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Assignment 4.

Problem Statement : To develop any distributed algorithm for leader election

Objectives : By end of this assignment, student will able to explain concept of leader election Algorithm.

Tools : Eclipse Java 8.

Theory :

Distributed Algorithm : It is a algo that runs on distributed system each process or has its own memory & they communicate via communication network.
Election Algorithm we designed to choose a coordinator

Election Algorithm :

Assumption : Each process has a unique number to distinguish them. Process knows each other's process No.
There are 2 types of election Algorithm.

1) Bully Algorithm
2) Ring Algorithm

Bully Alg : It applies to system where every process can send or msg to every other process in the system.
Algorithm : (Suppose process P sends msg to co-ordinator)

1. If coordinator does not respond to it within time travel T then it is assumed coordinator has failed.
2. Now process P sends election msg to every process with high priority.

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3. It waits for responses if no one responds for time interval T then process elects itself as coordinator
4. Then send a msg to all lower priority process that it is elected as their real coordinator
5. However if answer is received within time T
   a) Process P again waits for time T to receive
   b) If P doesn't responds within time interval then it is assumed to have failed & algo is installed

Ring Algorithm: This alg. applies to systems organised as a ring (logically or physically). In this algo then we assume that link between process are unidirectional & every process can manage to process on its right only. DS that this algo works is active list

Algorithm:

1. If processes detects coordinator failure, creates new active list which is empty initially. It sends election msg to its neighbour on right & adds no to its active list.
2. If P2 receives msg elect from process on left it responds in 3 ways.
   ① If msg receive does not contain in active list then P, add 2 to its active list & forwards msg.
   ② If this is first election msg, it has received or sent P1 creates new active list with no 1 & 2. It then sends election msg 1 followed by 2.
   ③ If process P3 receives its own election msg 1 then active list for P1 now contains no. of all active processes in system Now process P1 elects highest priority no from list & elects it as new coordinator

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Conclusion :

Thus in the assignment, It have learned about election algorithms in distributed systems & implemented Bully & Ring election algorithm.