Q)Let up the topology with 6 nodes and demonstrate the working of Distance vector routing protocol. The link blw I & 4 breaks at 1.0ms and comes up at 3.0ms. Assume that the source node 0 transmits packets to node 5. Plot the congestion window when TCP sends packets via 4.5,6. Assume your own parameters for bandwidth and delay.

save this file as p3.tcl:

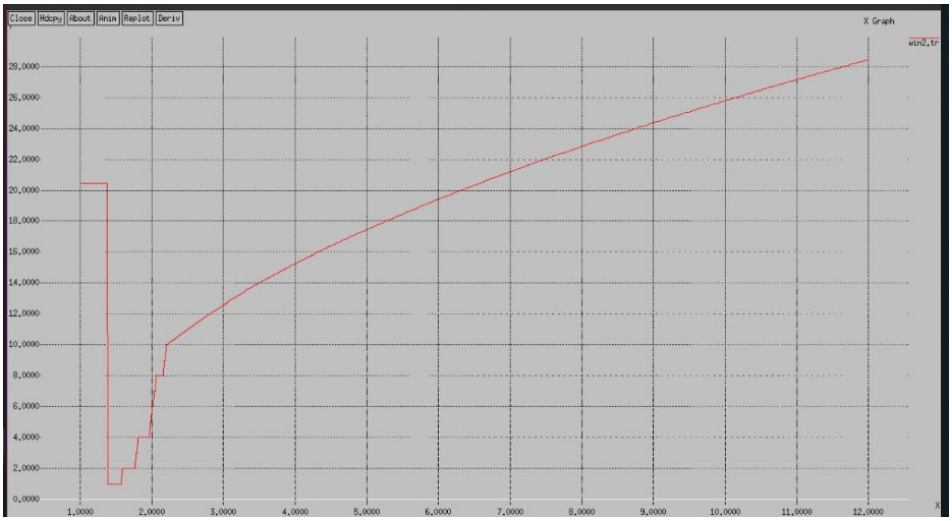
```
set ns [new Simulator]
set tf [open ex3.tr w]
$ns trace-all $tf
set nf [open ex3.nam w]
$ns namtrace-all $nf
set cwind [open win3.tr w]

$ns color 1 Blue
$ns color 2 Red
$ns rtproto DV

set n0 [$ns node]
set n1 [$ns node]
set n2 [$ns node]
set n3 [$ns node]
set n4 [$ns node]
set n5 [$ns node]

$ns duplex-link $n0 $n1 0.3Mb 10ms DropTail
$ns duplex-link $n0 $n2 0.3Mb 10ms DropTail
$ns duplex-link $n2 $n3 0.3Mb 10ms DropTail
$ns duplex-link $n1 $n4 0.3Mb 10ms DropTail
$ns duplex-link $n3 $n5 0.5Mb 10ms DropTail
$ns duplex-link $n4 $n5 0.5Mb 10ms DropTail

$ns duplex-link-op $n0 $n1 orient right-up
$ns duplex-link-op $n0 $n2 orient right-down
$ns duplex-link-op $n2 $n3 orient right
$ns duplex-link-op $n1 $n4 orient right
$ns duplex-link-op $n3 $n5 orient right-up
$ns duplex-link-op $n4 $n5 orient right-down

set tcp [new Agent/TCP]
$ns attach-agent $n0 $tcp
set sink [new Agent/TCPSink]
$ns attach-agent $n4 $sink
$ns connect $tcp $sink
$tcp set fid_ 1

set ftp [new Application/FTP]
$ftp attach-agent $tcp

$ns rtmodel-at 1.0 down $n1 $n4
$ns rtmodel-at 3.0 up $n1 $n4
```

