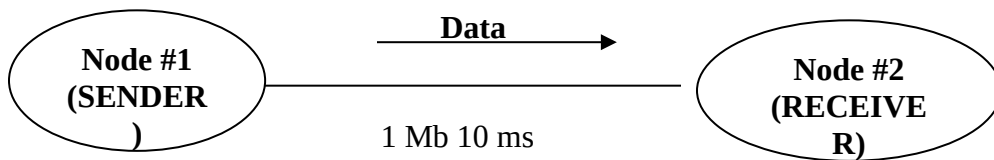


## Lab 5

**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:

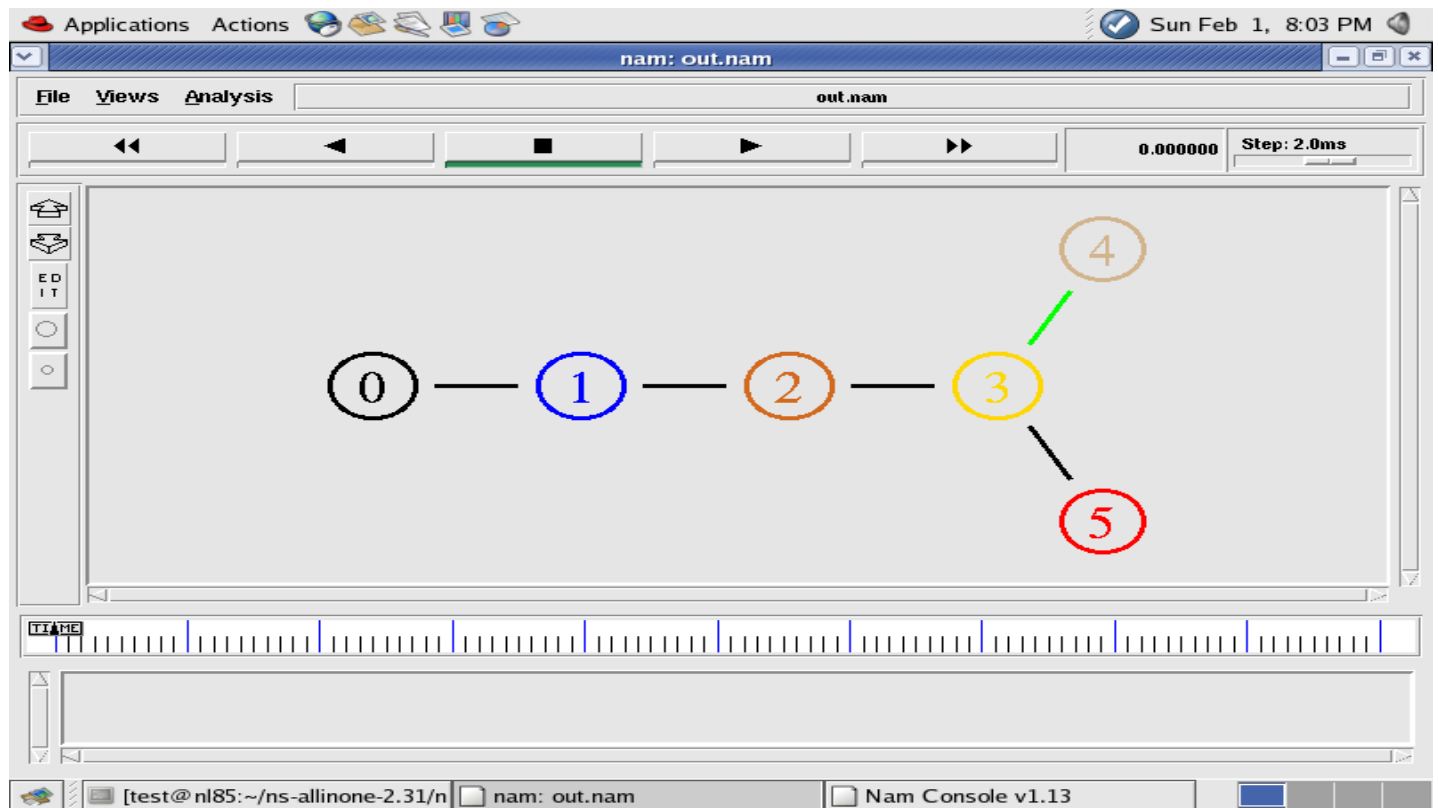
---

