MOHAMMAD TOFIK C SECTION

Roll No: 62 FIFTH-SEM

190905514

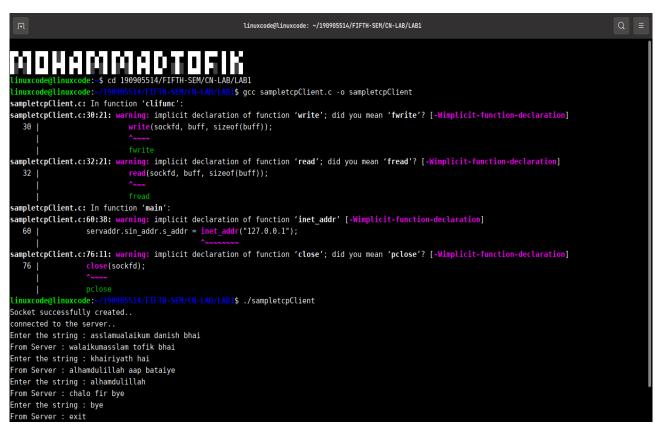
[LAB-SESSION-1] CN-LAB-1

sample program output :

sampleudpServer.c
sampleudpClient.c

```
linuxcode@linuxcode: ~/190905514/FIFTH-SEM/CN-LAB/LAB1
                                                          pgm3Server
 190905514_62_MOHAMMAD_TOFIK_CN-LAB1.odt pgm2Client
                                                                          sampletcpClient.c
 a.out
                                            pgm2Client.c pgm3Server.c
                                                                         sampletcpServer.c
 pgm1Client
                                                           pgm4Client
                                                                          sampleudpClient
                                            pgm2Server
pgm1Client.c
                                            pgm2Server.c pgm4Client.c
                                                                          sampleudpClient.c
 pgm1Server
                                            pgm3Client
                                                          pgm4Server
                                                                          sampleudpServer
                                            pgm3Client.c pgm4Server.c sampleudpServer.c
pgm1Server.c
 linuxcode@linuxcode:~/190905514/FIFTH-SEM/CN-LAB/LAB1$ gcc sampleudpServer.c -o sampleudp
 sampleudpServer.c: In function 'main':
 sampleudpServer.c:39:11: warning: implicit declaration of function 'close'; did you mean
'pclose'? [-Wimplicit-function-declaration]
39 | close(sockfd);
 linuxcode@linuxcode:~/190905514/FIFTH-SEM/CN-LAB/LAB1$ ./sampleudpServer
 Hello Server
 ^Z
 [1]+ Stopped
                                 ./sampleudpServer
 linuxcode@linuxcode:~/190905514/FIFTH-SEM/CN-LAB/LAB1$
                         linuxcode@linuxcode: ~/190905514/FIFTH-SEM/CN-LAB/LAB1
inuxcode@linuxcode:~$ cd 190905514/FIFTH-SEM/CN-LAB/LAB1
190905514_62_MOHAMMAD_TOFIK_CN-LAB1.odt pgm2Client
                                                          pgm3Server
                                                                         sampletcpClient.c
                                           pgm2Client.c pgm3Server.c sampletcpServer.c
a.out
                                                          pgm4Client
                                                                         sampleudpClient
pgm1Client
                                           pgm2Server
pgm1Client.c
                                           pgm2Server.c
                                                          pgm4Client.c sampleudpClient.c
ogm1Server
                                           pgm3Client
                                                          pgm4Server
                                                                         sampleudpServer
                                           pgm3Client.c pgm4Server.c sampleudpServer.c
pgm1Server.c
linuxcode@linuxcode:~/190905514/FIFTH-SEM/CN-LAB/LAB1$ gcc sampleudpClient.c -o sampleudpC
lient
linuxcode@linuxcode:~/190905514/FIFTH-SEM/CN-LAB/LAB1$ ./sampleudpClient
nessage fromser is Hello Server
[1]+ Stopped
                               ./sampleudpClient
linuxcode@linuxcode:~/190905514/FIFTH-SEM/CN-LAB/LAB1$
```

```
linuxcode@linuxcode: ~/190905514/FIFTH-SEM/CN-LAB/LAB1
linuxcode@linuxcode:~$ cd 190905514/FIFTH-SEM/CN-LAB/LA
                                         /CN-LAB/LAB1$ gcc sampletcpServer.c -o sampletcpServer
sampletcpServer.c: In function 'servfunc':
sampletcpServer.c:24:21: warning: implicit declaration of function 'read'; did you mean 'fread'? [-Wimplicit-function-declaration]
                           read(sockfd, buff, sizeof(buff));
ampletcpServer.c:34:21: warning: implicit declaration of function 'write'; did you mean 'fwrite'? [-Wimplicit-function-declaration]
                           write(sockfd, buff, sizeof(buff));
sampletcpServer.c: In function 'main':
sampletcpServer.c:94:11: warning: implicit declaration of function 'close'; did you mean 'pclose'? [-Wimplicit-function-declaration]
                 close(sockfd);
inuxcode@linuxcode:~/190905514/FIFTH-SEM/CN-LAB/LAB1$ ./sampletcpServer
Socket successfully created..
Socket successfully binded..
Gerver listening..
server acccept the client...
From client: asslamualaikum danish bhai
        To client : walaikumasslam tofik bhai
From client: khairiyath hai
        To client : alhamdulillah aap bataiye
rom client: alhamdulillah
        To client : chalo fir bye
rom client: bye
        To client : exit
```



EXCERCISE:

1. Write a UDP client-server program where client sends rows of a matrix to the server combines them together as a two dimensional matrix and display the same.

pgm1udpClient.c

```
#include <stdio.h>
#include <strings.h>
#include <sys/types.h>
#include <arpa/inet.h>
#include <sys/socket.h>
#include <netinet/in.h>
#include <unistd.h>
#include <stdlib.h>
#define PORT 5000
#define MAXLINE 1000
void main()
int buffer[100];
int sockfd, n, len;
struct sockaddr in servaddr, cliaddr;
// using a square matrix of 3*2
printf("Enter the elements of the first row\n");
int a, b, c;
scanf("%d %d %d", &a, &b, &c);
printf("Enter the elements of the second row \n");
int d, e, f;
scanf("%d%d%d", &d, &e, &f);
// clear servaddr
bzero(&servaddr, sizeof(servaddr));
servaddr.sin addr.s addr = htonl(INADDR ANY);
servaddr.sin port = htons(PORT);
servaddr.sin family = AF INET;
int message[6];
message[0] = a;
message[1] = b;
message[2] = c;
message[3] = d;
```

```
message[4] = e;
message[5] = f;
// create datagram socket
sockfd = socket(AF_INET, SOCK_DGRAM, 0);
sendto(sockfd, message, MAXLINE, 0, (struct sockaddr *)&servaddr,
sizeof(servaddr));
len = sizeof(cliaddr);
// waiting for response
n = recvfrom(sockfd, buffer, sizeof(buffer), 0, (struct sockaddr *)&cliaddr,
&len);
buffer[n] = '\0';
printf("Message from Server is \n");
// Just chck if it gives correct outpur or not , connection is alreadyesablished
for (int i = 0; i < 6; i++)
// hardcoded till 3
printf("The %d th element of the matrix is :-%d \n", i, (buffer[i]));
} // close the descriptor
close(sockfd);
}
pgm1udpServer.c
#include <stdio.h>
#include <strings.h>
#include <sys/types.h>
#include <arpa/inet.h>
#include <sys/socket.h>
#include <netinet/in.h>
#define PORT 5000
#define MAXLINE 1000
void main()
{
int buffer[100];
int servsockfd, i, len, n;
struct sockaddr_in servaddr, cliaddr;
bzero(&servaddr, sizeof(servaddr));
// Create a UDP Socket
servsockfd = socket(AF INET, SOCK DGRAM, 0);
```

```
servaddr.sin_addr.s_addr = htonl(INADDR_ANY);
servaddr.sin_port = htons(PORT);
servaddr.sin_family = AF_INET;
// bind server address to socket descriptor
bind(servsockfd, (struct sockaddr *)&servaddr, sizeof(servaddr));
// receive the datagram
len = sizeof(cliaddr);
n = recvfrom(servsockfd, buffer, sizeof(buffer), 0, (struct sockaddr *)&cliaddr,
&len);
for (i = 0; i < 3; i++)
printf("%d\t", buffer[i]);
printf("\n");
for (i = 3; i < 6; i++)
printf("%d\t", buffer[i]);
// Echoing back to the client
sendto(servsockfd, buffer, n, 0, (struct sockaddr *)&cliaddr, sizeof(cliaddr));
// close the descriptor
close(servsockfd);
}
```

OUTPUT:

```
student@V310Z-000: ~/190905514/FIFTH-SEM/CN-LAB/LAB1
                                                                                           File Edit View Search Terminal Help
student@V310Z-000:~/190905514/FIFTH-SEM/CN-LAB/LAB1$ gcc pgm1udpClient.c -o pgm1udpClient
student@V310Z-000:~/190905514/FIFTH-SEM/CN-LAB/LAB1$ ./pgm1udpClient
Enter the elements of the first row
6 7 8
Enter the elements of the second row
9 8 5
Message from Server is
The 0 th element of the matrix is :-6
The 1 th element of the matrix is :-7
The 2 th element of the matrix is :-8
The 3 th element of the matrix is :-9
The 4 th element of the matrix is :-8
The 5 th element of the matrix is :-5
student@V310Z-000:~/190905514/FIFTH-SEM/CN-LAB/LAB1$
```

2. Write a TCP client which sends a string to a server program. Server displays the string along with client IP and ephemeral port number. Server then responds to the client by echoing back the string in uppercase. The process continues until one of them types "QUIT".

pgm2tcpClient.c

```
#include <sys/types.h>
#include <sys/socket.h>
#include <stdio.h>
#include <netinet/in.h>
#include <arpa/inet.h>
#include <unistd.h>
#include <stdlib.h>
#include <ctype.h>
```

```
#include <string.h>
#define MAX 50
void clifunc(int sockfd)
char buff[MAX];
int n = 0, recv_len = 0;
while (1)
{
memset(buff, 0, sizeof(buff));
printf("Type message\n");
//while((buff[n++]=getchar())!='\n');
scanf("%s", buff);
write(sockfd, buff, sizeof(buff));
if (strcmp("quit", buff) == 0)
printf("client closing\n");
return;
}
memset(buff, 0, sizeof(buff));
n = read(sockfd, buff, sizeof(buff));
buff[n] = '\n';
printf("SERVER : %s\n", buff);
}
}
int main(int argc, char const *argv[])
{
int sockfd;
int len:
struct sockaddr_in server_address;
int result;
char ch;
sockfd = socket(AF INET, SOCK STREAM, 0);
server_address.sin_family = AF_INET;
server_address.sin_addr.s_addr = inet_addr("127.0.0.1");
server address.sin port = htons(7280);
len = sizeof(server address);
result = connect(sockfd, (struct sockaddr *)&server_address, len);
if (result == -1)
```

```
{
printf("connection error\n");
exit(0);
}
clifunc(sockfd);
close(sockfd);
return 0;
}
pgm2tcpServer.c
#include <sys/types.h>
#include <sys/socket.h>
#include <stdio.h>
#include <netinet/in.h>
#include <arpa/inet.h>
#include <unistd.h>#include <stdlib.h>
#include <ctype.h>
#include <string.h>
#define MAX 50
void servfunc(int conn_fd, struct sockaddr_in client_address)
{
char buff[MAX];
int n = 0;
char *ip_add = inet_ntoa(client_address.sin_addr);
int port = client_address.sin_port;
printf("Client IP : %s Client port : %d \n", ip_add, port);
while (1)
{
printf("WAITING from client\n");
memset(buff, 0, sizeof(buff));
n = read(conn_fd, buff, sizeof(buff));
buff[n] = '\n';
printf("CLIENT IP ADDRESS : %s Client port : %d and msg recieved is : %s \
n",
ip_add, port, buff);
if (strcmp("quit", buff) == 0)
{
```

```
printf("server is getting closed...\n");
return;
}
for (int i = 0; i < n; i++)
buff[i] = toupper(buff[i]);
}
write(conn_fd, buff, sizeof(buff));
}
}
int main()
{
int server_sockfd, conn_sockfd;
int server_len, client_len;
struct sockaddr_in server_address;
struct sockaddr_in client_address;
server_sockfd = socket(AF_INET, SOCK_STREAM, 0);
server_address.sin_family = AF_INET;
server_address.sin_addr.s_addr = inet_addr("127.0.0.1");
server_address.sin_port = htons(7280);
server_len = sizeof(server_address);
if (bind(server_sockfd, (struct sockaddr *)&server_address, server_len) != 0)
printf("socket binding failed\n");
exit(0);
}
else
printf("socked bound successfully\n");
}
if (listen(server_sockfd, 2) != 0)
{
printf("listen failed\n");
exit(0);
}
else
{
printf("server listening\n");
```

```
}
client_len = sizeof(client_address);
conn_sockfd = accept(server_sockfd, (struct sockaddr *)&client_address,
&client_len);
if (conn_sockfd < 0)</pre>
{
printf("server accept failed\n");
exit(0);
}
else
printf("server accepted the client\n");
}
servfunc(conn sockfd, client address);
close(server_sockfd);
return 0;
}
```

OUTPUT:

```
student@V310Z-000: ~/190905514/FIFTH-SEM/CN-LAB/LAB1
                                                                                     File Edit View Search Terminal Help
student@V310Z-000:~/190905514/FIFTH-SEM/CN-LAB/LAB1$ ls
190905514_62_MOHAMMAD_TOFIK_CN-LAB1.odt pgm1udpServer.c
                                                            sampletcpClient.c
pgm1udpClient
                                         pgm1udpServer.png sampletcpServer.c
pgm1udpClient.c
                                         pgm2tcpClient.c
                                                            sampleudpClient
pgm1udpClient.o
                                         pgm2tcpServer.c
                                                            sampleudpClient.c
pgm1udpClient.png
                                         sample1Client.png sampleudpServer
pgm1udpServer
                                         sample1Server.png sampleudpServer.c
student@V310Z-000:~/190905514/FIFTH-SEM/CN-LAB/LAB1$ gcc pgm2tcpServer.c -o pgm2tcpServer
student@V310Z-000:~/190905514/FIFTH-SEM/CN-LAB/LAB1$ ./pgm2tcpServer
socked bound successfully
server listening
server accepted the client
Client IP : 127.0.0.1 Client port : 50356
WAITING from client
CLIENT IP ADDRESS: 127.0.0.1 Client port: 50356 and msg recieved is: hello
WAITING from client
CLIENT IP ADDRESS: 127.0.0.1 Client port: 50356 and msg recieved is: how
WAITING from client
CLIENT IP ADDRESS: 127.0.0.1 Client port: 50356 and msg recieved is: are
WAITING from client
CLIENT IP ADDRESS: 127.0.0.1 Client port: 50356 and msg recieved is: you
WAITING from client
CLIENT IP ADDRESS : 127.0.0.1 Client port : 50356 and msg recieved is : exit
WAITING from client
CLIENT IP ADDRESS : 127.0.0.1 Client port : 50356 and msg recieved is : asslamualaikum
WAITING from client
CLIENT IP ADDRESS : 127.0.0.1 Client port : 50356 and msg recieved is : danish
WAITING from client
[2]+ Stopped
                              ./pgm2tcpServer
student@V310Z-000:~/190905514/FIFTH-SEM/CN-LAB/LAB1$
```

```
student@V310Z-000: ~/190905514/FIFTH-SEM/CN-LAB/LAB1
                                                                                       File Edit View Search Terminal Help
student@V310Z-000:~/190905514/FIFTH-SEM/CN-LAB/LAB1$ gcc pgm2tcpClient.c -o pgm2tcpClient
student@V310Z-000:~/190905514/FIFTH-SEM/CN-LAB/LAB1$ ./pgm2tcpClient
Type message
hello
SERVER : HELLO
Type message
how
SERVER : HOW
Type message
are
SERVER : ARE
Type message
you
SERVER : YOU
Type message
exit
SERVER : EXIT
Type message
asslamualaikum
SERVER : ASSLAMUALAIKUM
Type message
danish
SERVER : DANISH
Type message
[2]+ Stopped
                              ./pgm2tcpClient
student@V310Z-000:~/190905514/FIFTH-SEM/CN-LAB/LAB1$
```

3.DayTime server: where client sends request to time server to send current time. Server responds by sending the current time.

[Hint : read man pages of asctime() and localtime()].Display server process id at the client side along with time.

pgm3Client.c

```
#include <stdlib.h>
#include <time.h>
#include <stdio.h>
#include <string.h>
#include <unistd.h>
#include <ctype.h>
#include <sys/socket.h>
#include <sys/types.h>
#include <netinet/in.h>
```

```
#include <arpa/inet.h>
int main()
int sockfd;
int len;
struct sockaddr_in address;
struct tm *timeinfo;
int result;
char *reply;
int hour, mins, sec, pid;
/* Create a socket for the client. */
sockfd = socket(AF_INET, SOCK_STREAM, 0);
/* Name the socket, as agreed with the server. */
address.sin family = AF INET;
address.sin_addr.s_addr = inet_addr("127.0.0.1");
address.sin_port = 9734;
len = sizeof(address);
/* Now connect our socket to the server's socket. */
result = connect(sockfd, (struct sockaddr *)&address, len);
if (result == -1)
{
perror("oops: client2");
exit(1);
}
/* We can now read/write via sockfd. */
printf(" Sending request to get the time\n");
read(sockfd, &hour, 1);
read(sockfd, &mins, 1);
read(sockfd, &sec, 1);
read(sockfd, &pid, 1);
printf("%d:%d:%d", hour, mins, sec);
printf(" The process id is: %d", pid);
close(sockfd);
exit(0);
return 0;
}
```

```
pgm3Server.c
#include <sys/types.h>
#include <sys/socket.h>
#include <stdio.h>
#include <netinet/in.h>
#include <arpa/inet.h>
#include <unistd.h>
#include <stdlib.h>
#include <time.h>
int main()
{
time_t rawtime;
struct tm *timeinfo;
char *reply;
int server_sockfd, client_sockfd;
int server len, client len;
struct sockaddr in server address;
struct sockaddr_in client_address;
int hour, mins, sec, pid;
/* Create an unnamed socket for the server. */
server_sockfd = socket(AF_INET, SOCK_STREAM, 0);
/* Name the socket. */
server_address.sin_family = AF_INET;
server_address.sin_addr.s_addr = inet_addr("127.0.0.1");
server_address.sin_port = 9734;
server len = sizeof(server address);
bind(server_sockfd, (struct sockaddr *)&server_address, server_len);
/* Create a connection queue and wait for clients. */
listen(server_sockfd, 5);
while (1)
{
```

```
char ch;
printf("server waiting\n");
/* Accept a connection. */
client_len = sizeof(client_address);
client_sockfd = accept(server_sockfd, (struct sockaddr *)&client_address,
&client_len);
/* We can now read/write to client on client_sockfd. */
//char *inet_ntoa(client_addr.sin_addr);
char *ip_add = inet_ntoa(client_address.sin_addr);
int port = client_address.sin_port;
printf("IP:%s PORT:%d\n", ip_add, port);
//get the time
time(&rawtime);
timeinfo = localtime(&rawtime);
reply = asctime(timeinfo);
printf("The current date/time is: %s", reply);
hour = timeinfo->tm_hour;
mins = timeinfo->tm_min;
sec = timeinfo->tm_sec;
pid = getpid();
write(client_sockfd, &hour, 1);
write(client sockfd, &mins, 1);
write(client_sockfd, &sec, 1);
write(client sockfd, &pid, 1);
//close(client_sockfd);
}
return 0;
}
```

