1. Implement three node point-to-point networks with duplex links between them. Set the queue size, vary the bandwidth and find the number of packets dropped.

TCL:

#Create a simulator object
set ns [new Simulator]

#Open the nam trace file
set tf [open lab1.tr w]

$ns trace-all $tf

#Open the nam trace file
set nf [open lab1.nam w]

$ns namtrace-all $nf

#Define a 'finish' procedure
proc finish { } {

global ns nf tf

$ns flush-trace

exec nam lab1.nam &

close $tf

close $nf

exit 0

}

#Creating nodes
set n0 [$ns node]

set n1 [$ns node]

set n2 [$ns node]

set n3 [$ns node]

#Define different colors and labels for data flows

$ns color 1 "red"

$ns color 2 "blue"

$n0 label "Source/udp0"

$n1 label "Source/udp1"

$n2 label "Router"

$n3 label "Destination/Null"

#Create link between nodes
$ns duplex-link $n0 $n2 100Mb 300ms DropTail

$ns duplex-link $n1 $n2 100Mb 300ms DropTail

$ns duplex-link $n2 $n3 1Mb 300ms DropTail

#Set queue size of links
$ns set queue-limit $n0 $n2 50

$ns set queue-limit $n1 $n2 50

$ns set queue-limit $n2 $n3 5

#Setup a UDP connection
set udp0 [new Agent/UDP]

$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
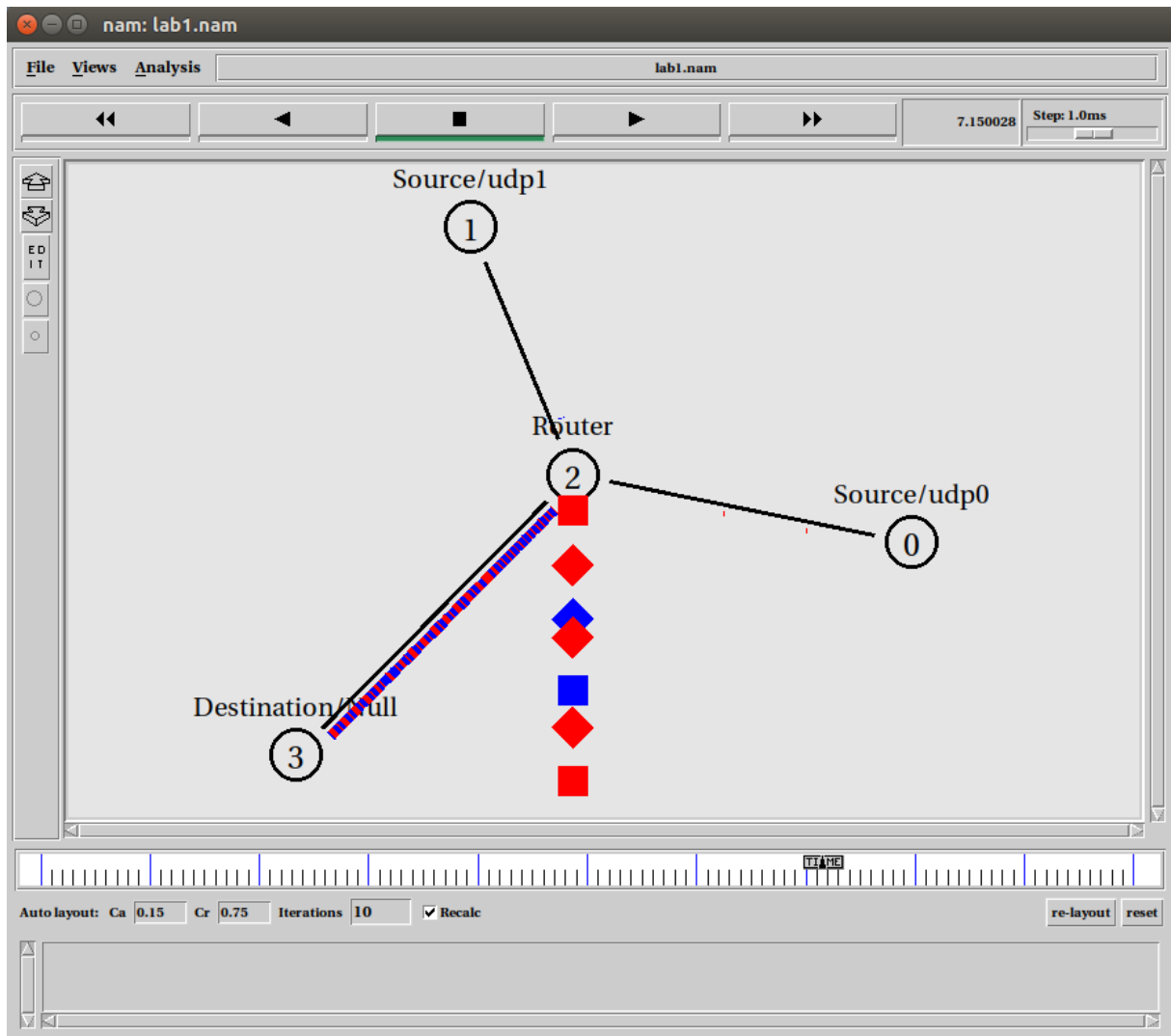
```
$ns at 5.0 "finish"
```

#Run the simulation

```
$ns run
```

AWK:

```
BEGIN{

count=0;

}

{

if($1=="d")

count++

}

END{

printf("The Total no of Packets Drop is :%d\n\n", count)

}
```

Simulated Network:

Packet Dropped:

krishna@ubuntu:~$ awk -f lab1.awk lab1.tr
The Total no of Packets Drop is :708

krishna@ubuntu:~$

OR

<u>Using grep command</u>:   cat lab1.tr | grep ^d | wc -l