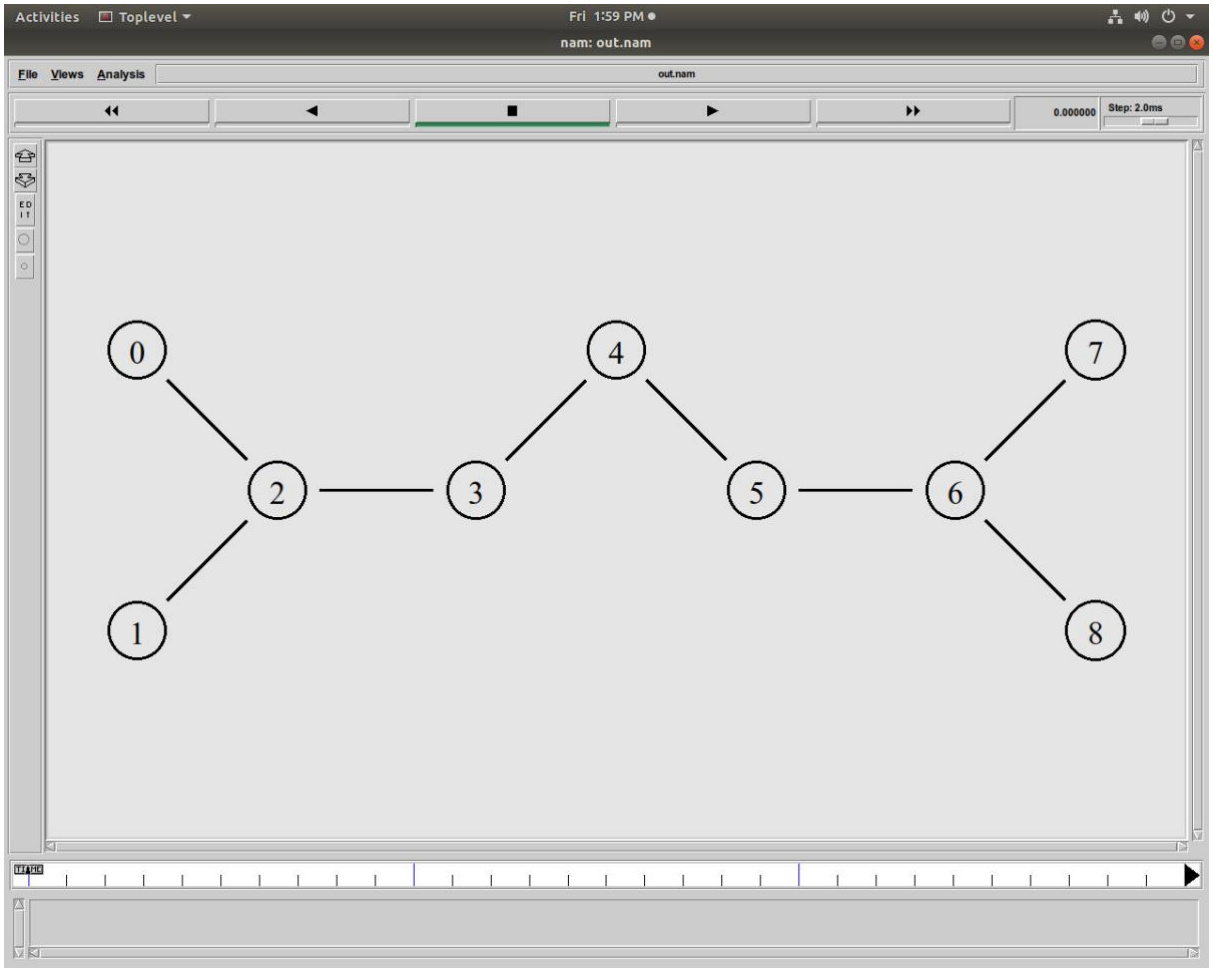
Experiment 7A

```
set ns [new Simulator]

#$ns color 1 Blue
#$ns color 2 Red
set nf [open out.nam w]
$ns namtrace-all $nf


proc finish {} {
    global ns nf
    $ns flush-trace

    close $nf

    exec nam out.nam &
    exit 0
}
set n0 [$ns node]
set n1 [$ns node]
set n2 [$ns node]
set n3 [$ns node]
set n4 [$ns node]
set n5 [$ns node]
set n6 [$ns node]
set n7 [$ns node]
set n8 [$ns node]



$ns duplex-link $n0 $n2 2Mb 20ms DropTail
$ns duplex-link $n1 $n2 2Mb 20ms DropTail
$ns duplex-link $n2 $n3 2mb 20ms DropTail
$ns duplex-link $n3 $n4 2Mb 20ms DropTail
$ns duplex-link $n4 $n5 2Mb 20ms DropTail
$ns duplex-link $n5 $n6 2Mb 20ms DropTail
$ns duplex-link $n6 $n7 2Mb 20ms DropTail
$ns duplex-link $n6 $n8 2Mb 20ms 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-
$ns duplex-link-op $n3 $n4 orient right-up
$ns duplex-link-op $n4 $n5 orient right-down
$ns duplex-link-op $n5 $n6 orient right
$ns duplex-link-op $n6 $n7 orient right-up
$ns duplex-link-op $n6 $n8 orient right-down

$ns run

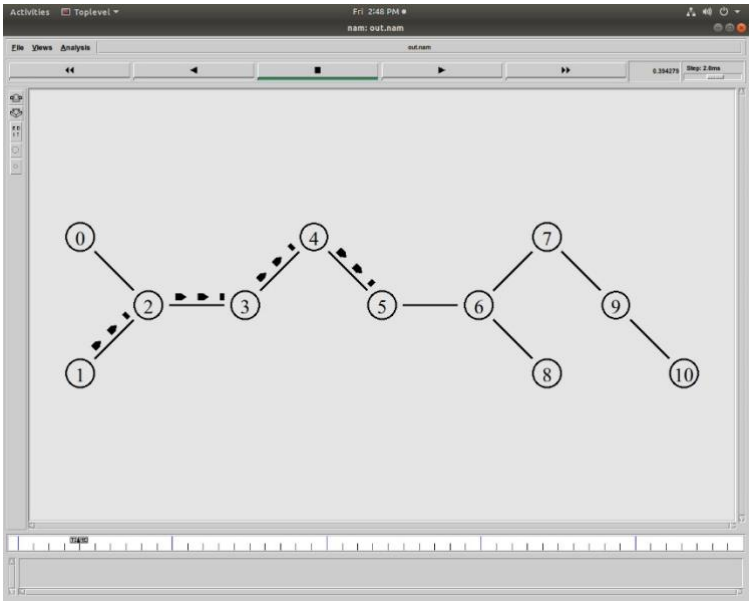


Experiment 7B

