CPSC 441: Computer Networks
Design Notes
Assignment-4

Note: These notes are based on my own implementation. I do not claim that my implementation is the simplest or the best. Feel free to use or disregard any of these suggestions as you wish.

My implementation logic can be summarized as follows:

Algorithm 1 Algorithm Router

```
Initialization of data structure(s)
Create UDP socket to send and listen link state message
Set timer task to send node's link state vector to neighboring nodes every 1000 ms
Set timer task to update node's route information every 10000 ms
while TRUE
    Receive link state message from neighbor
    Update data structure(s)
    Forward link state message received to neighboring node(s) based on broadcast algorithm
end of while
```

How to implement recurring task?: Use classes `Timer` and `TimerTask`.

- Method-1: Schedule timer task of type `TimerTask`. As part of the task logic, schedule the next timer task.

- Method-2: Use `scheduleAtFixedRate()` method of class `Timer`

Helper methods: There are three helper methods, *processUpdateDS*, *processUpdateNeighbor* and *processUpdateRoute*, defined in class `Router`. The main thread receives link state message from neighboring node and call *processUpdateDS* method. The timer task that updates neighboring nodes about node's link state vector calls *processUpdateNeighbor*. The timer task that updates route information of the node calls *processUpdateRoute*. All three methods are **synchronized** to avoid running them simultaneously which may lead to unintended concurrency problems.

Pseudo code: The pseudo code of all helper methods are shown below (self explanatory):

```
public synchronized void processUpDateDS(DatagramPacket receivepacket)
{

  // Update data structure(s).
  // Forward link state message received to neighboring nodes
  // based on broadcast algorithm used.

}

public synchronized void processUpdateNeighbor(){

// Send node’s link state vector to neighboring nodes as link
// state message.
// Schedule task if Method-1 followed to implement recurring
// timer task.



}


public synchronized void processUpdateRoute(){

// If link state vectors of all nodes received,
// Yes => Compute route info based on Dijkstra’s algorithm
// and print as per the output format.
// No => ignore the event.
// Schedule task if Method-1 followed to implement recurring
// timer task.


}
```