QUESTIONS – Distributed Coordination

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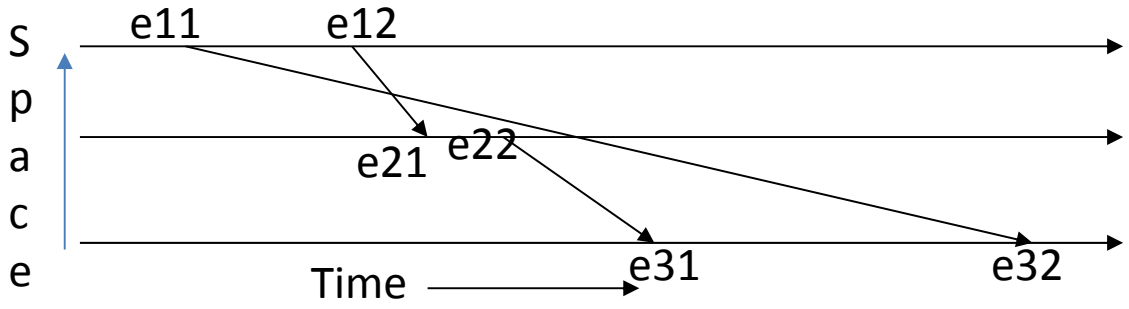
Questions – Distributed Coordination

1. What are causally related events?
2. Show that using single value for logical clock C, it is not possible to ensure that if C(a) < C(b), then a$\rightarrow$b, where $\rightarrow$ denoted happen-before relation among the events in a distributed system.
3. Give implementation rules of Lamport's logical clock and vector clock. In which type of applications vector clocks are more appropriate?
4. Why global clock is important in a distributed system? Why this is an issue? How this can be realized?
5. Consider a bank database which is fully replicated. Give an algorithm/protocol for ordering of transactions in above situations.
6. Differentiate implementation rules of Vector clock and Lamport's clock.
7. Prove that vector clock condition is strong. What is the significance of this condition?

Questions – Ordering of Messages



1. Trace SES protocol to ensure the ordering of messages in above scenario.
2. Discuss BSS protocol for causal ordering of messages. In what way this algorithm is different from SES protocol?

Questions – Global State Detection

1. Why global state detection is an issue in distributed system?
2. Give the consistent global state requirements in DCS. When the global state is said to be strongly consistent?
3. Let ‘C’ be the channel from node S1 to S2. Show that a consistent global state must always satisfy $n \geq m$, where ‘n’ is the number of messages sent by S1 along ‘C’ before S1 state is recorded and ‘m’ is the number of messages received by S2 along ‘C’ before S2 state is recorded.
4. Consider a DCS with set of sites, S={S1,S2,S3}. With respect to real time, t, the global state G={LS1, LS2,LS3} (where LSi is local state of site Si) is recorded.

   Let LS1={recv(e21, e11), send(e12, e31), recv(e22, e13)}

   Let LS2={send(e21, e11), send(e22, e13), recv(e14, e23)}

   Let LS3={recv(e12, e31), send(e32, e15), recv(e16, e33)}

   where eij is jth event at ith site; send/recv(x,y) – send/receive message from x to y. Comment with justification on global state G recorded.
5. Differentiate:

   Transit-less global state from Consistent global state