Exercise 4 (TCP)

Aim:

To encode the message from client using TCP protocol

Program (C):

Server :

```
#include<stdio.h>
#include<netinet/in.h>
#include<netdb.h>
#include<string.h>
#include<sys/socket.h>
#include<sys/types.h>
#define SA struct sockaddr
#define PORT 8080
int main()
{
int sockfd,newsockfd,clength,n,b;
struct sockaddr_in serv_addr,cli_addr;
char buffer[4096],c;
sockfd=socket(AF_INET,SOCK_STREAM,0);
if(sockfd==-1)
{
printf("Socket creation failed..\n");
}
else
{
printf("Socket created successfully..\n");
}
serv_addr.sin_family=AF_INET;
serv_addr.sin_addr.s_addr=htonl(INADDR_ANY);
serv_addr.sin_port=htons(PORT);
if(bind(sockfd,(struct sockaddr*)&serv_addr,sizeof(serv_addr))!=0)
```

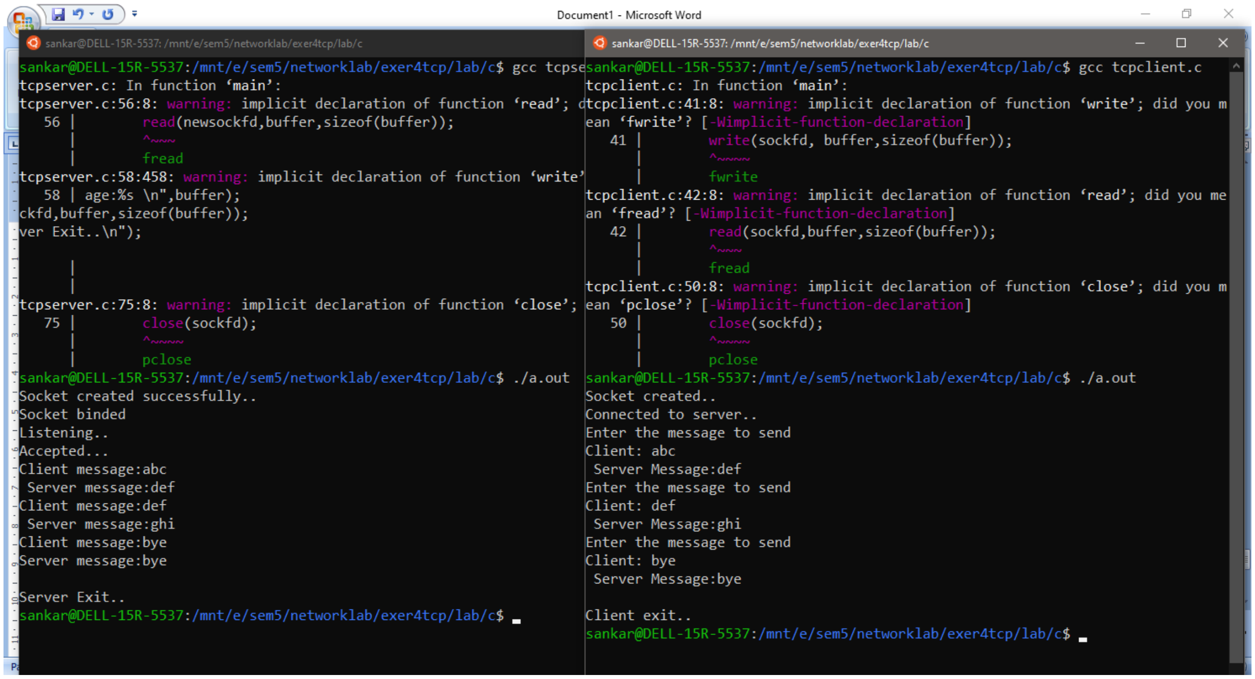
```
{
printf("socket bind failed...\n");
}
else
{
printf("Socket binded \n");

}

if(listen(sockfd,5)!=0)
{
printf("Listen failed..\n");
}
else
{
printf("Listening..\n");
}
clength=sizeof(cli_addr);
newsockfd=accept(sockfd,(SA*)&cli_addr,&clength);
if(newsockfd<0)
{
printf("Srever accept failed...\n");
}
else
{
printf("Accepted...\n");
}
while(1)
{
read(newsockfd,buffer,sizeof(buffer));
printf("Client message:%s",buffer);
if(strncmp("bye",buffer,3)==0)
{
printf("Server message:%s \n",buffer);
write(newsockfd,buffer,sizeof(buffer));
printf("Server Exit..\n");
break;
}
else
{
n=strlen(buffer);

char message[n];
int i=0;
for(;i<n;i++)
{
b=(int)buffer[i];
b=b+3;
c=(char)b;
buffer[i]=c;
}
printf(" Server message:%s \n",buffer);
write(newsockfd,buffer,sizeof(buffer));
}
}
close(sockfd);
return 0;
}
```

Client:

```
#include<stdio.h>
#include<string.h>
#include<sys/types.h>
#include<sys/socket.h>
#include<netinet/in.h>
#include<netdb.h>
#define PORT 8080
```

```
#define SA struct sockaddr
int main()
{
int sockfd,n;
struct sockaddr_in serv_addr;
struct hostent *server;
char buffer[4096];
sockfd=socket(AF_INET,SOCK_STREAM,0);
if(sockfd==-1)
{
printf("Socket creation failed..\n");
}
else
{
printf("Socket created..\n");
}
serv_addr.sin_family=AF_INET;
serv_addr.sin_addr.s_addr=(INADDR_ANY);
serv_addr.sin_port=htons(PORT);
if(connect(sockfd,(SA*)&serv_addr,sizeof(serv_addr))!=0)
{
printf("Connection with server failed..\n");
}
else
{
printf("Connected to server..\n");
}

while(1)

    {

    printf("Enter the message to send\n");

    printf("Client: ");

    n=0;
    while ((buffer[n++] = getchar()) != '\n');
    write(sockfd, buffer,sizeof(buffer));
    read(sockfd,buffer,sizeof(buffer));
    printf(" Server Message:%s \n",buffer);
    if((strncmp(buffer,"bye",3))==0)
    {
        printf("Client exit..\n");
        break;
     }
    }
    close(sockfd);
    return 0;
}
```

Output:


Document1 - Microsoft Word
sankar@DELL-15R-5537: /mnt/e/sem5/networklab/exer4tcp/lab/c
sankar@DELL-15R-5537: /mnt/e/sem5/networklab/exer4tcp/lab/c

```
sankar@DELL-15R-5537:/mnt/e/sem5/networklab/exer4tcp/lab/c$ gcc tcpse
tcpserver.c: In function ‘main’:
tcpserver.c:56:8: warning: implicit declaration of function ‘read’; d
   56 |        read(newsockfd,buffer,sizeof(buffer));
      |        ^~~~
      |        fread
tcpserver.c:58:458: warning: implicit declaration of function ‘write’
   58 | age:%s \n",buffer);
ckfd,buffer,sizeof(buffer));
ver Exit..\n");

      |
      |
tcpserver.c:75:8: warning: implicit declaration of function ‘close’;
   75 |        close(sockfd);
      |        ^~~~~
      |        pclose
sankar@DELL-15R-5537:/mnt/e/sem5/networklab/exer4tcp/lab/c$ ./a.out
Socket created successfully..
Socket binded
Listening..
Accepted...
Client message:abc
 Server message:def
Client message:def
 Server message:ghi
Client message:bye
Server message:bye

Server Exit..
sankar@DELL-15R-5537:/mnt/e/sem5/networklab/exer4tcp/lab/c$
```

```
sankar@DELL-15R-5537:/mnt/e/sem5/networklab/exer4tcp/lab/c$ gcc tcpclient.c
tcpclient.c: In function ‘main’:
tcpclient.c:41:8: warning: implicit declaration of function ‘write’; did you m
ean ‘fwrite’? [-Wimplicit-function-declaration]
   41 |        write(sockfd, buffer,sizeof(buffer));
      |        ^~~~~
      |        fwrite
tcpclient.c:42:8: warning: implicit declaration of function ‘read’; did you me
an ‘fread’? [-Wimplicit-function-declaration]
   42 |        read(sockfd,buffer,sizeof(buffer));
      |        ^~~~
      |        fread
tcpclient.c:50:8: warning: implicit declaration of function ‘close’; did you m
ean ‘pclose’? [-Wimplicit-function-declaration]
   50 |        close(sockfd);
      |        ^~~~~
      |        pclose
sankar@DELL-15R-5537:/mnt/e/sem5/networklab/exer4tcp/lab/c$ ./a.out
Socket created..
Connected to server..
Enter the message to send
Client: abc
 Server Message:def
Enter the message to send
Client: def
 Server Message:ghi
Enter the message to send
Client: bye
 Server Message:bye

Client exit..
sankar@DELL-15R-5537:/mnt/e/sem5/networklab/exer4tcp/lab/c$
```

