Semester: V I
Sub & Code: DOS (CS-4024)
Branch (s): CSSE

SPRING MID SEMESTER EXAMINATION-2020

Distributed Operating System

[CS-4024]

Full Marks: 20 **Time: 1.5 Hours**

Answer any four questions including question No.1 which is compulsory.
The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable and all parts of a question should be answered at one place only.

Q1 Answer the following questions: (1 x 5)

a) What are the differences between DOS and COS?

b) Explain happened before relationship for Lamport's logical clock.

c) Explain the impact of the absence of global clock, global time and shared memory in Distributed Computing System (DCS) with example.

d) Write the advantages of Ricart-Agrawala algorithm for distributed mutual exclusion. How many messages are required per Critical Section (CS) execution in this algorithm?

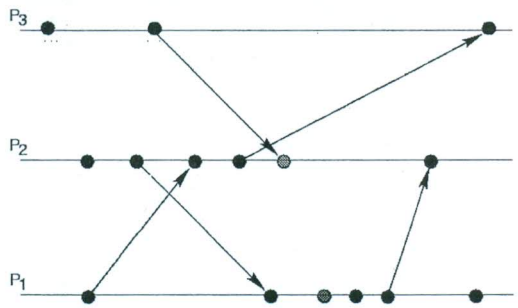
e) What are the metrics used for measuring the performance of mutual exclusion algorithm in DCS?

Q2 a) Let S1,S2 and S3 are three sites in Distributed Computing System (DCS). Site S1 and S3 are making request for Critical Section (CS) execution with time stamps (3,1) and (2,3) respectively. Using the Ricart-Agrawala algorithm, show the sequence of CS execution with graphical representation. Also, Describe How this algorithm achieves mutual exclusion? (2.5)

b) Explain the Flynn's classification of computer systems. (2.5)

Q3 a) Explain the different types of transparencies in Distributed Computing Systems. (2.5)

b) (2.5)



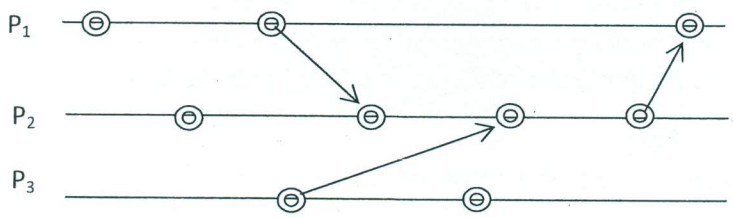
Consider the above figure, where events of the three processes P_1, P_2 and P_3 are given with respect to global time (x-axis) and space (y-axis). Events (represented as dot sequence) of process P_1, P_2 and P_3 are represented by $(e_{11},e_{12},e_{13},e_{14},e_{15},e_{16})$, $(e_{21},e_{22},e_{23},e_{24},e_{25},e_{26})$ and (e_{31},e_{32},e_{33}) respectively. Using Lamport's logical clock system, show how clock values for events advance in different processes? Assume that each process's logical clock is set to 0 initially.

Q4 a) Using a suitable example, discuss the problem of deadlock in Maekawa's algorithm for distributed mutual exclusion. Also, define the procedure of deadlock handling in Maekawa's algorithm. (2.5)

b) What do you mean by Token-based algorithms for distributed mutual exclusion? Explain Suzuki-Kasami's broadcast algorithm with a suitable example. (2.5)

Q5 a) What is the limitation of Lamport's logical clock? Explain with a suitable example (2.5)

b)



Consider the above figure, where events of the three processes P_1, P_2 and P_3 are given with respect to global time (x-axis) and space (y-axis). Events (represented as circled dot sequence) of process P_1, P_2 and P_3 are represented by **(e_{11},e_{12},e_{13}), $(e_{21},e_{22},e_{23},e_{24})$** and **$(e_{31}, e_{32})$** respectively. Using Vector's logical clock system, show how clock values for events advance in different processes? Assume that each process's logical clock is set to 0 initially.

==========