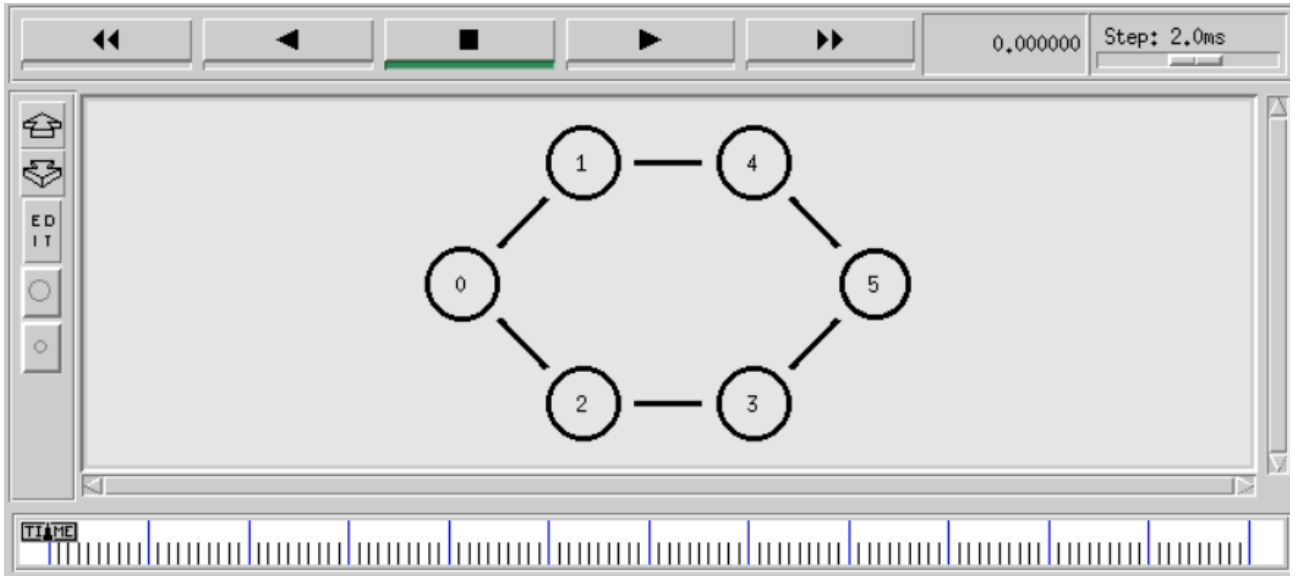
```
$ns at 0.1 "$ftp start"
$ns at 12.0 "finish"

proc plotWindow {tcpSource file} {
global ns
set time 0.01
set now [$ns now]
set cwnd [$tcpSource set cwnd_]
puts $file "$now $cwnd"
$ns at [expr $now + $time] "plotWindow $tcpSource $file"
}

$ns at 1.0 "plotWindow $tcp $cwind"

proc finish {} {
global ns tf nf cwind
$ns flush-trace
close $tf
close $nf
exec nam ex3.nam &
exec xgraph win3.tr &
exit 0
}

$ns run
```

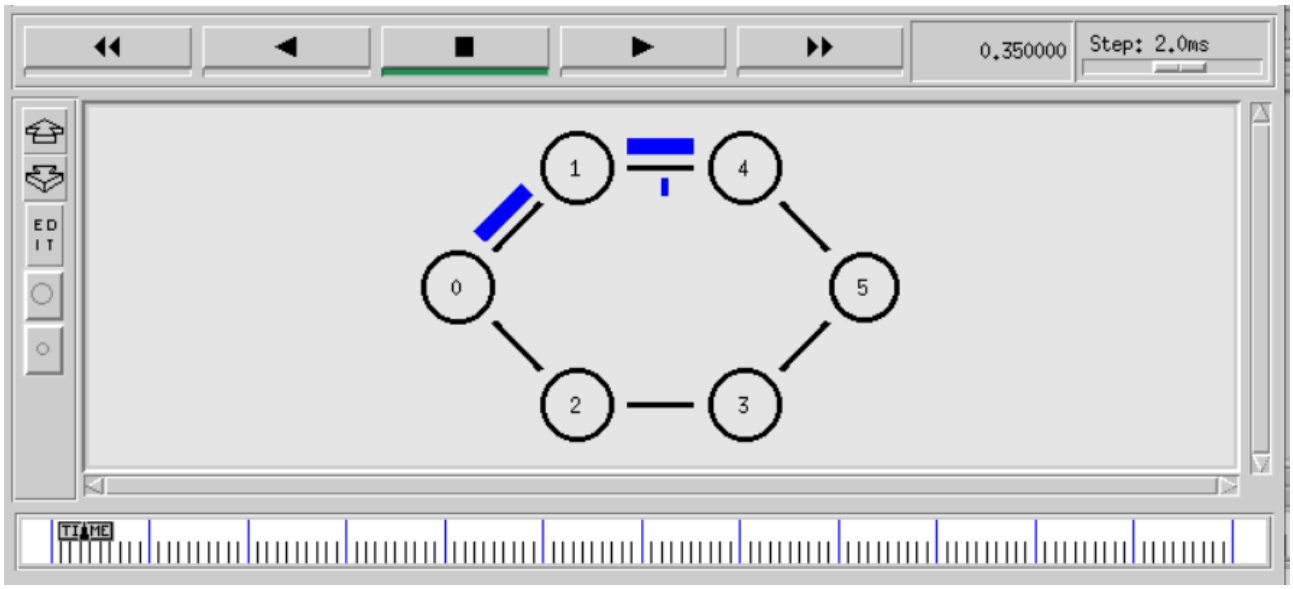
Execution commands:

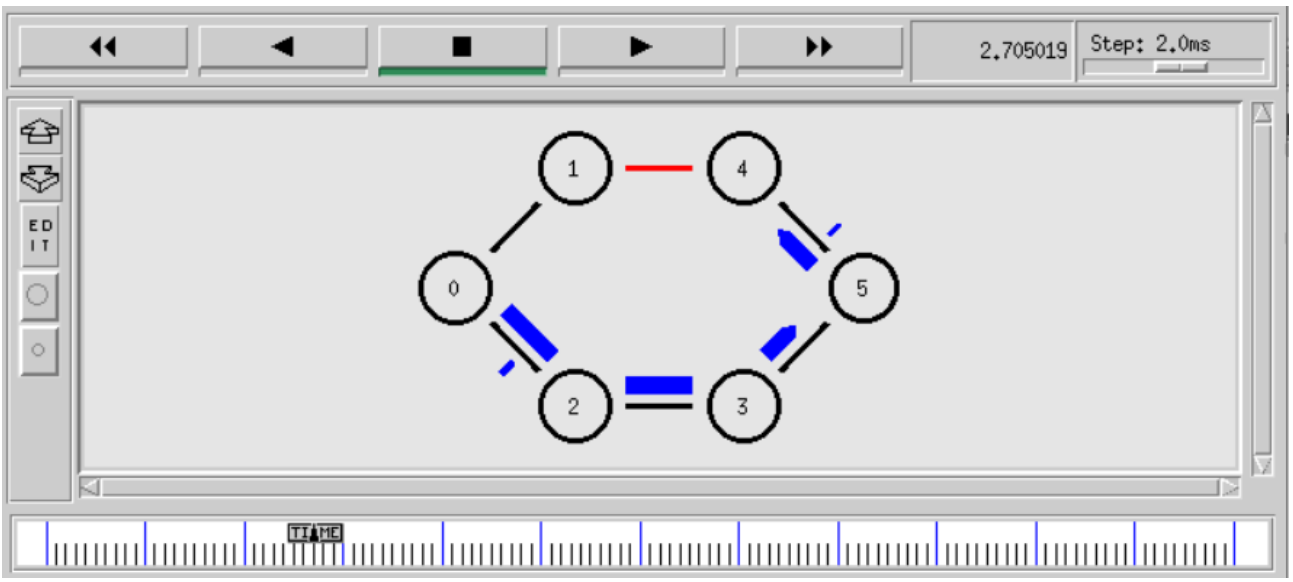
1) ns p3.tcl

Outputs:




0.000000
Step: 2.0ms
ED
IT
TIME
0
1
2
3
4
5


0.350000
Step: 2.0ms
ED
IT
TIME
0
1
2
3
4
5


2.705019
Step: 2.0ms
ED
IT
TIME
0
1
2
3
4
5