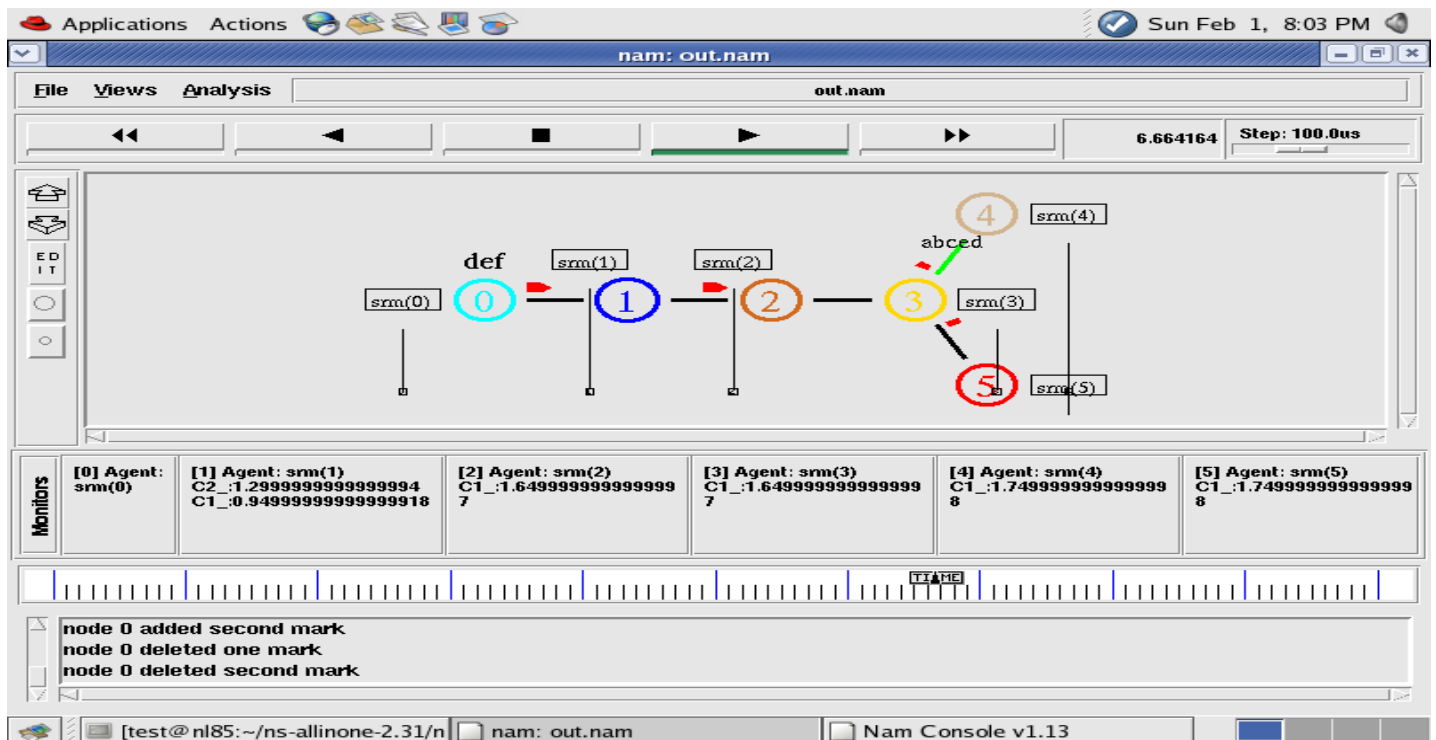
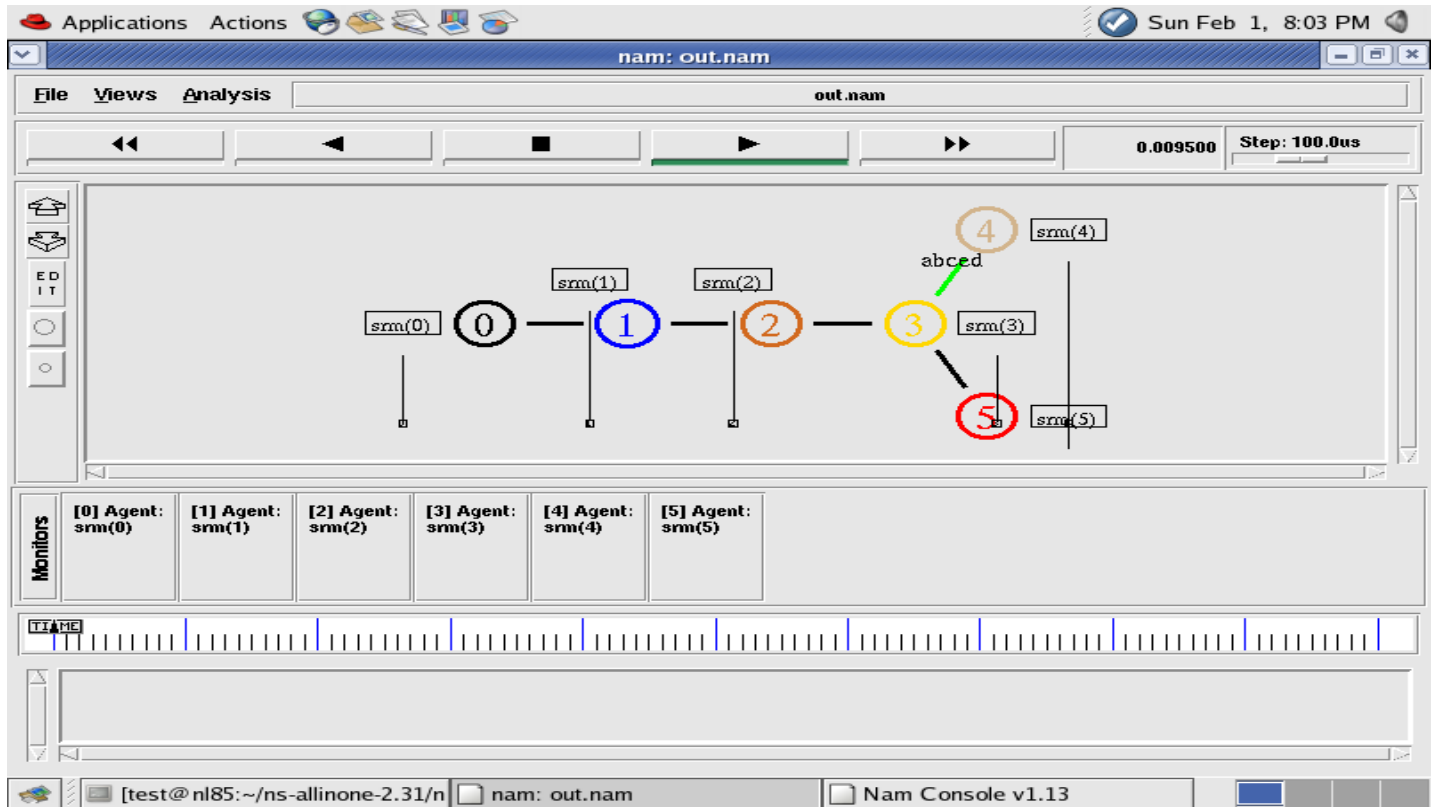


