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Slot: L27 + L28

Subject: Networking Lab (CSE1004)

Experiment – 4

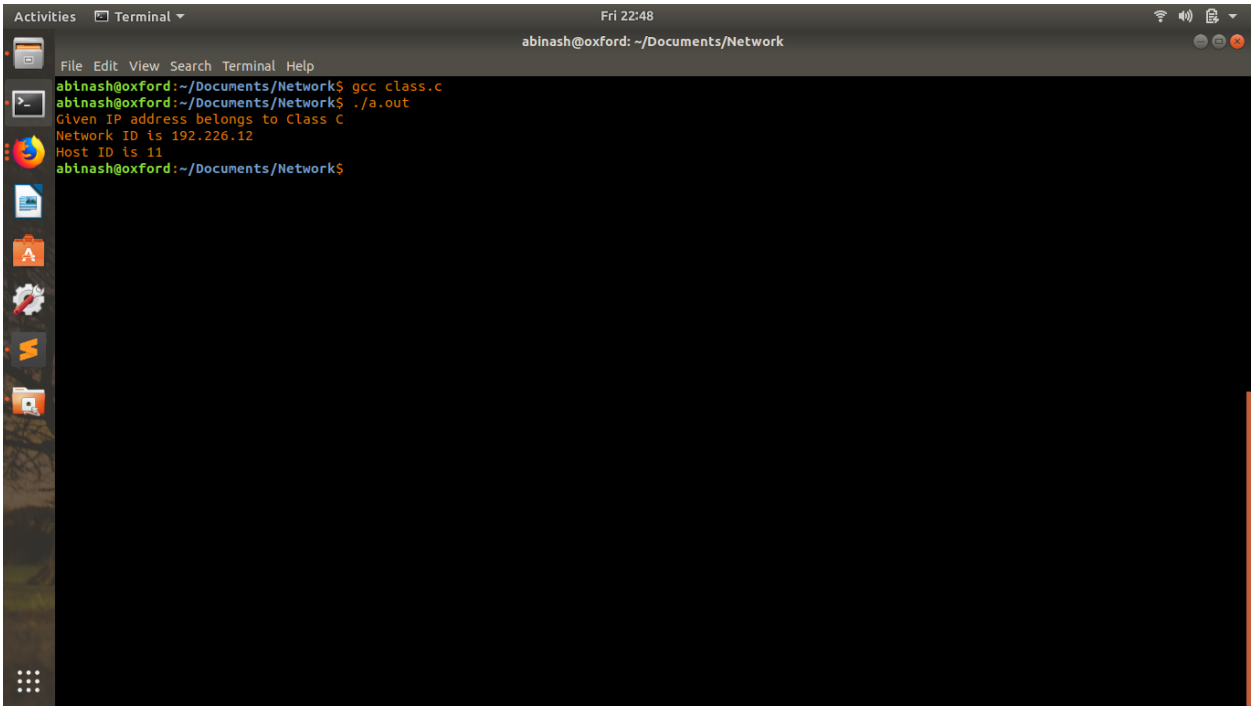
1. Classful/less addressing

```
#include<stdio.h>
#include<string.h>

// Function to find out the Class
char findClass(char str[])
{
   // storing first octet in arr[] variable
   char arr[4];
   int i = 0;
   while (str[i] != '.')
   {
      arr[i] = str[i];
      i++;
   }
   i--;

   // converting str[] variable into number for
   // comparison
   int ip = 0, j = 1;
   while (i >= 0)
   {
      ip = ip + (str[i] - '0') * j;
      j = j * 10;
      i--;
   }

   // Class A
   if (ip >=1 && ip <= 126)
      return 'A';

   // Class B
   else if (ip >= 128 && ip <= 191)
      return 'B';
```

```
    // Class C
    else if (ip >= 192 && ip <= 223)
        return 'C';

    // Class D
    else if (ip >= 224 && ip <= 239)
        return 'D';

    // Class E
    else
        return 'E';
}

// Function to separate Network ID as well as
// Host ID and print them
void separate(char str[], char ipClass)
{
    // Initializing network and host array to NULL
    char network[12], host[12];
    for (int k = 0; k < 12; k++)
        network[k] = host[k] = '\0';

    // for class A, only first octet is Network ID
    // and rest are Host ID
    if (ipClass == 'A')
    {
        int i = 0, j = 0;
        while (str[j] != '.')
            network[i++] = str[j++];
        i = 0;
        j++;
        while (str[j] != '\0')
            host[i++] = str[j++];
        printf("Network ID is %s\n", network);
        printf("Host ID is %s\n", host);
    }

    // for class B, first two octet are Network ID
    // and rest are Host ID
    else if (ipClass == 'B')
    {
        int i = 0, j = 0, dotCount = 0;
```

```
    // storing in network[] up to 2nd dot
    // dotCount keeps track of number of
    // dots or octets passed
    while (dotCount < 2)
    {
        network[i++] = str[j++];
        if (str[j] == '.')
            dotCount++;
    }
    i = 0;
    j++;

    while (str[j] != '\0')
        host[i++] = str[j++];

    printf("Network ID is %s\n", network);
    printf("Host ID is %s\n", host);
}

// for class C, first three octet are Network ID
// and rest are Host ID
else if (ipClass == 'C')
{
    int i = 0, j = 0, dotCount = 0;

    // storing in network[] up to 3rd dot
    // dotCount keeps track of number of
    // dots or octets passed
    while (dotCount < 3)
    {
        network[i++] = str[j++];
        if (str[j] == '.')
            dotCount++;
    }

    i = 0;
    j++;

    while (str[j] != '\0')
        host[i++] = str[j++];

    printf("Network ID is %s\n", network);
    printf("Host ID is %s\n", host);
}
```

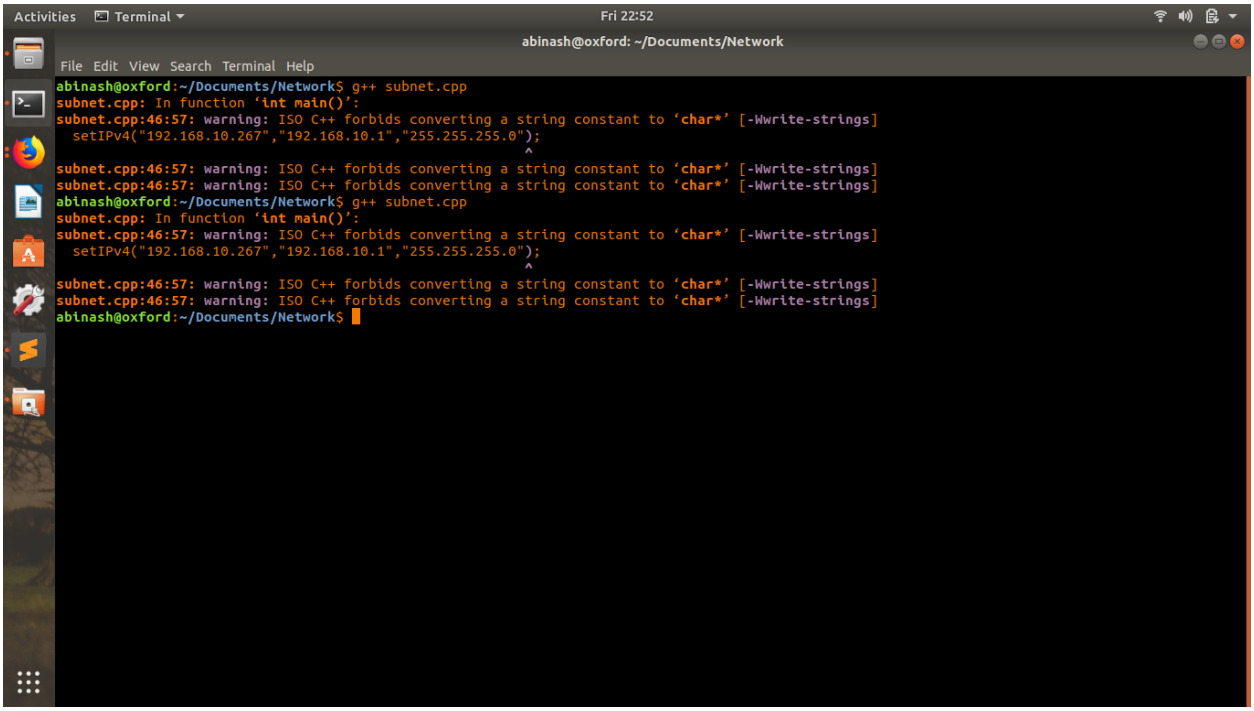
```
    // Class D and E are not divided in Network
    // and Host ID
    else
        printf("In this Class, IP address is not"
          " divided into Network and Host ID\n");
}

// Driver function is to test above function
int main()
{
    char str[] = "192.226.12.11";
    char ipClass = findClass(str);
    printf("Given IP address belongs to Class %c\n",
                                ipClass);
    separate(str, ipClass);
    return 0;
}
```



2. Subnetting

```
#include <iostream>
using namespace std;

#include <stdio.h>
#include <sys/socket.h>
#include <arpa/inet.h>
#include <netinet/in.h>
#include <errno.h>
#include <string.h>
#include <stdlib.h>



void setIPv4(char *ip,char *gw,char *netmask)
{
        char cmd[128];
        //network interface
        char nwkInf[5]="eth0";

        //link down command in Linux
        sprintf(cmd,"ip link set %s down",nwkInf);
        system(cmd);


        memset(cmd,0x00,64);
        //command to set ip address, netmask
        sprintf(cmd,"ifconfig %s %s netmask %s",nwkInf,ip,netmask);
        system(cmd);
        printf("\ncmd : %s",cmd); fflush(stdout);
        memset(cmd,0X00,64);

        //command to set gateway
        sprintf(cmd,"route add default gw %s %s",gw,nwkInf);
        system(cmd);

        memset(cmd,0X00,64);
        //link up command
        sprintf(cmd,"ip link set %s up",nwkInf);
        system(cmd);

}
```

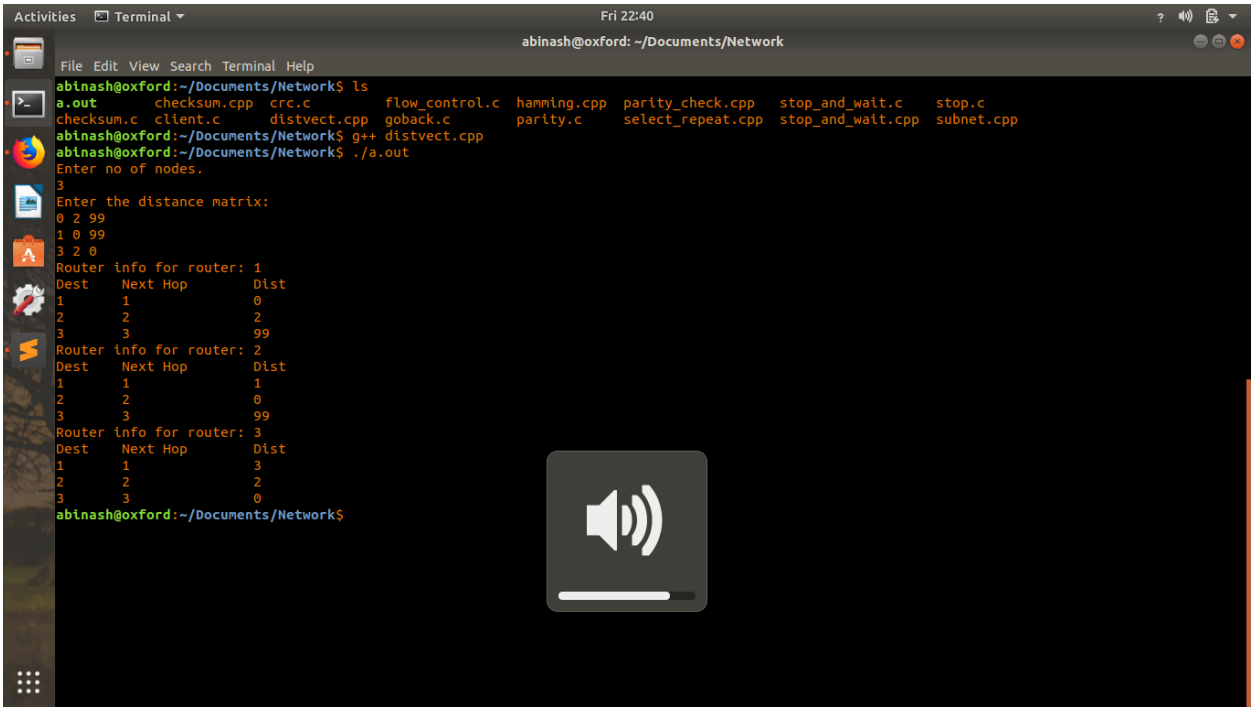
```
int main()
{
        //calling function to set network settings
        setIPv4("192.168.10.267","192.168.10.1","255.255.255.0");
        return 0;
}
```



