Evaluation Scheme:-

Day to Day Evaluation: 60 Marks

Viva :   20 Marks

Quiz: 20 Marks

Instructions for the Lab

A. If a student is absent on the day of evaluation, will be awarded ZERO for that evaluation.

B. Turn off your systems before leaving lab. Do not use mobile phone during lab hours.

Lab 6

Objective: Goal of this lab is to familiarize with network simulator and how to run a simple program.

Step #1:-   Create a script that simulates the simplest topology:
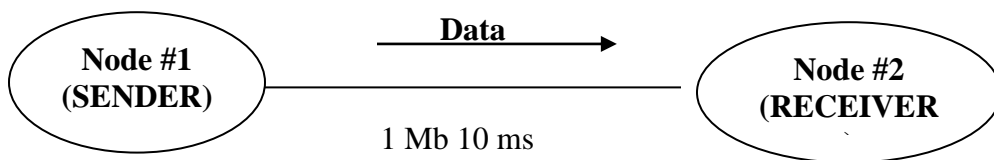
Step #2:-   Now write following script in a text file (with extension of *.tcl):
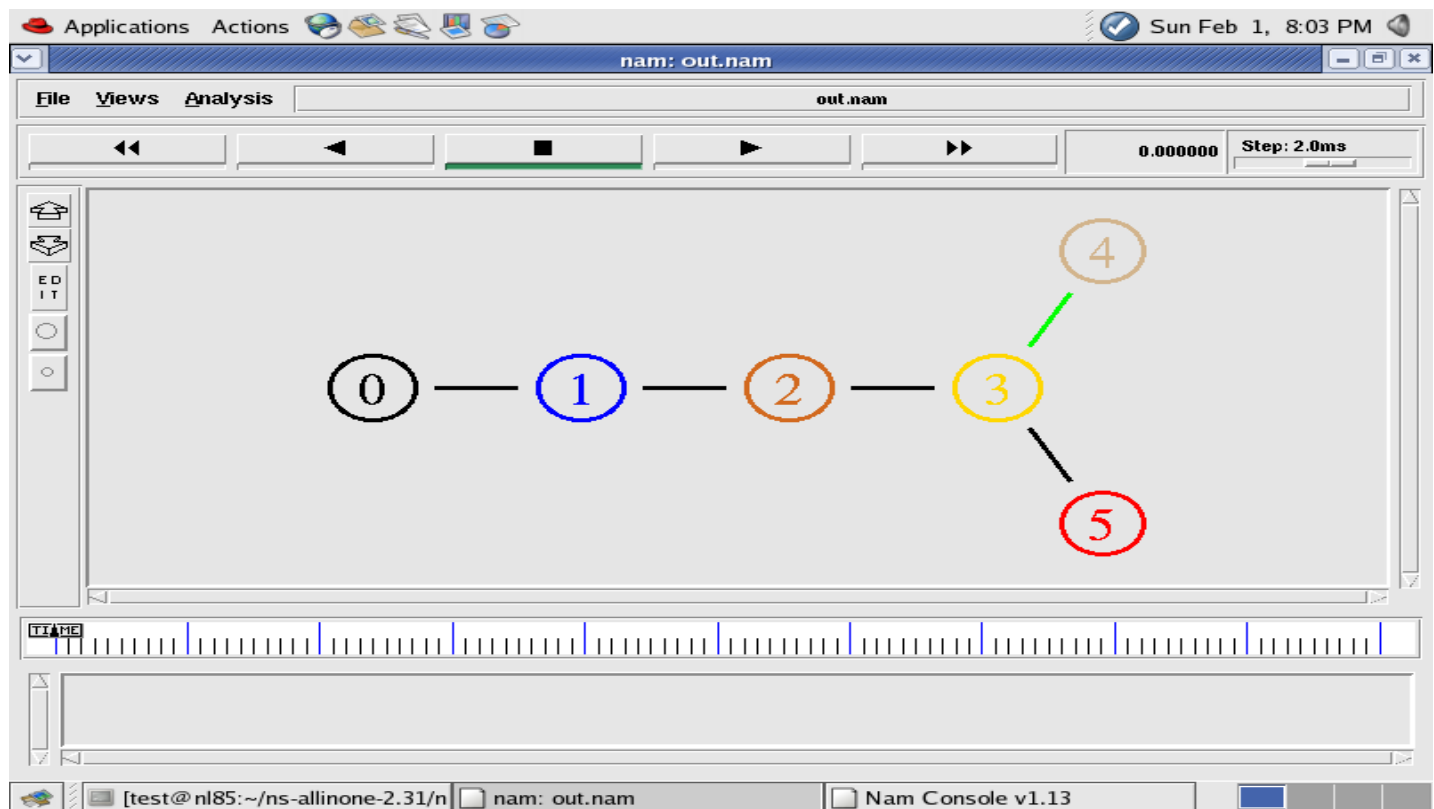
```
#Create a simulator object
        set ns [new Simulator]
