1)Simulate a four node point-to-point network with duplex link as follows: n0-n2, nl-n2 and n2-n3 Apply TCP agent between. no-n3 and UDP agent between n1-n3 Apply relevant applications over TCP and UDP agents. Set the queue size and vary the bandwidth - Find the number of packet dropped and received by TCP/UDP using awk script and grep command

save the file as p1.tcl:

```
set ns [new Simulator]
set tf [open ex1.tr w]
$ns trace-all $tf
set nf [open ex1.nam w]
$ns namtrace-all $nf

#nodes
set n0 [$ns node]
set n1 [$ns node]
set n2 [$ns node]
set n3 [$ns node]

#link
$ns duplex-link $n0 $n2 2mb 2ms DropTail
$ns duplex-link $n1 $n2 2mb 2ms DropTail
$ns duplex-link $n2 $n3 0.4mb 10ms DropTail
#$ns queue-limit $n0 $n1 5

#Application
set udp1 [new Agent/UDP]
$ns attach-agent $n0 $udp1
set null1 [new Agent/Null]
$ns attach-agent $n3 $null1

set cbr1 [new Application/Traffic/CBR]
$ns connect $udp1 $null1
$cbr1 attach-agent $udp1
$ns at 1.1 "$cbr1 start"

set tcp1 [new Agent/TCP]
$ns attach-agent $n3 $tcp1
set sink [new Agent/TCPSink]
$ns attach-agent $n1 $sink
$ns connect $tcp1 $sink

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

$ns at 0.1 "$ftp start"
$ns at 10.0 "finish"

proc finish {} {
        global ns tf nf
```

```
        $ns flush-trace
        close $tf
        close $nf
        puts "running nam..."
        exec nam ex1.nam &
        exit 0
}

$ns run
```
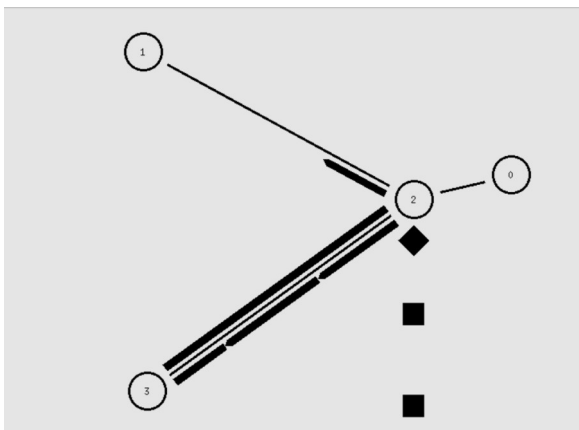
save the file as p1.awk:

```
BEGIN {
tcp_count=0 ;
udp_count=0;
} {
if ($1=="d" && $5 == "tcp")
tcp_count++;
if ($1== "d" && $5=="cbr")
udp_count++;
}
END {
printf("Number of packet dropped in TCP %d\n", tcp_count);
printf("Number of packet dropped in UDP %d\n", udp_count);
}
```

Execution commands:
1) ns p1.tcl
2) awk -f p1.awk ex1.tr

Outputs:


```
Number of packet dropped in TCP 0
Number of packet dropped in UDP 283
```