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Ques- The worst case and average case complexity for Chang Robert

Ans-

worst case complexity → $O(n^2)$
average case complexity → $O(n \log n)$

proof :

worst case -
when each process acts as an initiator and processes are arranged in increasing order of uid.

token p will take (n-p) jumps to reach process 0 and all tokens will vanish at 0.

⇒ number of messages = $1 + 2 + \dots + n$

$= \frac{n(n+1)}{2}$

$= O(n^2)$

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Ques- State true or false: In the lamport's mutual exclusion algo.

Ans- True.

Process P_i will be at top of request queues of all processes because each request is sent to every node and is pushed in their request queue.

On exiting CS P_i will remove its request from queue and will send release message to every process.

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Ques- Which of the following ordering is/are true in the given condition.

Ans- FIFO

FIFO but not CO

The computation is FIFO because the message which is sent first will be received first.

Not all messages are casually ordered.

Ques- 40% of the code for a certain sequential application

Ans:- According to Amdahl's law,

here. $P = 40\% = 0.4$

$$\text{speedup} = \frac{1}{1 - P + P/s}$$

$$1.3 = \frac{1}{1 - 0.4 + 0.4/s}$$

$$1.3 = \frac{1}{1 - 0.4 + 0.4/s}$$

$$1.3\left(1 - 0.4 + \frac{0.4}{s}\right) = 1$$

$$\frac{0.52}{s} = 1.52 - 1.3$$

$$\frac{0.52}{s} = 0.22$$

$$s = \frac{0.52}{0.22}$$

$$\boxed{s = 2.36}$$

Ques:- A synchronous distributed system is as shown in figure with one process

Ans:- required rounds = O(V)

where, V is the graph

The algorithm given in the question is similar to the flooding algorithm in arbitary order.

hence, V = max edges between any two nodes
= 5

Therefore, number of rounds = 5

Ques:- which of fol. differentiates LE and ME

Ans:- starvation-freedom is irrelevant in LE algo
failures are not considered in ME algo
LE require process identifiers to be known
process entering is need not to announce their exit.

Ques:- Removing which of the fol. messages (one at a time)

Ans:- Removing P2 to P3 removes the conflict between P2 to P3 (second message) and P1 to P3

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Ques:- Consider the following figure that shows picture of network divided into 3 clusters

Ans:- let, e = number of intercluster edges

message complexity in each cluster = $O(|e|)$

let n = number of clusters

total message complexity = $O(p.|e|)$

total no. of messages in cluster 1 = 5 (1) + 5 ack + 5 safe + 6 cluster safe (sent) + 6 cluster safe (received) + 5 next

= 32

cluster 2 = 34 (due to 2 intercluster edges)

cluster 3 = 32

total = cluster 1 + cluster 2 + cluster 3

= 32 + 34 + 32

= 98

hence **total = 98**