#Open the nam trace file
        set nf [open out.nam w]
        $ns namtrace-all $nf
#Define a 'finish' procedure
        proc finish {} {
        global ns nf
        $ns flush-trace
#Close the trace file
        close $nf
#Execute nam on the trace file
        exec nam out.nam&
        exit 0
```
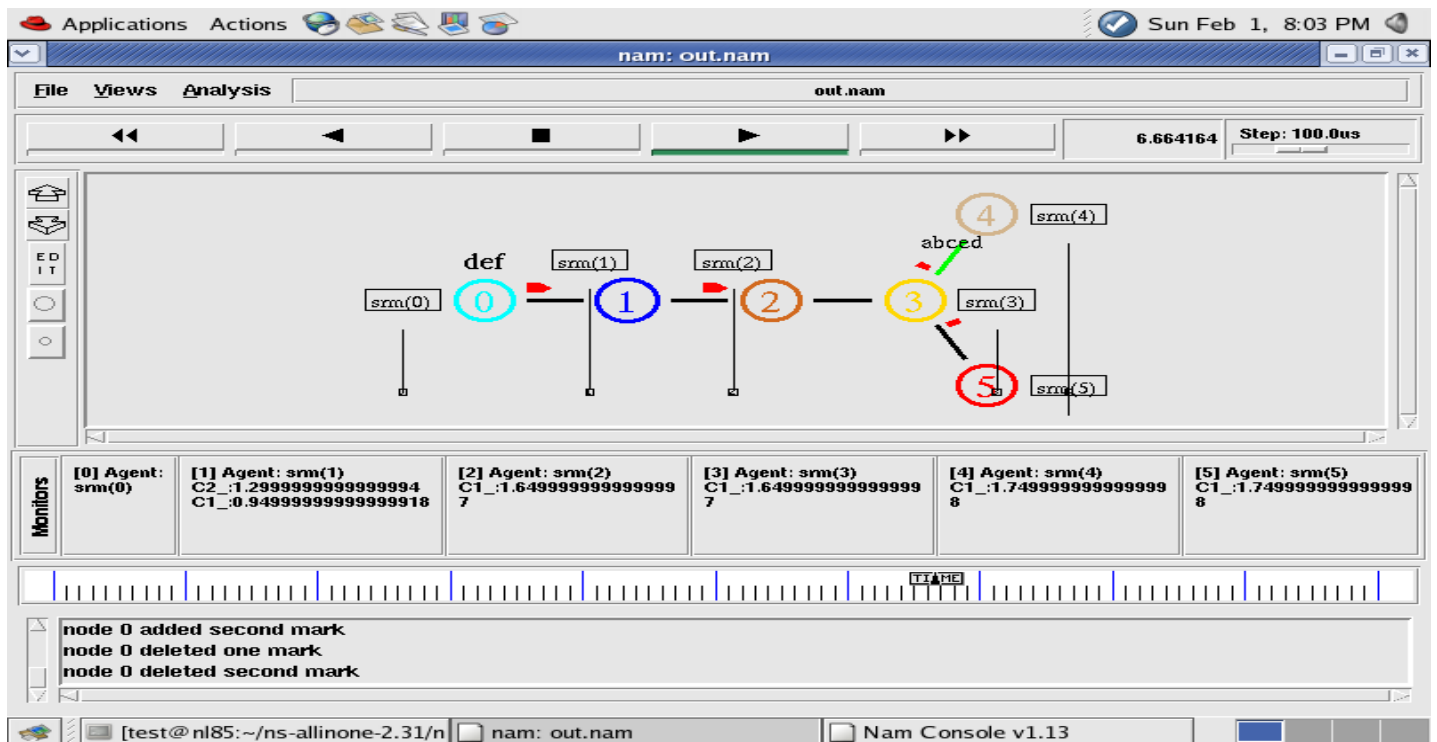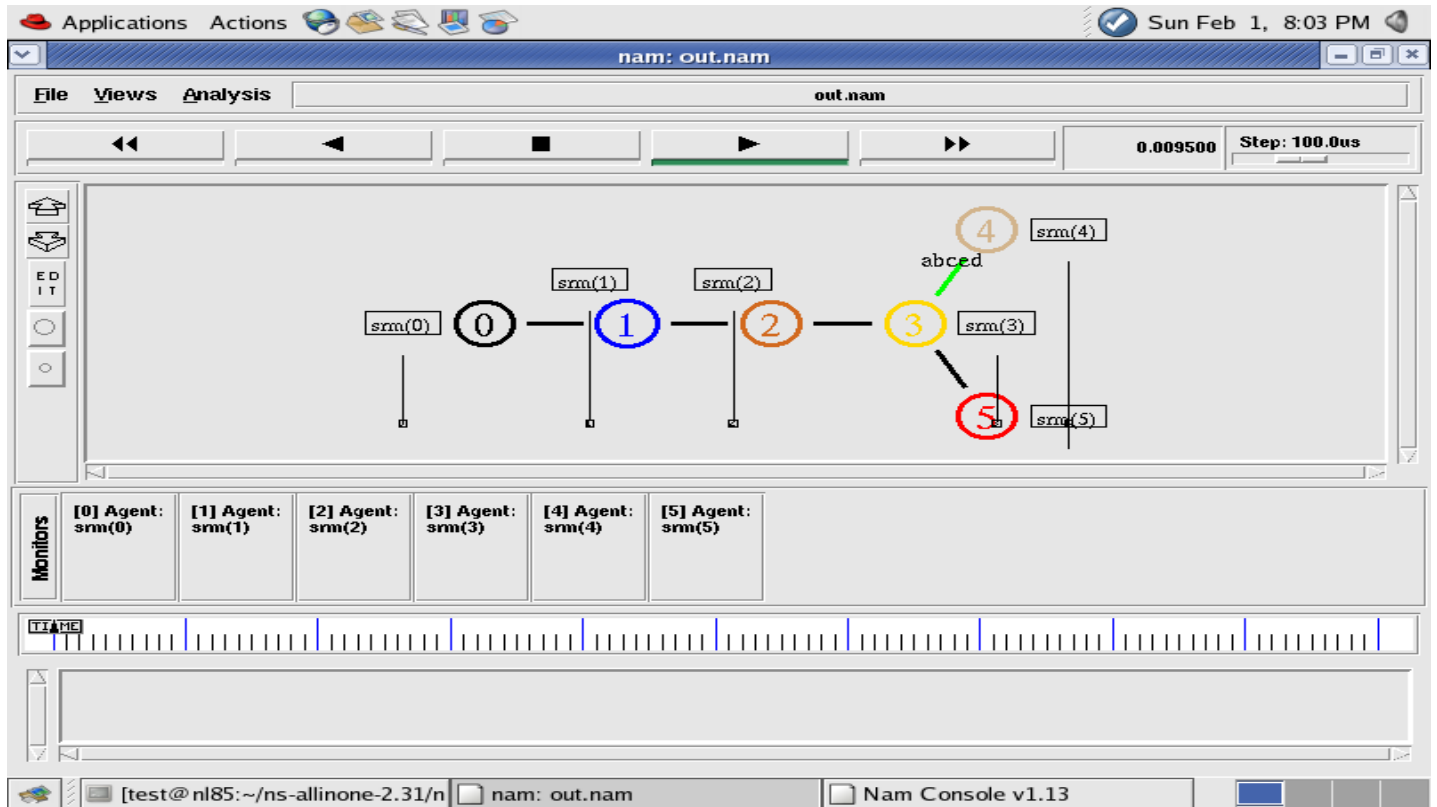
