 'Happened Before' relationship.



- i) A1 → B2 ---- True/False
- ii) A2 → B3 ---- True/False
- iii) C1 → B3 ---- True/False
- iv) B4 → A4 ---- True/False
- v) B6 → C5 ---- True/False
- vi) B5 → C6 ---- True/False
- vii) B7 → C7 ---- True/False
- viii) B8 → C8 ---- True/False
- ix) B7 → A8 ---- True/False
- x) A6 → C8 ---- True/False

(5+5+10)

3.a) With proper illustration, explain why taking Global Snapshot of a Distributed System is difficult?

b) Illustrate your understanding about "Consistent Cut".

c) Explain the concept of 'Communicator' in MPI (Message Passing Interface).

d) With proper illustration, explain the concept of 'Collective Communication' in MPI (Message Passing Interface).

(5+5+4+6)

4.a) Explain the Performance Metrics required to compare different Mutual Exclusion Algorithm in a Distributed System.

b) List down various algorithms for Mutual Exclusion in a Distributed System.

c) Illustrate Lamport's Algorithm of Mutual Exclusion in a Distributed System.

d) Explain your understanding about 'Quorum-Based Mutual Exclusion Algorithm'.

(4+2+7+7)

5.a). List down the various Deadlock Handling Strategies.

b) Illustrate your understanding about various Models of Deadlock.

c) Explain the pros and cons of 'Centralized Approaches' of Deadlock Detection and Recovery.

d) Illustrate a Deadlock Detection Algorithm which belongs to the 'Edge Chasing' class.

(2+6+6+6)

- 6.a) Explain your understanding about Distributed File System Architecture.
- b) Do a detail 'Feature Comparison' among various types of Distributed File Systems.
- c) Explain the various methods of enhancing Distributed File System Performance.
- d) What are the differences between v-node and i-node?

(4+6+8+2)