```
#Create a simulator object
set ns [new Simulator]

#Define different colors for data flows (for NAM)
$ns color 1 Red
$ns color 2 Black

#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 NAM 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]
set n4 [$ns node]
set n5 [$ns node]
set n6 [$ns node]
set n7 [$ns node]
set n8 [$ns node]
set n9 [$ns node]
set n10 [$ns node]

#Create links between the nodes
$ns duplex-link $n0 $n2 2Mb 20ms DropTail
$ns duplex-link $n1 $n2 2Mb 20ms DropTail
$ns duplex-link $n2 $n3 2mb 20ms DropTail
```

```
$ns duplex-link $n3 $n4 2Mb 20ms DropTail
$ns duplex-link $n4 $n5 2Mb 20ms DropTail
$ns duplex-link $n5 $n6 2Mb 20ms DropTail
$ns duplex-link $n6 $n7 2Mb 20ms DropTail
$ns duplex-link $n6 $n8 2mb 20ms DropTail
$ns duplex-link $n7 $n9 2mb 20ms DropTail
$ns duplex-link $n9 $n10 2mb 20ms DropTail

#Set Queue Size of link (n2-n3) to 10
$ns queue-limit $n2 $n3 10
$ns queue-limit $n3 $n4 10

#Give node position (for NAM)
$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
$ns duplex-link-op $n3 $n4 orient right-up
$ns duplex-link-op $n4 $n5 orient right-down
$ns duplex-link-op $n5 $n6 orient right
$ns duplex-link-op $n6 $n7 orient right-up
$ns duplex-link-op $n6 $n8 orient right-down
$ns duplex-link-op $n7 $n9 orient right-down
$ns duplex-link-op $n9 $n10 orient right-down

#Monitor the queue for link (n2-n3). (for NAM)
$ns duplex-link-op $n2 $n3 queuePos 0.5


#Setup a TCP connection
set tcp [new Agent/TCP]
$tcp set class_ 1
$ns attach-agent $n0 $tcp
set sink [new Agent/TCPSink]
$ns attach-agent $n7 $sink
$ns connect $tcp $sink
$tcp set fid_ 1

#Setup a FTP over TCP connection
set ftp [new Application/FTP]
$ftp attach-agent $tcp
$ftp set type_ FTP
```