}
#Create two nodes
       set n0 [$ns node]
       set n1 [$ns node]
#Create a duplex link between the nodes
       $ns duplex-link $n0 $n1 1Mb 10ms DropTail
#Call the finish procedure after 5 seconds of simulation time
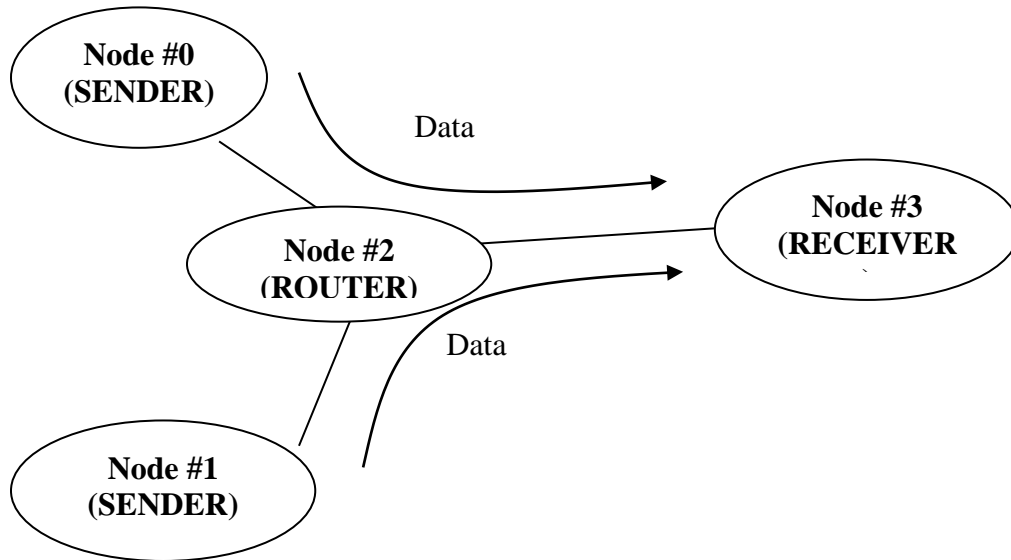 $ns at 5.0 "finish"
#Run the simulation
       $ns run