3. Distance Vector

```
#include <iostream>
#include <stdio.h>

using namespace std;

struct node {
   int dist[20];
   int from[20];
} route[10];

int main()
{
   int dm[20][20], no;

   cout << "Enter no of nodes." << endl;
   cin >> no;
```

```
    cout << "Enter the distance matrix:" << endl;
    for (int i = 0; i < no; i++) {
        for (int j = 0; j < no; j++) {
            cin >> dm[i][j];
            /*  Set distance from i to i as 0 */
            dm[i][i] = 0;
            route[i].dist[j] = dm[i][j];
            route[i].from[j] = j;
        }
    }

    int flag;
    do {
        flag = 0;
        for (int i = 0; i < no; i++) {
            for (int j = 0; j < no; j++) {
                for (int k = 0; k < no; k++) {
                    if ((route[i].dist[j]) > (route[i].dist[k] + route[k].dist[j])) {
                        route[i].dist[j] = route[i].dist[k] + route[k].dist[j];
                        route[i].from[j] = k;
                        flag = 1;
                    }
                }
            }
        }
    } while (flag);

    for (int i = 0; i < no; i++) {
        cout << "Router info for router: " << i + 1 << endl;
        cout << "Dest\tNext Hop\tDist" << endl;
        for (int j = 0; j < no; j++)
            printf("%d\t%d\t\t%d\n", j+1, route[i].from[j]+1, route[i].dist[j]);
    }
    return 0;
}
```


Activities
Terminal
Fri 22:40
abinash@oxford: ~/Documents/Network
File Edit View Search Terminal Help
abinash@oxford:~/Documents/Network$ ls
a.out checksum.cpp crc.c flow_control.c hamming.cpp parity_check.cpp stop_and_wait.c stop.c
checksum.c client.c distvect.cpp goback.c parity.c select_repeat.cpp stop_and_wait.cpp subnet.cpp
abinash@oxford:~/Documents/Network$ g++ distvect.cpp
abinash@oxford:~/Documents/Network$ ./a.out
Enter no of nodes.
3
Enter the distance matrix:
0 2 99
1 0 99
3 2 0
Router info for router: 1
Dest Next Hop Dist
1 1 0
2 2 2
3 3 99
Router info for router: 2
Dest Next Hop Dist
1 1 1
2 2 0
3 3 99
Router info for router: 3
Dest Next Hop Dist
1 1 3
2 2 2
3 3 0
abinash@oxford:~/Documents/Network$