



# Assignment-3

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CSE

## Write a socket program in C to determine class, Network and Host ID of an IPv4 address.

Ranges 127.x.x.x are reserved for the loopback or localhost, for example, 127.0.0.1 is the loopback address. Range 255.255.255.255 broadcasts to all hosts on the local network.

```

1:krishna@wired:~/Documents/csn361/3
krishna@wired:~/Documents/csn361/3$ ls
1 2_cli 2_ser 3.nam 4.nam 5.nam html rtf
1.c 2_cli.c 2_ser.c 3.tcl 4.tcl 5.tcl man xml
krishna@wired:~/Documents/csn361/3$ gcc -o 1 1.c
krishna@wired:~/Documents/csn361/3$ ./1 1.0.0.1
Given IP address belongs to Class A
Network ID is 1
Host ID is 0.0.1
krishna@wired:~/Documents/csn361/3$ ./1 126.255.255.255
Given IP address belongs to Class A
Network ID is 126
Host ID is 255.255.255
krishna@wired:~/Documents/csn361/3$ clear
krishna@wired:~/Documents/csn361/3$ ls
1 1.c 2_cli 2_cli.c 2_ser 2_ser.c 3.nam 3.tcl 4.nam 4.tcl 5.nam 5.tcl html man rtf xml
krishna@wired:~/Documents/csn361/3$ gcc -o 1 1.c
krishna@wired:~/Documents/csn361/3$ ./1 1.0.0.1
Given IP address belongs to Class A
Network ID is 1
Host ID is 0.0.1
krishna@wired:~/Documents/csn361/3$ ./1 126.255.255.254
Given IP address belongs to Class A
Network ID is 126
Host ID is 255.255.254
krishna@wired:~/Documents/csn361/3$ ./1 128.1.0.1
Given IP address belongs to Class B
Network ID is 128.1
Host ID is 0.1
krishna@wired:~/Documents/csn361/3$ ./1 191.255.255.254
Given IP address belongs to Class B
Network ID is 191.255
Host ID is 255.254
krishna@wired:~/Documents/csn361/3$ ./1 192.0.0.1
Given IP address belongs to Class C
Network ID is 192.0.0
Host ID is 1
krishna@wired:~/Documents/csn361/3$ ./1 233.255.254.254
Given IP address belongs to Class D
In this class, IP address is not divided into Network and Host ID
krishna@wired:~/Documents/csn361/3$ ./1 223.255.254.254
Given IP address belongs to Class C
Network ID is 223.255.254
Host ID is 254
krishna@wired:~/Documents/csn361/3$ ./1 224.0.0.0
Given IP address belongs to Class D
In this class, IP address is not divided into Network and Host ID
krishna@wired:~/Documents/csn361/3$ ./1 239.255.255.255
Given IP address belongs to Class D
In this class, IP address is not divided into Network and Host ID
krishna@wired:~/Documents/csn361/3$ ./1 127.0.0.1
Given IP address belongs to Class E
In this class, IP address is not divided into Network and Host ID
krishna@wired:~/Documents/csn361/3$

```

Class	Address range	Supports
Class A	1.0.0.1 to 126.255.255.254	Supports 16 million hosts on each of 127 networks.
Class B	128.1.0.1 to 191.255.255.254	Supports 65,000 hosts on each of 16,000 networks.
Class C	192.0.1.1 to 223.255.254.254	Supports 254 hosts on each of 2 million networks.
Class D	224.0.0.0 to 239.255.255.255	Reserved for multicast groups.
Class E	240.0.0.0 to 254.255.255.254	Reserved for future use, or research and development purposes.