Step #3:-   **Execute this code:**
             ns example1a.tcl

Example 2:- Build a script to simulate following network simulator scenario:



```
#Create a simulator object
      set ns [new Simulator]
#Define different colors for data flows
      $ns color 1 Blue
      $ns color 2 Red
#Open the nam trace file
      set nf [open out.nam w]
      $ns namtrace-all $nf
#Define a 'finish' procedure
      proc finish {} {
      global ns nf
      $ns flush-trace
#Close the trace file
      close $nf
#Execute nam on the trace file
      exec nam out.nam&
      exit 0
      }
#Create four nodes
      set n0 [$ns node]
      set n1 [$ns node]
      set n2 [$ns node]
      set n3 [$ns node]
#Create links between the nodes
      $ns duplex-link $n0 $n2 1Mb 10ms DropTail
      $ns duplex-link $n1 $n2 1Mb 10ms DropTail
      $ns duplex-link $n3 $n2 1Mb 10ms DropTail
      $ns duplex-link-op $n0 $n2 orient right-down
      $ns duplex-link-op $n1 $n2 orient right-up
```

```
        $ns duplex-link-op $n2 $n3 orient right
#Monitor the queue for the link between node 2 and node 3
        $ns duplex-link-op $n2 $n3 queuePos 0.5
#Create a UDP agent and attach it to node n0
        set udp0 [new Agent/UDP]
        $udp0 set class_ 1
        $ns attach-agent $n0 $udp0
# Create a CBR traffic source and attach it to udp0
        set cbr0 [new Application/Traffic/CBR]
        $cbr0 set packetSize_ 500
        $cbr0 set interval_ 0.005
        $cbr0 attach-agent $udp0
#Create a UDP agent and attach it to node n1
        set udp1 [new Agent/UDP]
        $udp1 set class_ 2
        $ns attach-agent $n1 $udp1
# Create a CBR traffic source and attach it to udp1
        set cbr1 [new Application/Traffic/CBR]
        $cbr1 set packetSize_ 500
        $cbr1 set interval_ 0.005
        $cbr1 attach-agent $udp1
#Create a Null agent (a traffic sink) and attach it to node n3
        set null0 [new Agent/Null]
        $ns attach-agent $n3 $null0
#Connect the traffic sources with the traffic sink
        $ns connect $udp0 $null0
        $ns connect $udp1 $null0
#Schedule events for the CBR agents
        $ns at 0.5 "$cbr0 start"
        $ns at 1.0 "$cbr1 start"
        $ns at 4.0 "$cbr1 stop"
        $ns at 4.5 "$cbr0 stop"
#Call the finish procedure after 5 seconds of simulation time
        $ns at 5.0 "finish"
#Run the simulation
        $ns run
```

Exercise 1:- **Build a script to simulate following network simulator scenario. Apply TCP/FTP at node 1 , 3 and UDP/CBR at node 5.**
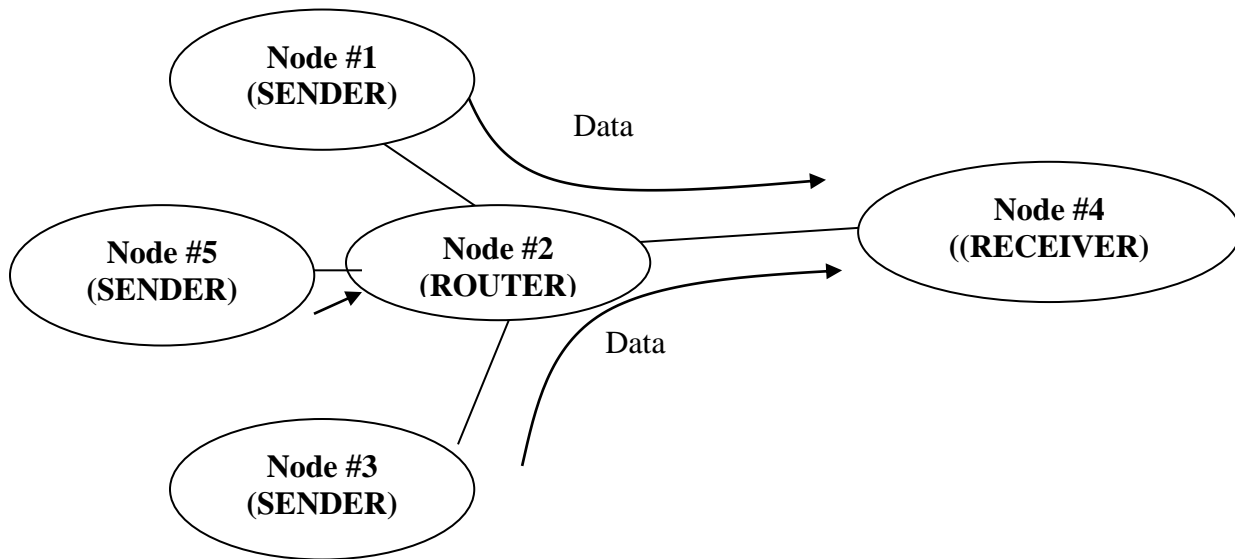
Exercise 2:- **Build a script to simulate following network simulator scenario:**