**Step #2:- Now write following script in a text file (with extension of \*.tcl):**

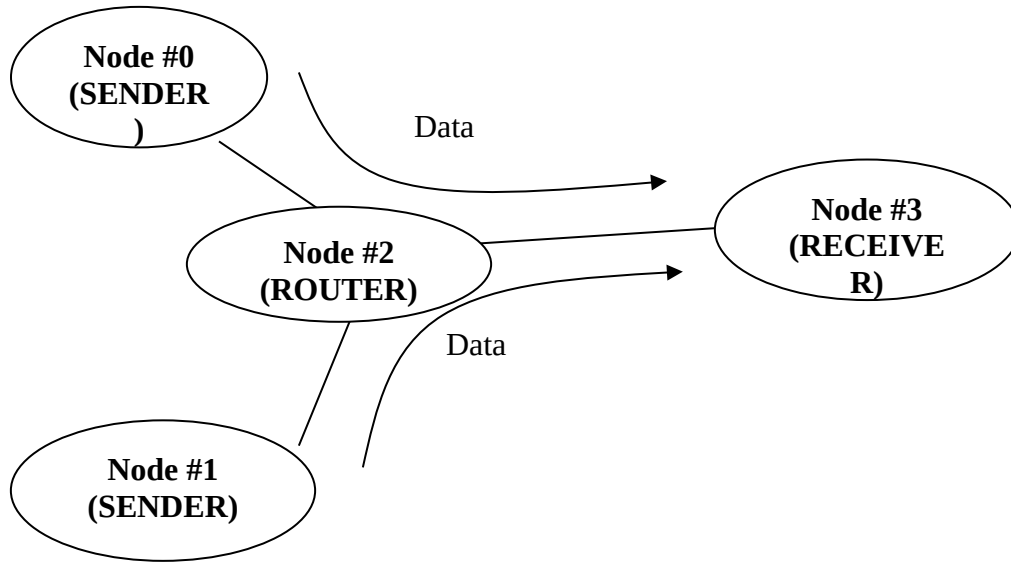
```
#Create a simulator object
set ns [new Simulator]
#Open the nam trace file
set nf [open out.nam w]
$ns namtrace-all $nf
#Define a 'finish' procedure
proc finish {} {
    global ns nf
    $ns flush-trace
}
#Close the trace file
close $nf
#Execute nam on the trace file
exec nam out.nam&
exit 0
}
#Create two nodes
set n0 [$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:**

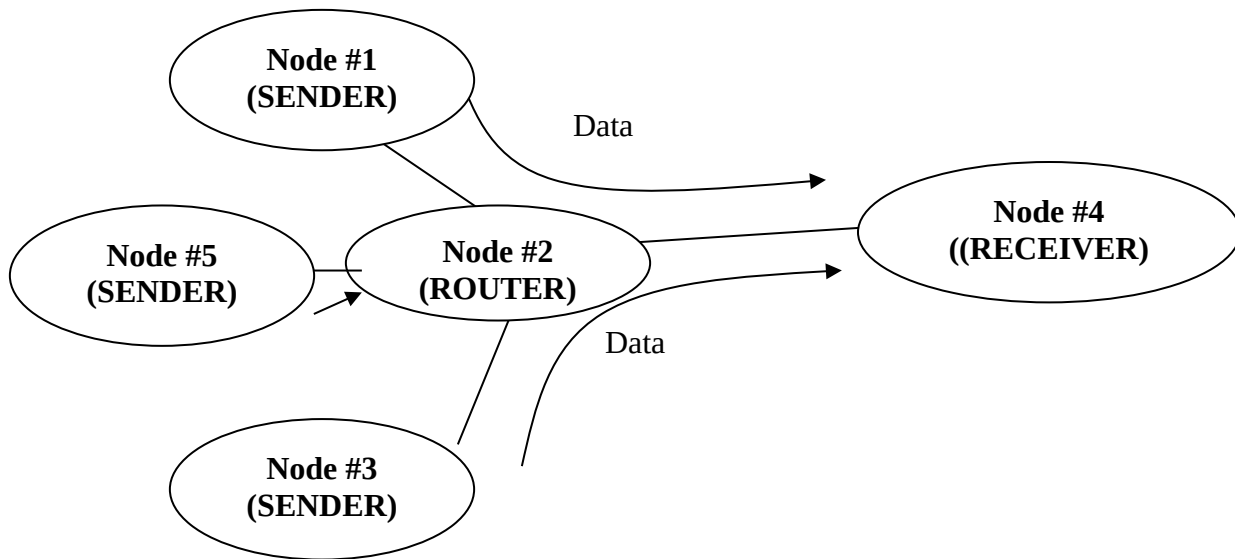


```

#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:

