53 (IT 712) DBSY

2014

DISTRIBUTED SYSTEM

Paper : IT 712

Full Marks : 100

Time : Three hours

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

*Answer **any five** questions out of **seven**.*

1. *(a)* Differentiate Synchronous and Asynchronous Distributed System. What is clock drift rate and clock skew ? 10

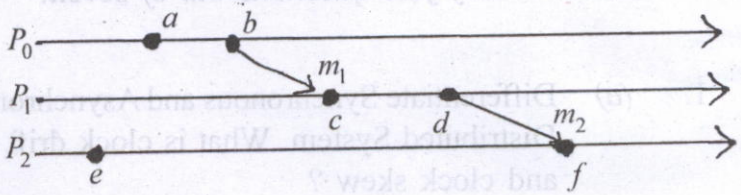
   (b) What is internal synchronization and external synchronization of a physical clock ? Explain Berkley algorithm with a suitable example. 10

2. *(a)* With the help of Corba architecture, discuss the role of middleware in DS. 10

(b) What are the difficulties and threats in distributed systems ? 10

3. *(a)* How is Heterogeneity a challenge in Distributed Systems ? How are they handelled ? 5

(b) Give the happened before relations of Lamport's logical clock, considering the following diagram 5



Give relations between :

(i) *b* and *d*

(ii) *a* and *c*

(iii) *b* and *f*

(c) Consider the following sequences of events at processes P_0, P_1, P_2 5

P_0	–	a	s_1	r_3	b
P_1	–	c	r_2	s_3	
P_2	–	r_1	d	s_2	e

S_i and r_i are corresponding send and receive events, for $i = 1, 2, 3$.

Provide the vector clock values for all events.

(d) What do you mean by Global state in the context of a distributed system ? Give the formal defenition of the following : 5

(i) Inconsistent GS.

(ii) Consistent GS.

(iii) Strongly consistent GS.

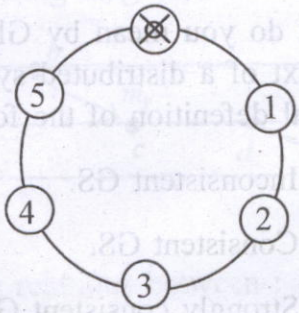
4. (a) What do you mean by Agreement problem in DS ? What are the major agreement problems ? Describe *any one* in detail. 10

(b) Describe various failure models in DS. 10

5. *(a)* Describe an algorithm to detect the termination of any algorithm. 5

(b) How can we prevent a Distributed deadlock ? Compare wait-die algorithm and wound-wait algorithm. 2+5=7

(c) Determine the new leader for the following ring structured network, using Chang and Robert's algorithm, if the process with $P_{id} = 0$ is dead. Also describe the algorithm in detail. 4+4=8

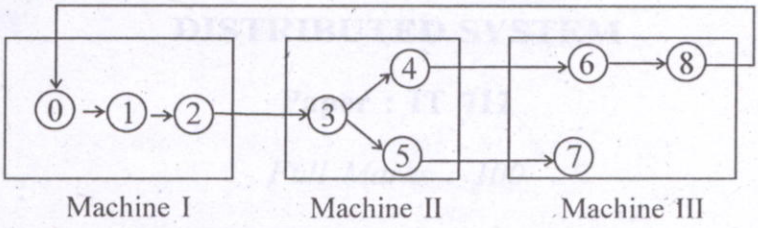


6. *(a)* Show that the Ricart and Agarwala's algorithm achieves ME1. 6

(b) What are the conditions for a deadlock to occur in a DS ? 4

(c) What is Distributed Deadlock detection ? 4

(d) Determine if there is a deadlock in the DS given below using Chandy-Misra-Haas algorithm : 6



7. Write short notes on the following : 5×4=20

(a) Wave algorithms

(b) Mobile code and Mobile agent

(c) Cloud computing

(d) Client-Server Communication.