## Write a C program to demonstrate File Transfer using UDP(User Datagram Protocol).

User Datagram Protocol (UDP) is part of the Internet Protocol suite used by programs running on different computers on a network. UDP is used to send short messages called datagrams but overall, it is an unreliable, connectionless protocol. UDP is officially defined in RFC 768 and was formulated by David P. Reed.

```

1: krishna@wired: ~/Documents/csn361/3
krishna@wired:~/Documents/csn361/3$ ./2_ser
Waiting for file name...
File Name Received: 3.tcl
Waiting for file name...

2: krishna@wired:~/Documents/csn361/3$ ./2_cli 127.0.0.1
Please enter file name to receive:
3.tcl

-----File Received-----
## \file 3.tcl
# File documentation
## Documented var \c ns
#\setup
set ns [new Simulator]
# setting up the simulator
#\setup

#\color
Sns color 0 Red
Sns color 1 Blue
Sns color 2 Azure
Sns color 3 Coral
Sns color 4 Cyan
# setting up required colors
#\color

## Nantrace
#\trace
set f [open 3.nan w]
Sns nantrace-all $f
# setting trace into 3.nan file
#\trace

## proc \c finish
# \param[] no arguments
proc finish {} {
    global ns f
    Sns flush-trace
    close $f
    exec nan 3.nan &
    exit 0
}

puts "Enter no. of Nodes: "
gets stdin N
set n(0) [Sns node]
for {set i 1} {$i < $N} {incr i} {
    set n($i) [Sns node]
    Sns duplex-link $n($i) $n(0) 1Mb 10ms DropTail
}

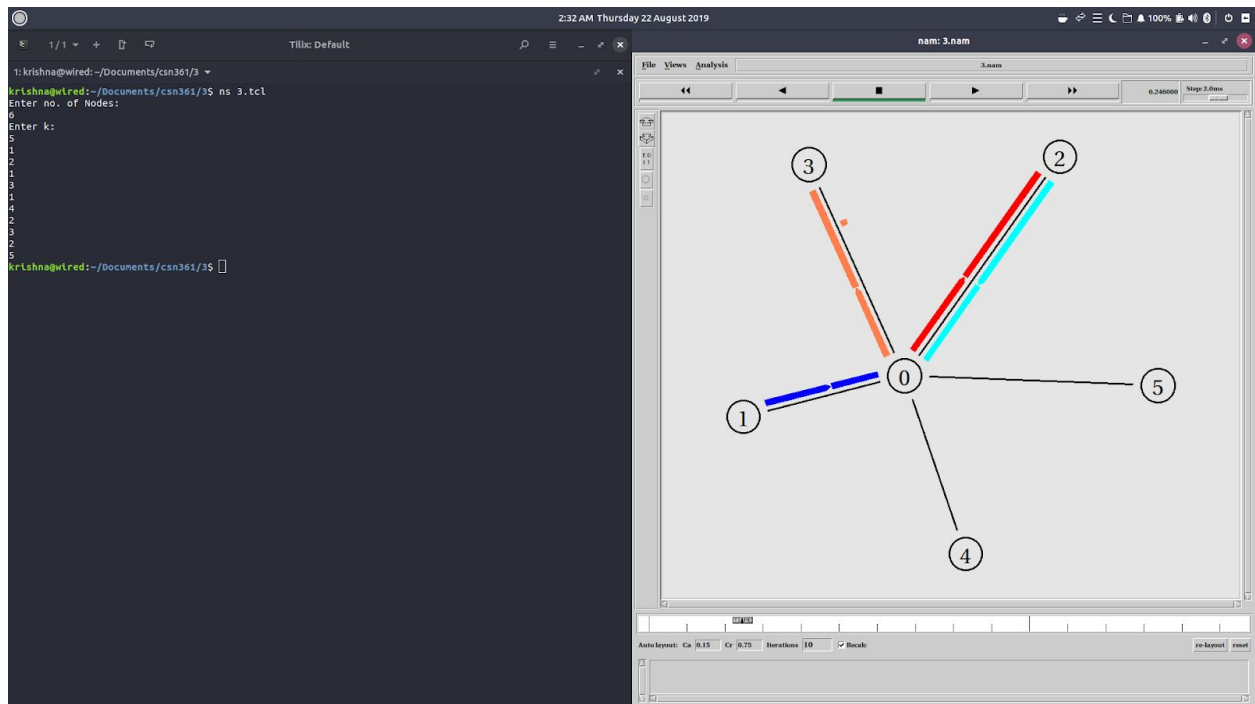
puts "Enter k: "
gets stdin k
for {set i 0} {$i < $k} {incr i} {
    gets stdin i1
    gets stdin i2
    set tcp [new Agent/TCP]

```

UDP network traffic is organized in the form of datagrams, which comprise one message units. The first eight bytes of a datagram contain header information, while the remaining bytes contain message data. A UDP datagram header contains four fields of two bytes each:

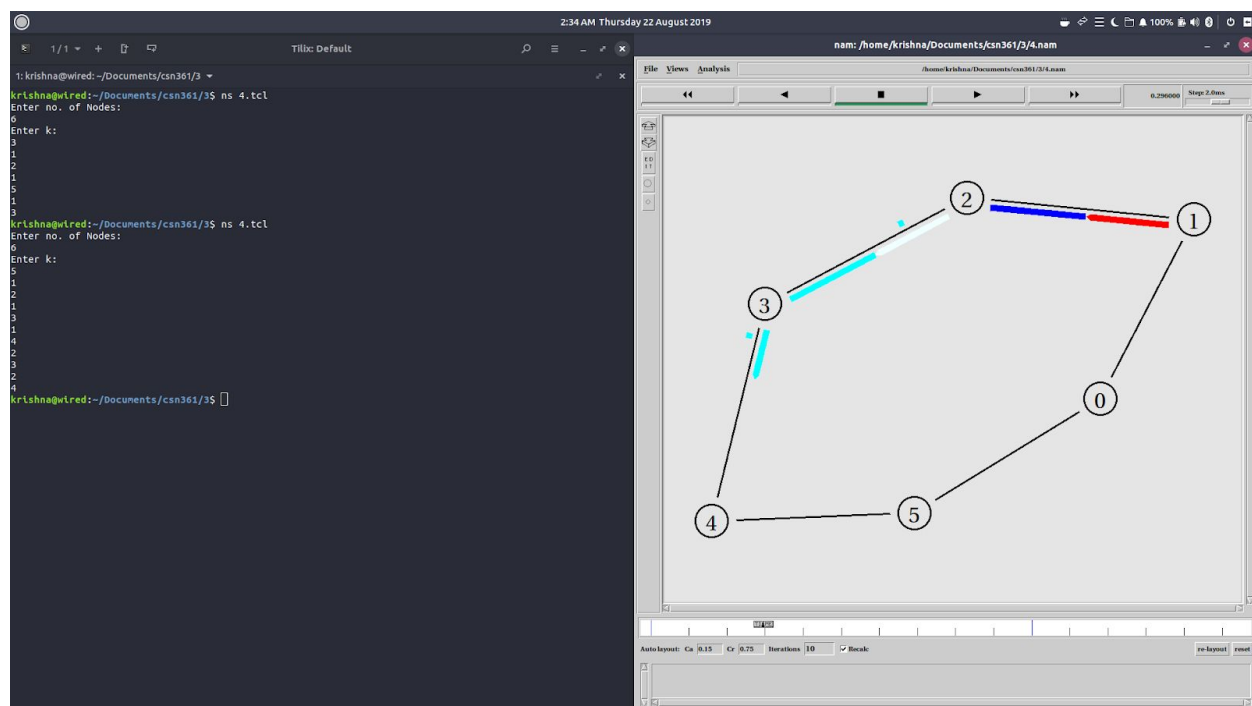
- Source port number
- Designated port number
- Datagram size
- Checksum

Write a TCL code for network simulator NS2 to demonstrate the star topology among a set of computer nodes. Given N nodes, one node will be assigned as the central node and the other nodes will be connected to it to form the star. You have to set up a TCP connection between k pairs of nodes and demonstrate the packet transfer between them using Network Animator (NAM). Use File Transfer protocol (FTP) for the same. Each link should have different color of packets to differentiate the packets transferred between each pair of nodes. The program should take the number of nodes (N) as input followed by k pairs of nodes.



