3. Simulate the transmission of ping messages over a network topology consisting of 6 nodes and find the number of packets dropped due to congestion.

```
set ns [new Simulator]
set tf [open lab2.tr w]
$ns trace-all $tf
setnf [open lab2.nam w]
$ns namtrace-all $nf

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]

$n0 label "Ping0"
$n4 label "Ping4"
$n5 label "Ping5"
$n6 label "Ping6"
$n2 label "Router"

$ns color 1 "red"
$ns color 2 "green"

$ns duplex-link $n0 $n2 100Mb 300ms DropTail
$ns duplex-link $n2 $n6 1Mb 300ms DropTail
$ns duplex-link $n5 $n2 100Mb 300ms DropTail
$ns duplex-link $n2 $n4 1Mb 300ms DropTail
$ns duplex-link $n3 $n2 1Mb 300ms DropTail
$ns duplex-link $n1 $n2 1Mb 300ms DropTail

$ns queue-limit $n0 $n2 5
$ns queue-limit $n2 $n6 2
$ns queue-limit $n2 $n4 3
$ns queue-limit $n5 $n2 5

set ping0 [new Agent/Ping]
$ns attach-agent $n0 $ping0

set ping4 [new Agent/Ping]
$ns attach-agent $n4 $ping4

set ping5 [new Agent/Ping]
$ns attach-agent $n5 $ping5
set ping6 [new Agent/Ping]
```

```
$ns attach-agent $n6 $ping6

$ping0 set packetSize_ 50000
$ping0 set interval_ 0.0001
$ping5 set packetSize_ 60000
$ping5 set interval_ 0.00001

$ping0 set class_ 1
$ping5 set class_ 2
$ns connect $ping0 $ping4
$ns connect $ping5 $ping6

Agent/Ping instprocrecv {from rtt} {
$self instvar node_

puts " The node [$node_ id] received an reply from $from
with round trip time of $rtt"
}

proc finish {} {
global ns nftf
execnam lab4.nam &
$ns flush-trace
close $tf
close $nf
exit 0
}

$ns rtmodel-at 0.9 down $n2 $n6
$ns rtmodel-at 1.5 up $n2 $n6
$ns at 0.1 "$ping0 send"
$ns at 0.2 "$ping0 send"
$ns at 0.3 "$ping0 send"
$ns at 0.4 "$ping0 send"
$ns at 0.5 "$ping0 send"
$ns at 0.6 "$ping0 send"
$ns at 0.7 "$ping0 send"
$ns at 0.8 "$ping0 send"
$ns at 0.9 "$ping0 send"
$ns at 1.0 "$ping0 send"
$ns at 1.1 "$ping0 send"
$ns at 1.2 "$ping0 send"
$ns at 1.3 "$ping0 send"
$ns at 1.4 "$ping0 send"
$ns at 1.5 "$ping0 send"
$ns at 1.6 "$ping0 send"
$ns at 1.7 "$ping0 send"
$ns at 1.8 "$ping0 send"
```

$ns at 0.1 "$ping5 send"
$ns at 0.2 "$ping5 send"
$ns at 0.3 "$ping5 send"
$ns at 0.4 "$ping5 send"
$ns at 0.5 "$ping5 send"
$ns at 0.6 "$ping5 send"
$ns at 0.7 "$ping5 send"
$ns at 0.8 "$ping5 send"
$ns at 0.9 "$ping5 send"
$ns at 1.0 "$ping5 send"
$ns at 1.1 "$ping5 send"
$ns at 1.2 "$ping5 send"
$ns at 1.3 "$ping5 send"
$ns at 1.4 "$ping5 send"
$ns at 1.5 "$ping5 send"
$ns at 1.6 "$ping5 send"
$ns at 1.7 "$ping5 send"
$ns at 1.8 "$ping5 send"
$ns at 5.0 "finish"
$ns run

Awk Script:
```
BEGIN {
#include<stdio.h>
count=0;
}
{
if($1=="d")
count++
}
END{
printf("The Total no of Packets Dropped due toCongestion:%d
", count)
}
```

Output:
ns lab4.tcl
awk –f lab4.awk lab4.tr
The Total no of packets dropped due to
congestion : 345

Snapshot: