Cycle 2
MULTI CLIENT CHAT SERVER USING TCP

AIM

To implement multi client chat server using TCP.

THEORY

In a multi client chat server, N clients are connected to a server and send messages. In this program, one of the clients send messages to the server and it will send back the messages to all other clients.

PROGRAM

Server.c

```
#include <stdio.h>

#include <stdlib.h>

#include <string.h>

#include <unistd.h>

#include <sys/types.h>

#include <sys/socket.h>

#include <netinet/in.h>

#include <arpa/inet.h>

#include <netdb.h>


#define PORT 4950
```

```
#define BUFSIZE 1024


void send_to_all(int j, int i, int sockfd, int nbytes_recvd, char
*recv_buf, fd_set *master)

{

   if (FD_ISSET(j, master)){

       if (j != sockfd && j != i) {

           if (send(j, recv_buf, nbytes_recvd, 0) == -1) {

               perror("send");

           }

       }

   }

}


void send_recv(int i, fd_set *master, int sockfd, int fdmax)

{

   int nbytes_recvd, j;

   char recv_buf[BUFSIZE], buf[BUFSIZE];


   if ((nbytes_recvd = recv(i, recv_buf, BUFSIZE, 0)) <= 0) {

       if (nbytes_recvd == 0) {

           printf("socket %d hung up\n", i);

       }else {

           perror("recv");
```

```
        }

        close(i);

        FD_CLR(i, master);

    }else {

    //  printf("%s\n", recv_buf);

        for(j = 0; j <= fdmax; j++){

            send_to_all(j, i, sockfd, nbytes_recvd, recv_buf, master );

        }

    }

}



void connection_accept(fd_set *master, int *fdmax, int sockfd, struct
sockaddr_in *client_addr)

{

    socklen_t addrlen;

    int newsockfd;



    addrlen = sizeof(struct sockaddr_in);

    if((newsockfd = accept(sockfd, (struct sockaddr *)client_addr,
&addrlen)) == -1) {

        perror("accept");

        exit(1);

    }else {

        FD_SET(newsockfd, master);
```

```
        if(newsockfd > *fdmax){
            *fdmax = newsockfd;
        }
        printf("new connection from %s on port %d
\n",inet_ntoa(client_addr->sin_addr), ntohs(client_addr->sin_port));
    }
}

void connect_request(int *sockfd, struct sockaddr_in *my_addr)
{
    int yes = 1;

    if ((*sockfd = socket(AF_INET, SOCK_STREAM, 0)) == -1) {
        perror("Socket");
        exit(1);
    }

    my_addr->sin_family = AF_INET;
    my_addr->sin_port = htons(4950);
    my_addr->sin_addr.s_addr = INADDR_ANY;
    memset(my_addr->sin_zero, '\0', sizeof my_addr->sin_zero);

    if (setsockopt(*sockfd, SOL_SOCKET, SO_REUSEADDR, &yes, sizeof(int)) ==
-1) {
```

```
        perror("setsockopt");
        exit(1);
    }

    if (bind(*sockfd, (struct sockaddr *)my_addr, sizeof(struct sockaddr))
== -1) {
        perror("Unable to bind");
        exit(1);
    }
    if (listen(*sockfd, 10) == -1) {
        perror("listen");
        exit(1);
    }
    printf("\nTCPServer Waiting for client on port 4950\n");
    fflush(stdout);
}
int main()
{
    fd_set master;
    fd_set read_fds;
    int fdmax, i;
    int sockfd= 0;
    struct sockaddr_in my_addr, client_addr;
```

```
   FD_ZERO(&master);
   FD_ZERO(&read_fds);
   connect_request(&sockfd, &my_addr);
   FD_SET(sockfd, &master);


   fdmax = sockfd;
   while(1){
       read_fds = master;
       if(select(fdmax+1, &read_fds, NULL, NULL, NULL) == -1){
           perror("select");
           exit(4);
       }


       for (i = 0; i <= fdmax; i++){
           if (FD_ISSET(i, &read_fds)){
               if (i == sockfd)
                   connection_accept(&master, &fdmax, sockfd,
&client_addr);
               else
                   send_recv(i, &master, sockfd, fdmax);
           }
       }
   }
   return 0;
```

```
}
```

Client.c

```
#include <stdio.h>

#include <string.h>

#include <stdlib.h>

#include <sys/types.h>

#include <sys/socket.h>

#include <netinet/in.h>

#include <arpa/inet.h>

#include <unistd.h>

#include <errno.h>



#define BUFSIZE 1024



void send_recv(int i, int sockfd)

{

   char send_buf[BUFSIZE];

   char recv_buf[BUFSIZE];

   int nbyte_recvd;
```

```
    if (i == 0){
        fgets(send_buf, BUFSIZE, stdin);
        if (strcmp(send_buf , "quit\n") == 0) {
            exit(0);
        }else
            send(sockfd, send_buf, strlen(send_buf), 0);
    }else {
        nbyte_recvd = recv(sockfd, recv_buf, BUFSIZE, 0);
        recv_buf[nbyte_recvd] = '\0';
        printf("%s\n" , recv_buf);
        fflush(stdout);
    }
}



void connect_request(int *sockfd, struct sockaddr_in *server_addr)
{
    if ((*sockfd = socket(AF_INET, SOCK_STREAM, 0)) == -1) {
        perror("Socket");
        exit(1);
    }
    server_addr->sin_family = AF_INET;
    server_addr->sin_port = htons(4950);
    server_addr->sin_addr.s_addr = inet_addr("127.0.0.1");
```

```
   memset(server_addr->sin_zero, '\0', sizeof server_addr->sin_zero);


   if(connect(*sockfd, (struct sockaddr *)server_addr, sizeof(struct
sockaddr)) == -1) {
       perror("connect");
       exit(1);
   }
}


int main()
{
   int sockfd, fdmax, i;
   struct sockaddr_in server_addr;
   fd_set master;
   fd_set read_fds;


   connect_request(&sockfd, &server_addr);
   FD_ZERO(&master);
       FD_ZERO(&read_fds);
       FD_SET(0, &master);
       FD_SET(sockfd, &master);
   fdmax = sockfd;


   while(1){
```

```
        read_fds = master;
        if(select(fdmax+1, &read_fds, NULL, NULL, NULL) == -1){
            perror("select");
            exit(4);
        }

        for(i=0; i <= fdmax; i++ )
            if(FD_ISSET(i, &read_fds))
                send_recv(i, sockfd);
    }
    printf("client-quited\n");
    close(sockfd);
    return 0;
}
```

EXECUTION STEPS

1. Start.
2. Compile and run server program in terminal window 1.

   gcc chatserver.c -o chatserver

   ./chatserver

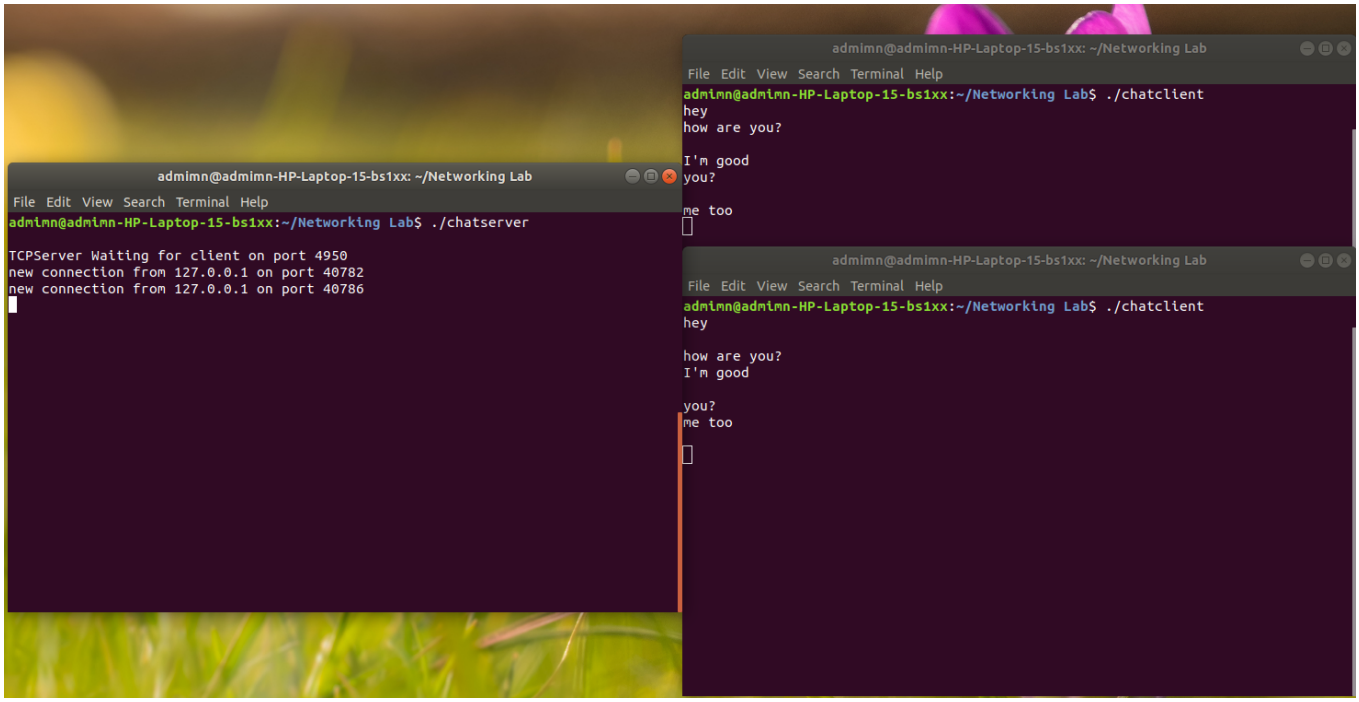
3. Compile and run client program in terminal window 2.

   gcc chatclient.c -o chatclient

./chatclient

4. In terminal window 3, run ./chatclient
5. Send messages between the two clients, that is, through terminal window 2 and 3.
6. Stop.

OUTPUT



RESULT

The program has been executed successfully and multi-client chat through TCP implemented.