```
#Setup a UDP connection
set udp [new Agent/UDP]
$ns attach-agent $n1 $udp
set null [new Agent/Null]
$ns attach-agent $n5 $null
$ns connect $udp $null
$udp set fid_ 2

#Setup a CBR over UDP connection
set cbr [new Application/Traffic/CBR]
$cbr attach-agent $udp
$cbr set type_ CBR
$cbr set packet_size_ 1000
$cbr set rate_ 1.5mb
$cbr set random_ false


#Schedule events for the CBR and FTP agents
$ns at 0.1 "$cbr start"
$ns at 0.7 "$ftp start"
$ns at 3.0 "$ftp stop"
$ns at 4.5 "$cbr stop"

#Detach tcp and sink agents (not really necessary)
$ns at 4.5 "$ns detach-agent $n0 $tcp ; $ns detach-agent $n5 $sink"

#Call the finish procedure after 5 seconds of simulation time
$ns at 5.0 "finish"

#Print CBR packet size and interval
puts "CBR packet size = [$cbr set packet_size_]"
puts "CBR interval = [$cbr set interval_]"

#Run the simulation
$ns run
```


Activities
Toplevel
Fri 2:48 PM
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File
Views
Analysis
out.nam
0
1
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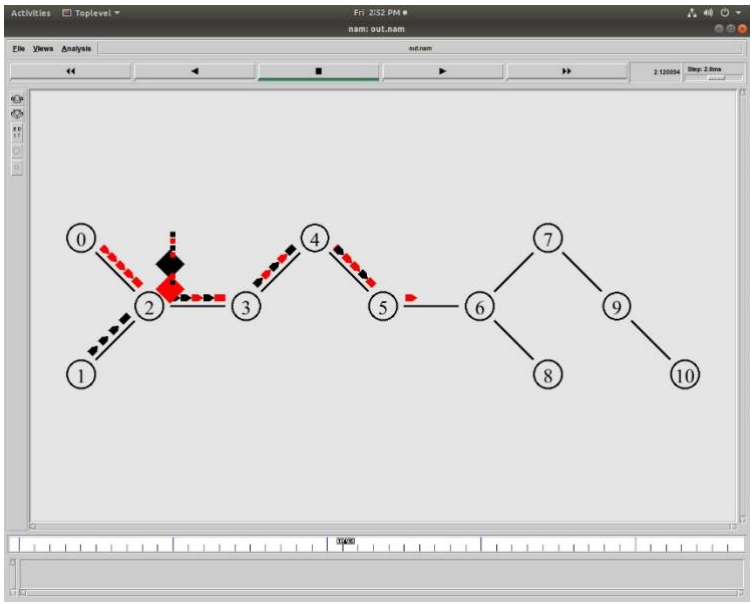
6
7
8
9
10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File
Views
Analysis
out.nam
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1
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3
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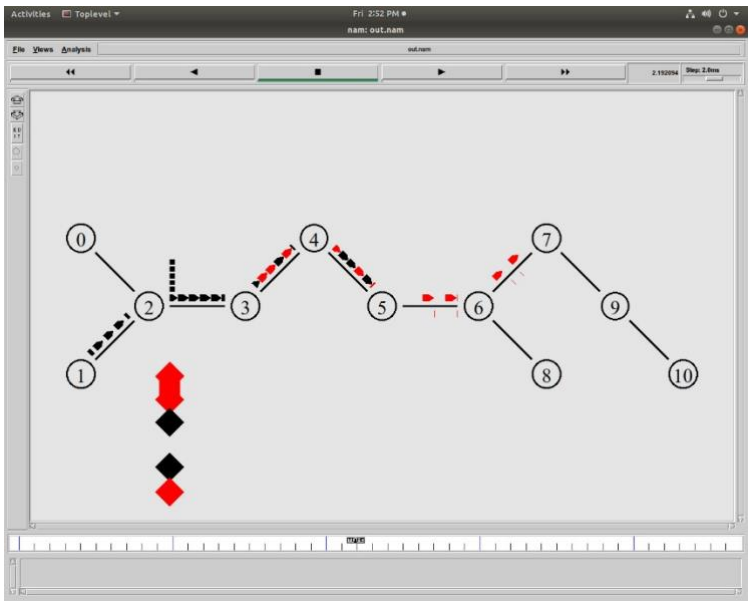
10


Activities
Toplevel
Fri 2:52 PM
nam: out.nam
File
Views
Analysis
out.nam
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