Experiment 3:

Implement an Ethernet LAN using n nodes and set multiple traffic nodes and plotcongestion window for different source / destination.

Step1: Open text editor, type the below program and save with extention .tcl (**prog3.tcl**)

```
set ns [new Simulator]
set nf [open prog3.nam w]
$ns namtrace-all $nf
set nd [open prog3.tr w]
$ns trace-all $nd

$ns color 1 Blue
$ns color 2 Red

proc finish { } {
global ns nf nd
$ns flush-trace
close $nf
close $nd
exec nam prog3.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]

$n7 shape box
$n7 color Blue
$n8 shape hexagon
$n8 color Red

$ns duplex-link $n1 $n0 2Mb 10ms DropTail
```

```
$ns duplex-link $n2 $n0 2Mb 10ms DropTail
$ns duplex-link $n0 $n3 1Mb 20ms DropTail

$ns make-lan "$n3 $n4 $n5 $n6 $n7 $n8" 512Kb 40ms LL Queue/DropTail Mac/802_3

$ns duplex-link-op $n1 $n0 orient right-down
$ns duplex-link-op $n2 $n0 orient right-up
$ns duplex-link-op $n0 $n3 orient right

$ns queue-limit $n0 $n3 20

set tcp1 [new Agent/TCP/Vegas]
$ns attach-agent $n1 $tcp1
set sink1 [new Agent/TCPSink]
$ns attach-agent $n7 $sink1
$ns connect $tcp1 $sink1
$tcp1 set class_ 1
$tcp1 set packetsize_ 55

set ftp1 [new Application/FTP]
$ftp1 attach-agent $tcp1

set tfile [open cwnd.tr w]
$tcp1 attach $tfile
$tcp1 trace cwnd_

set tcp2 [new Agent/TCP/Reno]
$ns attach-agent $n2 $tcp2
set sink2 [new Agent/TCPSink]
$ns attach-agent $n8 $sink2
$ns connect $tcp2 $sink2
$tcp2 set class_ 2
$tcp2 set packetSize_ 55

set ftp2 [new Application/FTP]
$ftp2 attach-agent $tcp2

set tfile2 [open cwnd2.tr w]
$tcp2 attach $tfile2
$tcp2 trace cwnd_
```

```
$ns at 0.5 "$ftp1 start"
$ns at 1.0 "$ftp2 start"
$ns at 5.0 "$ftp2 stop"
$ns at 5.0 "$ftp1 stop"

$ns at 5.5 "finish"
$ns run
```

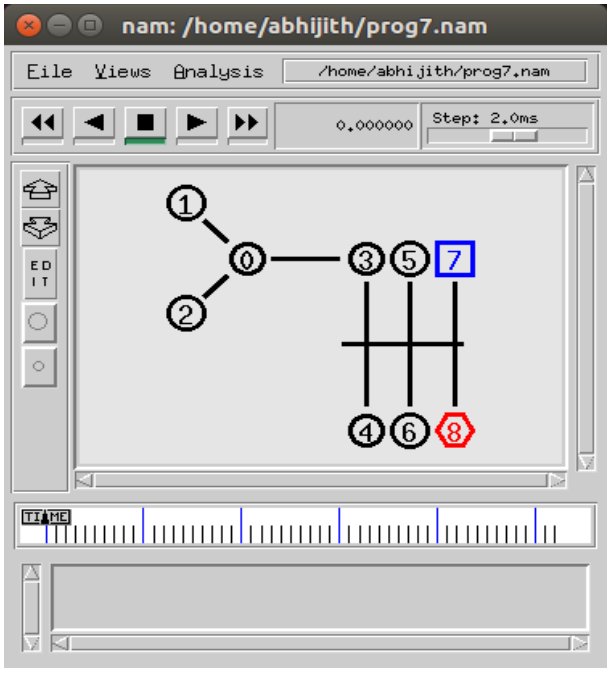
Step2: Open text editor, type the below program and save with extention .awk (**prog3.awk**)

```
BEGIN {
}
{
if($6=="cwnd_") {
printf("%f\t%f\n",$1,$7);
}
}
END {
}
```

Step3: Run the simulation program

[root@localhost~]# ns prog3.tcl

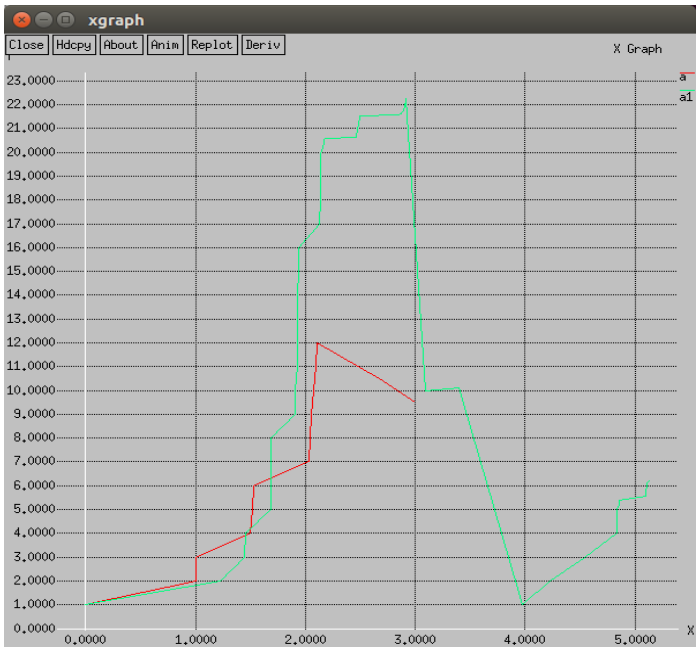
(Here **"ns"** indicates network simulator. We get the topology shown in the snapshot.)



Step 4: Now press the play button in the simulation window and the simulation will begins.

Step 5: After simulation is completed run **awk file** and generate the graph ,

[root@localhost~]# awk –f prog3.awk cwnd.tr> a1
[root@localhost~]# awk –f prog3.awk cwnd2.tr> a2
[root@localhost~]#xgraph a1 a2



Step 6: To see the trace file contents open the file as ,

[root@localhost~]# gedit cwnd.tr

Experiment 4: