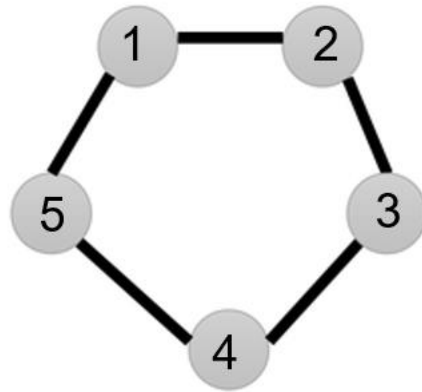# *Assignment 6*

Question:- Reproduce one leader election algorithm (Ring/Modified Ring/Bully) using multithread in Java/C/C++/Python

Algorithm :-Modified Ring Algorithm

How to Run:-

Command to compile the code :-

Command :- javac ModifiedRingLeaderElection.java

Command to run the code :-

Command :- java (.class file name})

For instance :- java ModifiedRingLeaderElection

Output:-

```
C:\Users\SUNYloaner\Desktop\SUBJECT\Ds\Assignment6>java ModifiedRingLeaderElection
Node 1 is starting the election process...
Node 1 received token, passing it to Node 2
Node 2 received token, passing it to Node 3
Node 3 received token, passing it to Node 4
Node 4 received token, passing it to Node 5
Node 5 is the leader.
Terminating all nodes

C:\Users\SUNYloaner\Desktop\SUBJECT\Ds\Assignment6>
```

Explanation:-

Node class:

- Each node represents a participant in the leader election process.
- Nodes maintain essential attributes, including an identifier (id), a reference to the next node in the ring (next), and flags indicating whether the node is the leader (isLeader) and whether it possesses the election token (hasToken).
- The **electLeader()** method encapsulates the logic for leader election. When a node receives the token, it checks whether it is the designated leader (node 5). If it is the leader, it declares itself as such, signals the latch to indicate the completion of the election process, and exits the loop. Otherwise, it passes the token to the next node in the ring.

ModifiedRingLeaderElection class:

- The main() method orchestrates the execution of the leader election process.
- It initializes a specified number of nodes and establishes a ring structure among them, where each node is linked to the next node in the sequence, and the last node is connected back to the first node, forming a cyclic structure.
- Each node is executed on a separate thread to enable concurrent execution of the leader election logic.
- Once the leader is elected and the latch is signaled, indicating the completion of the election process, the program terminates

Log for the code :-

Node 1 is starting the election process...

Node 1 received token, passing it to Node 2

Node 2 received token, passing it to Node 3

Node 3 received token, passing it to Node 4

Node 4 received token, passing it to Node 5

Node 5 is the leader.

Terminating all nodes