

# Computer Networks Laboratory

## CSN-361

### Assignment 1 (L3)

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Class: B.Tech CSE 3rd Year

#### Problem Statements

Problem Statement 1: Write a socket program in C to determine class, Network and Host ID of an IPv4 address. Input: 1.4.5.5 Output: Given IP address belongs to Class A Network ID is 1 Host ID is 4.5.5

Problem Statement 2: Write a C program to demonstrate File Transfer using UDP.

Problem Statement 3: 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.

Problem Statement 4: 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.

Problem Statement 5: 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.

## Algorithms and Data Structures Used

Question 1:

Class A has the first section containing the network ID, Class B has the first 2 sections, Class C has the first 3 sections as the network ID, and the rest sections signify the network ID. Class D and Class E don't have any such separation. The limits of values for each class was used in the code.

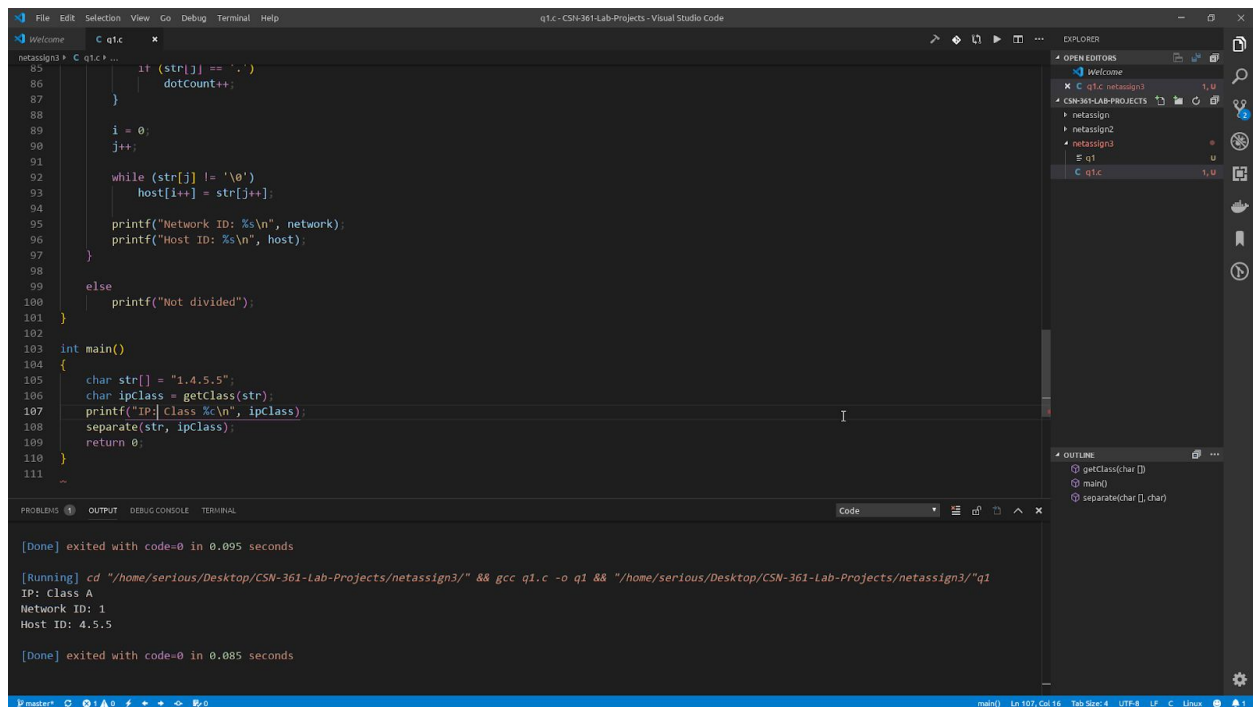
Question 2:

Created a server that listens on localhost:8080 and when the client connects on 8080 and sends a string to the server containing the file name. The file is found and sending it is handled through an FTP, where the string can also be the data coming from a file on the server system.

Question 3/4/5:

## Snapshots

Question 1



```
netassign3 C q1.c
85     if (str[j] == '.')
86         dotCount++;
87     }
88
89     i = 0;
90     j++;
91
92     while (str[j] != '\0')
93         host[i++] = str[j++];
94
95     printf("Network ID: %s\n", network);
96     printf("Host ID: %s\n", host);
97 }
98
99 else
100     printf("Not divided");
101 }
102
103 int main()
104 {
105     char str[] = "1.4.5.5";
106     char ipClass = getClass(str);
107     printf("IP: Class %c\n", ipClass);
108     separate(str, ipClass);
109     return 0;
110 }
111
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

[Done] exited with code=0 in 0.095 seconds

[Running] cd "/home/serious/Desktop/CSN-361-Lab-Projects/netassign3/" && gcc q1.c -o q1 && "/home/serious/Desktop/CSN-361-Lab-Projects/netassign3/"q1

IP: Class A

Network ID: 1

Host ID: 4.5.5

[Done] exited with code=0 in 0.085 seconds

Question 2

```
q2_client.c - CSI-361-Lab-Projects - Visual Studio Code
q2_client.c
68
69
70 while (1) {
71     printf("\nPlease enter file name to receive:\n");
72     scanf("%s", net_buf);
73     sendto(sockfd, net_buf, NET_BUF_SIZE,
74             sendrecvflag, (struct sockaddr*)&addr_con,
75             addrlen);
76
77     printf("\n-----Data Received-----\n");
78
79     while (1) {
80         // receive
81         clearBuf(net_buf);
82         nBytes = recvfrom(sockfd, net_buf, NET_BUF_SIZE,
83                           sendrecvflag, (struct sockaddr*)&addr_con,
84                           &addrlen);
85
86         // process
87         if (recvFile(net_buf, NET_BUF_SIZE)) {
88             break;
89         }
90     }
91     printf("\n-----\n");
92 }
93
94 return 0;
95
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

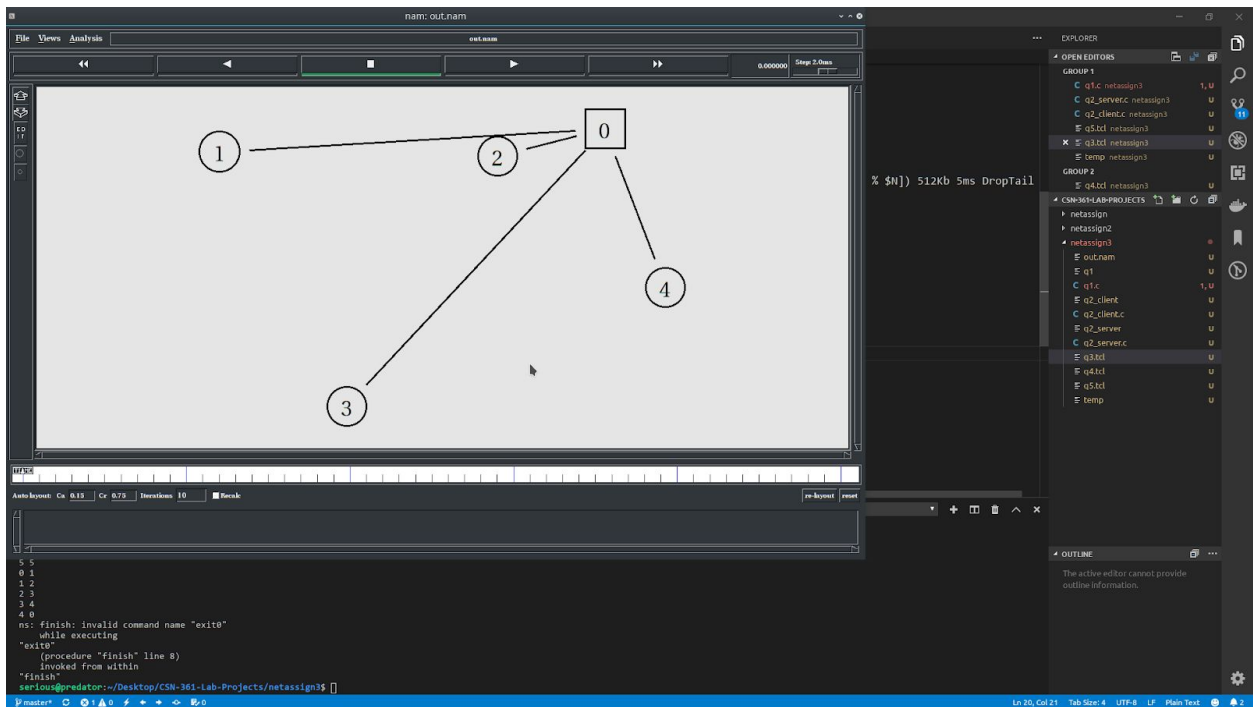
Please enter file name to receive:  
1

-----Data Received-----  
File Not Found!

Please enter file name to receive:  
q1.c

-----Data Received-----  
#include <stdio.h>  
#include <string.h>  
char getClass(char str[]) {

Question 3:



Question 4:

The screenshot shows the NetLogo environment with a network diagram and a command window. The network diagram has 5 nodes (0-4) and several edges. The command window shows the following error messages:

```

3 4
4 0
ns: finish: invalid command name "exit0"
while executing
"exit0"
(procedure "finish" line 8)
invoked from within
"finish"
serious@predator:~/Desktop/CSN-361-Lab-Projects/netassign3$ ns q4.tcl
5 5
0 1
1 2
2 3
3 4
4 0

```

The Explorer panel on the right shows the following structure:

- GROUP 1
  - C q1.c netassign3 1,U
  - C q2\_server.c netassign3 U
  - C q2\_client.c netassign3 U
  - E q5.tcl netassign3 U
  - E q3.tcl netassign3 U
  - E temp netassign3 U
- GROUP 2
  - E q4.tcl netassign3 U
- CSN-361-LAB-PROJECTS
  - netassign
    - netassign2
      - netassign3
        - E out.nam U
        - E q1 U
        - E q2\_client U
        - C q2\_client.c U
        - E q2\_server U
        - C q2\_server.c U
        - E q3.tcl U
        - E q4.tcl U
        - E q5.tcl U
        - E temp U

## Question 5:

The screenshot shows the NetLogo environment with a network diagram and a command window. The network diagram has 5 nodes (0-4) and several edges. The command window shows the following warning message:

```

5 5
_o10_o13_o16_o19_o22
warning: no class variable LanRouter::debug_
see tcl-object.tcl in tclcl for info about this warning.
1000
0 1
1 2
2 3
3 4
4 0
serious@predator:~/Desktop/CSN-361-Lab-Projects/netassign3$ Cannot connect to existing nam instance. Starting a new one...

```

The Explorer panel on the right shows the following structure:

- GROUP 1
  - C q1.c netassign3 1,U
  - C q2\_server.c netassign3 U
  - C q2\_client.c netassign3 U
  - E q5.tcl netassign3 U
  - E q3.tcl netassign3 U
  - E temp netassign3 U
- GROUP 2
  - E q4.tcl netassign3 U
- CSN-361-LAB-PROJECTS
  - netassign
    - netassign2
      - netassign3
        - E out.nam U
        - E q1 U
        - E q2\_client U
        - C q2\_client.c U
        - E q2\_server U
        - C q2\_server.c U
        - E q3.tcl U
        - E q4.tcl U
        - E q5.tcl U
        - E temp U