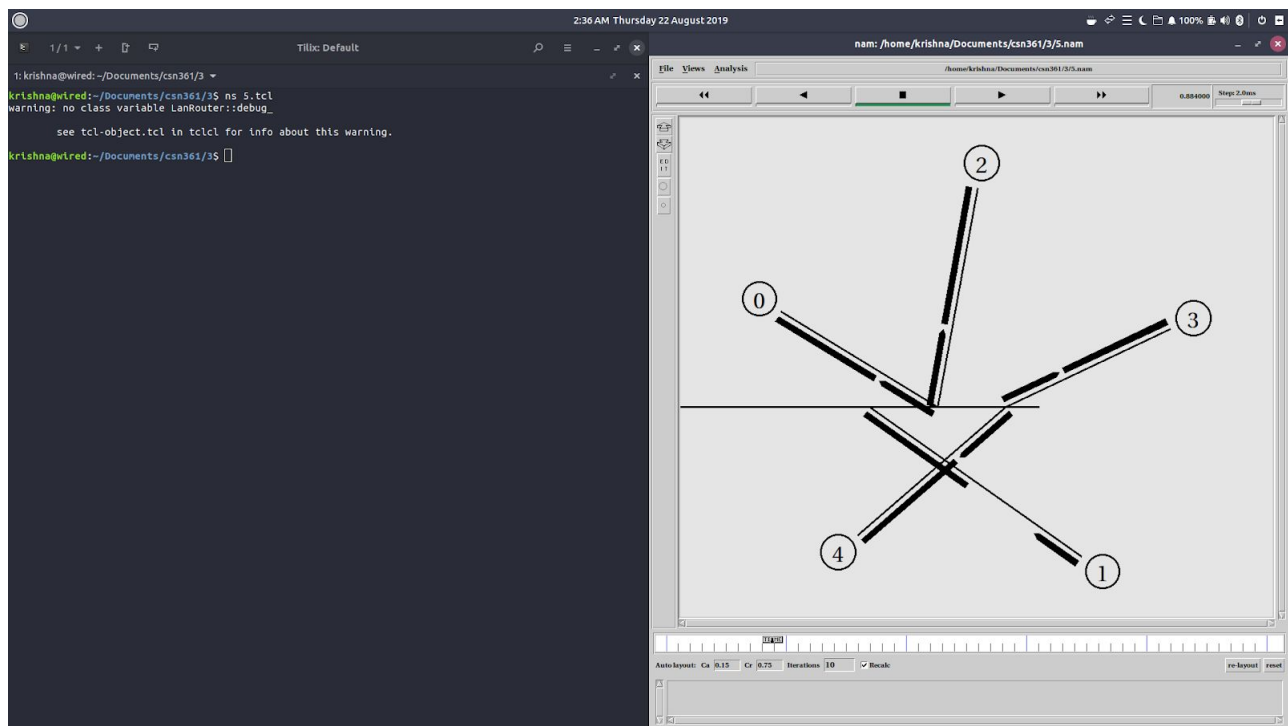
As we can see in Star topology, if the mid node is missing/ out of service then communication is not possible.

Write a TCL code for network simulator NS2 to demonstrate the ring topology among a set of computer nodes. Given N nodes, each node will be connected to two other nodes in the form of a ring. You have to set up a TCP connection between k pairs of nodes and demonstrate packet transfer between them using Network Animator (NAM). Use File Transfer protocol (FTP) for the same. Each link should have different color of packets to differentiate the packets transferred between each pair of nodes. The program should take the number of nodes (N) as input followed by k pairs of nodes.



In ring topology, even if one route to node is damaged, we can still send data to node. But it is highly unstable as two breaks makes it possible to almost half of connections.

Write a TCL code for network simulator NS2 to demonstrate the bus topology among a set of computer nodes. Given N nodes, each node will be connected to a common link. You have to set up a TCP connection between k pairs of nodes and demonstrate packet transfer between them using Network Animator (NAM). Use File Transfer protocol (FTP) for the same. Each link should have different color of packets to differentiate the packets transferred between each pair of nodes. The program should take the number of nodes (N) as input followed by k pairs of nodes.



In Bus topology, there is a lot of extra data wastage, which will be leaking, as each node receives data of other nodes.