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Experiment 1

OBJECTIVE 1

To implement an echo client server using TCP/IP.

Client-

shatzz@LAPTOP-A2PUH1OV: ~/CNLAB

```
#include<stdio.h>
#include<netinet/in.h>
#include<netdb.h>
#include<fcntl.h>
#include<unistd.h>
#define SERV_TCP_PORT 5035
int main(int argc,char**argv)
{
        int sockfd,newsockfd,clength;
        struct sockaddr_in serv_addr,cli_addr;
        char buffer[4096];
        sockfd=socket(AF_INET,SOCK_STREAM,0);
        serv_addr.sin_family=AF_INET;
        serv_addr.sin_addr.s_addr=INADDR_ANY;
        serv_addr.sin_port=htons(SERV_TCP_PORT);
        bind(sockfd,(struct sockaddr*)&serv_addr,sizeof(serv_addr));
        printf("\nServer is Listening..");
        printf("\n"); listen(sockfd,5);
        clength=sizeof(cli_addr);
        newsockfd=accept(sockfd,(struct sockaddr*)&cli_addr,&clength);
        printf("\nClient accepted");
        printf("\n"); read(newsockfd,buffer,4096);
        printf("\nClient message:%s",buffer);
        write(newsockfd,buffer,4096);
        printf("\n");
        close(sockfd);
        return 0;
}
```

Server-

shatzz@LAPTOP-A2PUH1OV: ~

```c
#include<netdb.h>
#include<fcntl.h>
#include<unistd.h>
#include<arpa/inet.h>
#define SERV_TCP_PORT 5035
int main(int argc,char*argv[])
{
        int sockfd;
        struct sockaddr_in serv_addr;
        struct hostent *server;
        char buffer[4096];
        sockfd=socket(AF_INET,SOCK_STREAM,0);
        serv_addr.sin_family=AF_INET;
        serv_addr.sin_addr.s_addr=inet_addr("127.0.0.1");
        serv_addr.sin_port=htons(SERV_TCP_PORT);
        printf("\nConnected");
        connect(sockfd,(struct sockaddr*)&serv_addr,sizeof(serv_addr));
        printf("\nEnter the message\n");
        printf("\nClient: ");
        fgets(buffer,4096,stdin);
        write(sockfd,buffer,4096);
        printf("echo message by server: %s",buffer);
        printf("\n");
        close(sockfd);
        return 0;
}
```

Output-

```
shatzz@LAPTOP-A2PUH1OV:~$ vi e1o1client.c
shatzz@LAPTOP-A2PUH1OV:~$ gcc e1o1client.c
shatzz@LAPTOP-A2PUH1OV:~$ ./a.out

Connected
Enter the message

Client: Hey This is Shatabdi
echo message by server: Hey This is Shatabdi

shatzz@LAPTOP-A2PUH1OV:~$
```

shatzz@LAPTOP-A2PUH1OV: ~/CNLAB

```
shatzz@LAPTOP-A2PUH1OV:~/CNLAB$ vi e1o1server.c
shatzz@LAPTOP-A2PUH1OV:~/CNLAB$ gcc e1o1server.c
shatzz@LAPTOP-A2PUH1OV:~/CNLAB$ ./a.out

Server is Listening..

Client accepted

Client message:Hey This is Shatabdi

shatzz@LAPTOP-A2PUH1OV:~/CNLAB$
```

OBJECTIVE 2

To Implement a chat of client server communication using TCP/IP

Client-

```
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <string.h>
#include <sys/types.h>
#include <sys/socket.h>
#include <netinet/in.h>
#include <netdb.h>
void error(const char *msg)
{
perror(msg);
exit(0);
}
int main ( int argc , char *argv[] )
{
int sockfd , portno , n;
struct sockaddr_in serv_addr;
struct hostent *server;
char buffer[256];
if(argc < 3){
fprintf(stderr,"Usage %s hostname port\n",argv[0]);
exit(1);
}
portno = atoi(argv[2]);
sockfd = socket(AF_INET,SOCK_STREAM,0);
if (sockfd<0)
{
error("error opening socket");
}
server = gethostbyname(argv[1]);
if (server == NULL)
{
fprintf(stderr,"Error , no such host");
}
bzero((char *) &serv_addr,sizeof(serv_addr));
serv_addr.sin_family = AF_INET;
bcopy((char *) server->h_addr , (char *) &serv_addr.sin_addr.s_addr,server->h_length);
serv_addr.sin_port = htons(portno);
if(connect(sockfd,(struct sockaddr *) &serv_addr,sizeof(serv_addr))<0)
error("Connection Failed ");
while(1)
{
bzero(buffer,255);
fgets(buffer , 255,stdin);
```

