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FACULTY OF EGINEERING AND TECHNOLOGY

Distributed Systems (BCS-701)

LECTURE -10

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OUTLINE

- Token Based Algorithm
- Non-token based approach
- Quorum based approach
- Difference Between Token and Non Token based Algorithm
- MCQ
- Reference

MUTUAL EXCLUSION IN DISTRIBUTED SYSTEM

1. Token Based Algorithm

- A unique token is shared among all the sites.
- If a site possesses the unique token, it is allowed to enter its critical section
- This approach uses sequence number to order requests for the critical section.
- Each requests for critical section contains a sequence number. This sequence number is used to distinguish old and current requests.
- This approach insures Mutual exclusion as the token is unique.
- **Example:** Suzuki-Kasami's Broadcast Algorithm

2. Non-token based approach

- A site communicates with other sites in order to determine which sites should execute critical section next. This requires exchange of two or more successive round of messages among sites.
- This approach use timestamps instead of sequence number to order requests for the critical section.
- When ever a site make request for critical section, it gets a timestamp. Timestamp is also used to resolve any conflict between critical section requests.
- All algorithm which follows non-token based approach maintains a logical clock. Logical clocks get updated according to Lamport's scheme
- **Example:** Lamport's algorithm, Ricart–Agrawala algorithm

3. Quorum based approach

- Instead of requesting permission to execute the critical section from all other sites, Each site requests only a subset of sites which is called a quorum.
- Any two subsets of sites or Quorum contains a common site.
- This common site is responsible to ensure mutual exclusion
- **Example:** Maekawa's Algorithm

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Difference Between Token and Non Token based Algorithm

S.No.	Token Based	Non Token Based
1	In the Token-based algorithm, a unique token is shared among all the sites in Distributed Computing Systems.	In Non-Token based algorithm, there is no token even not any concept of sharing token for access.
2	Here, a site is allowed to enter the Computer System if it possesses the token.	Here, two or more successive rounds of messages are exchanged between sites to determine which site is to enter the Computer System next.
3	The token-based algorithm uses the sequences to order the request for the Computer Systems and to resolve the conflict for the simultaneous requests for the System.	Non-Token based algorithm uses the timestamp (another concept) to order the request for the Computer Systems and to resolve the conflict for the simultaneous requests for the System.
4	The token-based algorithm produces less message traffic as compared to Non-Token based Algorithm.	Non-Token based Algorithm produces more message traffic as compared to the Token-based Algorithm.
5	Here, it was ensured that requests are executed exactly in the order as they are made in.	Here there is no surety of execution order.
6	Token-based algorithms make authentication quite easy.	Non-Token based algorithms can’t make authentication easy.
7	Examples of Token-Based Algorithms are: (i) Singhal’s Heuristic Algorithm (ii) Raymonds Tree Based Algorithm (iii) Suzuki-Kasami Algorithm	Examples of Non Token-Based Algorithms are: (i) Lamport’s Algorithm (ii) Ricart-Agarwala Algorithm (iii) Maekawa’s Algorithm

MCQ

1. What is the access point (AP) in a wireless LAN?

a) device that allows wireless devices to connect to a wired network

b) wireless devices itself

c) both device that allows wireless devices to connect to a wired network and wireless devices itself

d) all the nodes in the network

2. In wireless ad-hoc network _____

a) access point is not required

b) access point is must

c) nodes are not required

d) all nodes are access points

3. Which multiple access technique is used by IEEE 802.11 standard for wireless LAN?

a) CDMA

b) CSMA/CA

c) ALOHA

d) CSMA/CD

4. In wireless distribution system _____

a) multiple access point are inter-connected with each other

b) there is no access point

c) only one access point exists

d) access points are not required

5. A wireless network interface controller can work in _____

a) infrastructure mode

b) ad-hoc mode

c) both infrastructure mode and ad-hoc mode

d) WDS mode

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