OUTPUT:

```
student@V310Z-000: ~/190905514/FIFTH-SEM/CN-LAB/LAB1
File Edit View Search Terminal Help
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo root" for details.
student@V310Z-000:~$ cd 190905514/FIFTH-SEM/CN-LAB/LAB1
student@V310Z-000:~/190905514/FIFTH-SEM/CN-LAB/LAB1$ ls
190905514 62 MOHAMMAD TOFIK CN-LAB1.odt pgm2tcpClient
                                                             sample1Client.png
pgm1udpClient
                                                             sample1Server.png
                                         pgm2tcpClient.c
pgm1udpClient.c
                                         pgm2tcpClient.png sampletcpClient.c
pgm1udpClient.o
                                          pgm2tcpServer
                                                             sampletcpServer.c
                                          pgm2tcpServer
pgm2tcpServer.c
pgm1udpClient.png
                                                             sampleudpClient
pgm1udpServer
                                         pgm2tcpServer.png sampleudpClient.c
pgm1udpServer.c
                                         pgm3Client
                                                             sampleudpServer
pgm1udpServer.png
                                         pgm3Client.c
                                                             sampleudpServer.c
pgm21tcpserver.png
                                         pgm3Server
                                         pgm3Server.c
pgm22client.png
student@V310Z-000:~/190905514/FIFTH-SEM/CN-LAB/LAB1$ gcc pgm3Server.c -o pgm3Server
pgm3Server.c: In function 'main':
pgm3Server.c:50:5: warning: implicit declaration of function 'print'; did you mean 'printf
 ? [-Wimplicit-function-declaration]
     print("\n");
student@V310Z-000:~/190905514/FIFTH-SEM/CN-LAB/LAB1$ ./pgm3Server
server is waiting
IP : 127.0.0.1 PORT : 17536
The current date/time is : Wed Oct 20 09:46:11 2021
server is waiting
۸Z
[1]+ Stopped
                               ./pgm3Server
student@V310Z-000:~/190905514/FIFTH-SEM/CN-LAB/LAB1$
```

```
student@V310Z-000: ~/190905514/FIFTH-SEM/CN-LAB/LAB1
File Edit View Search Terminal Help
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.
student@V310Z-000:~$ cd 190905514/FIFTH-SEM/CN-LAB/LAB1
student@V310Z-000:~/190905514/FIFTH-SEM/CN-LAB/LAB1$ ls
190905514_62_MOHAMMAD_TOFIK_CN-LAB1.odt pgm2tcpClient
                                                            sample1Client.png
pgm1udpClient
                                         pgm2tcpClient.c
                                                            sample1Server.png
pgm1udpClient.c
                                         pgm2tcpClient.png sampletcpClient.c
pgm1udpClient.o
                                         pgm2tcpServer
                                                            sampletcpServer.c
                                         pgm2tcpServer.c
pgm1udpClient.png
                                                            sampleudpClient
                                         pgm2tcpServer.png sampleudpClient.c
pgm1udpServer
pgm1udpServer.c
                                         pgm3Client
                                                            sampleudpServer
                                                            sampleudpServer.c
pgm1udpServer.png
                                         pgm3Client.c
pgm21tcpserver.png
                                         pgm3Server
pgm22client.png
                                         pgm3Server.c
student@V310Z-000:~/190905514/FIFTH-SEM/CN-LAB/LAB1$ gcc pgm3Client.c -o pgm3Client
student@V310Z-000:~/190905514/FIFTH-SEM/CN-LAB/LAB1$ ./pgm3Client
Sending request to get the time :
9:-1921193426:21771 The process id is : 995716071student@V310Z-000:~/190905514/FIFTH-SEM/C
N-LAB/LAB1$
```