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Title:- Implement Bully & ring algorithm for leader election.

Theory:-

1) Explain need of election in a network.

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- The goal of leader election is to give a specific entity (such as a process, host, thread, object or person) special powers within a distributed system.
- These powers may include a ability to delegate tasks, the ability to modify data, or the responsibility for handling all system requests.
- Leader election can be useful tool for improving efficiency, minimizing coordination, simplifying architectures, & reducing overhead but it can also introduce additional failure modes & scaling challenges & make it more difficult to assess the validity of the system.

2) Difference between Bully & Ring algorithm.

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Bully algorithm	Ring algorithm
① The Bully algorithm is a centralized approach	① The ring algorithm is a decentralized approach.

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Bully algorithm	Ring algorithm
② In bully algorithm nodes elect a leader through a series of message exchanges.	② In Ring algorithm leader is elected by passing a token around the ring.
③ Each node has a unique ID & node with the highest ID is elected as a leader. When a node detects that the current leader has failed, it initiates an election by sending a message to all other nodes with higher IDs	③ Each node has a token, when a node wants to initiate an election, it sends its token to it's neighbour in a predetermined direction. When a node receives a token, it checks if it has the highest ID & becomes the leader if it does.
④ These nodes respond by acknowledging their current leadership status or by initiating their own elections.	④ Node continues to pass the token to the next node in the ring until a leader is elected.
⑤ Simple to implement	⑤ Not simple as bully to implement.
⑥ Can handle failures of both nodes & the leader.	⑥ May suffer from issues such as message delay or packet loss.