Total No. of printed pages = 4

MCA 18250 E 31

Roll No. of candidate | | | | | | | | | | |

16/3 | 2021

M.C.A. 5th Semester End-Term Examination

DISTRIBUTED SYSTEMS

(New Regulation)

Full Marks – 70 Time – Three hours

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

Answer question No. 1 and any *four* from the rest.

1. Choose the correct answer : $(10 \times 1 = 10)$

(i) If event "a" has a Lamport timestamp of 4 and Event "b" has a Lamport timestamp of 8, What can we tell about events a and b?

(a) Event a and bare casually related

(b) Event a and b are concurrent

(c) Event a happened before event b

(d) If event a and b are casually related ,then event a happened before event b

(ii) Which event is concurrent with vector clock (2, 4, 6)?

(a) (3, 5, 7)

(b) (1,3, 5)

(c) (1,4,6)

(d) (1,4,7)

(iii) Which of the following is a voting based mutual exclusion algorithm

(a) Ricart Agarwala Algorithm

(b) Maekawa's algorithm

(c) Christian algorithm

(d) None of the above

(iv) For n processes, critical section invocation using Ricart Agarwala algorithm requires

(a) $n-1$ messages (b) $2((n-1)$ messages

(c) $n+1$ messages (d) None of the above

(v) Byzantine failure is also known as

(a) Arbitrary failure (b) Omission failure

(c) Timing failure (d) Response failure

(vi) The instantaneous difference in reading between two clock is known as

(a) Clock drift (b) Clock Skew

(c) Clock cycle (d) None of the above

(vii) In distributed system, information is exchanged through

(a) Memory sharing (b) Message Passing

(c) Both (a) and (b) (d) None of the above

(viii) A software that lies between the OS and the applications running on it

(a) Firmware (b) Middleware

(c) Utility Software (d) None of the above

(ix) Distributed Mutual Exclusion Algorithm does not use

(a) Coordinator process

(b) Token

(c) Logical clock for event ordering

(d) Request and Reply messages

(x) In which of the following middleware, stub and skeleton is used

(a) Remote Method Invocation

(b) Message Oriented middleware

(c) Remote Procedure call

(d) None of the above

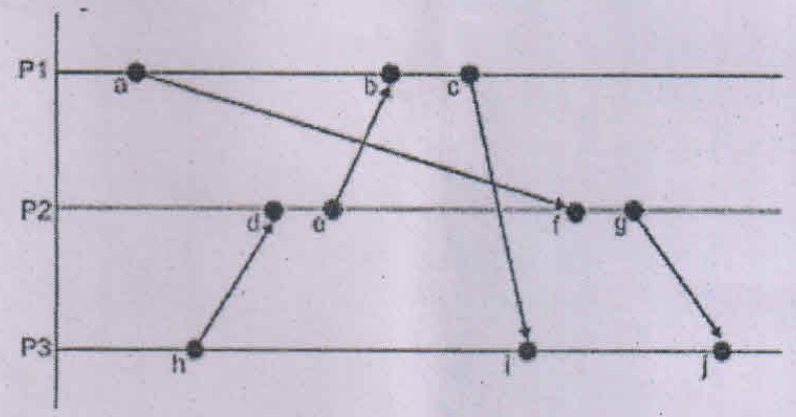
2. (a) What is coordinated universal time? (3)

(b) Define clock skew and clock drift. (4)

(c) What are the characteristics of a dependable system? (3)

(d) What is heterogeneity of a distributed system? Give two examples of a distributed system. (3+2=5)

3. (a) Time stamp the following events occurring at different processes using Lamport clock and vector clock. (5+5=10)



(b) A client's clock reads 3 :20:00. The server's clock reads 3: 10:00 when they synchronize using the Berkeley algorithm. Assume message delays are negligible. What is the time at the client after synchronization? (5)

4. (a) What is an election algorithm? What are the requirements of an election algorithm? Explain Bully algorithm with an example? (2+2+4=8)

(b) What is a fault tolerance distributed system? Discuss the various models of replication for fault tolerance? (1+6=7)

5. (a) What is CORBA? What are the different components of CORBA architecture? Write about the major task performed by these components. (2+3+5=10)

(b) Explain Christian algorithm for synchronizing clocks in a distributed system. (5)

6. (a) What is distributed mutual exclusion? What are the requirements of distributed mutual exclusion? Explain Maekawa's voting algorithm for mutual exclusion. Show how it satisfies the requirement of mutual exclusion. (2+3+5=10)

(b) Explain Huang's termination detection algorithm with an example. (5)

7. (a) What is Clock synchronization? Distinguish between external and internal Synchronization (2+3=5)

(b) What is a cut of a system? Explain consistent and inconsistent cut. (2+4=6)

(c) What is prefix of a process history? (2)

(d) Define what is meant by a scalable system. (2)