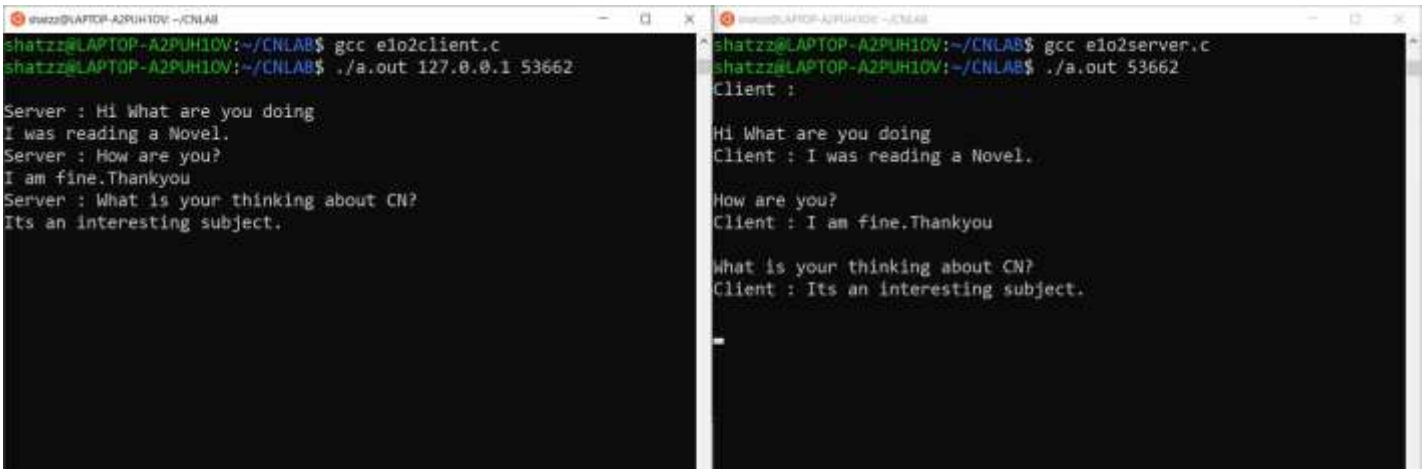
```
n = write(sockfd,buffer,strlen(buffer));
if(n<0)
error("Error on writing");
bzero(buffer,255);
n = read(sockfd,buffer,255);
if(n<0)
error("error on reading");
printf("Server : %s",buffer);
int i = strncmp("Bye",buffer,3);
if(i==0)
break;
}
close(sockfd);
return 0;
}
```

Server-

```
#include<stdio.h>
#include<stdlib.h>
#include<string.h>
#include<unistd.h>
#include<sys/types.h>
#include<sys/socket.h>
#include<netinet/in.h>
void error(const char *msg){
perror(msg);
exit(1);
}
int main(int argc , char *argv[])
{
if(argc < 2){
fprintf(stderr,"Port no not provided , program terminated");
exit(1);
}
int sockfd , newsockfd , portno , n;
char buffer[255];
struct sockaddr_in serv_addr , cli_addr;
socklen_t clilen;
sockfd = socket(AF_INET,SOCK_STREAM,0);
if (sockfd<0)
{
error("error opening socket");
}
bzero((char *) &serv_addr,sizeof(serv_addr));
portno = atoi(argv[1]);
serv_addr.sin_family=AF_INET;
serv_addr.sin_addr.s_addr=INADDR_ANY;
serv_addr.sin_port=htons(portno);
if(bind(sockfd,(struct sockaddr *) &serv_addr , sizeof(serv_addr)) < 0)
error("Binding failed");
```

```
listen(sockfd,5);
clilen = sizeof(cli_addr);
newsockfd = accept(sockfd,(struct sockaddr *) &cli_addr,&clilen);
if(newsockfd < 0)
error("Error on accept.");
while(1)
{
bzero(buffer , 250);
n = read(newsockfd , buffer , 255);
if(n < 0)
error("Error on reading");
printf("Client : %s\n", buffer);
bzero(buffer , 255);
fgets(buffer , 255 , stdin);
n = write(newsockfd , buffer , strlen(buffer));
if(n<0)
error("error on writing");
int i = strncmp("Bye",buffer,3);
if(i==0)
break;
}
close(newsockfd);
close(sockfd);
return 0;
}
```

Output-



OBJECTIVE 3

To implement date and time display from client to server using TCP sockets.

Client-

```c
#include <stdio.h>
#include <stdlib.h>
#include <sys/types.h>
#include <sys/socket.h>
#include <netinet/in.h>
#include <unistd.h>
#include <time.h>
int main(int argc, char **argv)
{
        if(argc != 2)
        {
                printf("Enter Port Address");
                exit(0);
        }
        int port = atoi(argv[1]);
        printf("Port: %d\n", port);
        int sockfd = socket(AF_INET, SOCK_STREAM, 0);
        char response[30];
        struct sockaddr_in serverAddress;
        serverAddress.sin_family = AF_INET;
        serverAddress.sin_addr.s_addr = INADDR_ANY;
        serverAddress.sin_port = htons(port);
        connect(sockfd, (struct sockaddr*)&serverAddress, sizeof(serverAddress));
        printf("Connected to the server\n");
        recv(sockfd, response, 29, 0);
        printf("Time from server: %s", response);
        return 0;
}
```

Server-

```c
#include <stdio.h>
#include <stdlib.h>
#include <sys/types.h>
#include <sys/socket.h>
#include <netinet/in.h>
#include <unistd.h>
#include <time.h>
#define BACKLOG 10
```

```c
int main(int argc, char **argv)
{
        if(argc != 2)
        {
                printf("Enter the Port No \n");
                exit(0);
        }
        int port = atoi(argv[1]);
        int n_client = 0;
        int sockfd = socket(AF_INET, SOCK_STREAM, 0);
        struct sockaddr_in serverAddress;
        serverAddress.sin_family = AF_INET;
        serverAddress.sin_addr.s_addr = INADDR_ANY;
        serverAddress.sin_port = htons(port);
        bind(sockfd, (struct sockaddr*)&serverAddress, sizeof(serve
rAddress));
        listen(sockfd, BACKLOG);
        printf("Listening on port %d\n",port);
        int i = 1;
        while(i)
        {
                int client_socket = accept(sockfd, NULL, NULL);
                n_client++;
                time_t currentTime;
                time(&currentTime);
                printf("Client %d requested at %s", n_client, ctime
(&currentTime));
                send(client_socket, ctime(&currentTime), 30, 0);
        }
        return 0;
}
```

Output-