Java program:

Server:

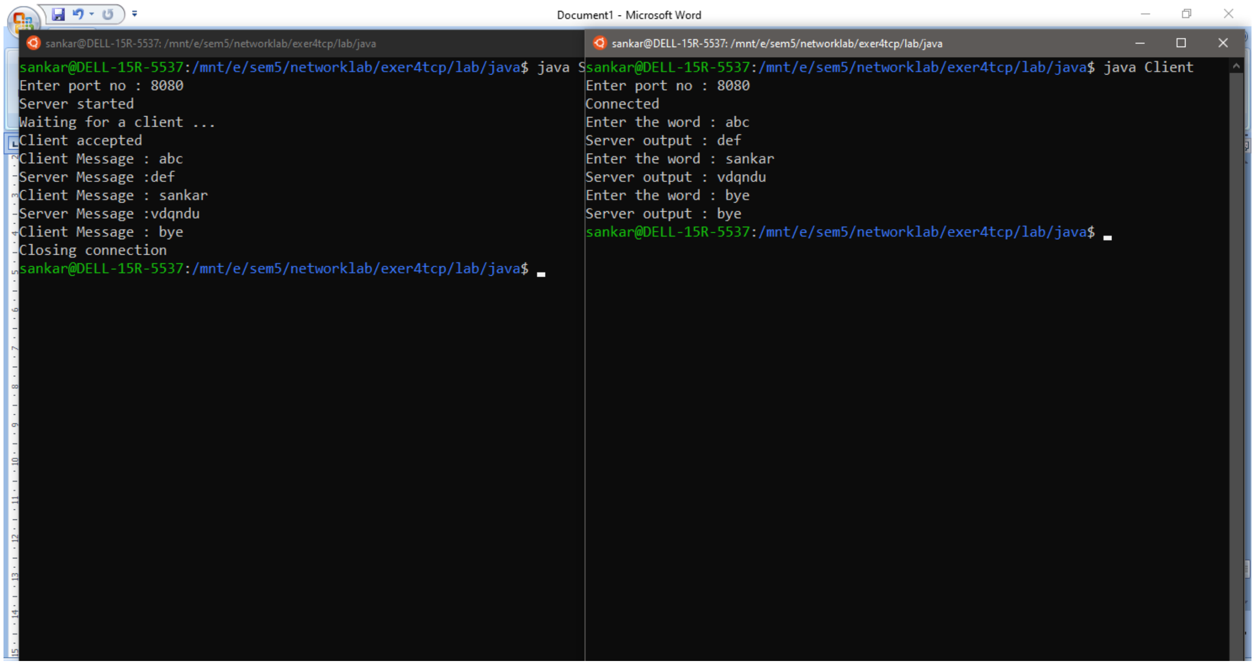
```
import java.net.*;
import java.io.*;
import java.util.Scanner;
public class Server{
private static final String Server_IP="127.0.0.1";
private int port;
private Socket sd=null;
private ServerSocket server= null;
private DataInputStream in=null;
```

```
public Server(int port){
try{
//creation of socket
server=new ServerSocket(port);
System.out.println("Server started");
System.out.println("Waiting for a client ...");
//accepting client request
sd = server.accept();
System.out.println("Client accepted");
// takes input from the client socket
in = new DataInputStream(new BufferedInputStream(sd.getInputStream()));
String msg = "";
// reads message from client until "bye" is sent
while (true)
{
try
{
msg = in.readUTF();
System.out.println("Client Message : "+msg);
String encode=msg;
if(msg.equals("bye"))
{
PrintWriter out=new PrintWriter(sd.getOutputStream(),true);
out.println(msg);
break;
}
else
{
//encoding
byte[] bytes = encode.getBytes("US-ASCII");
for(int i=0; i< bytes.length ; i++)
{
int a=bytes[i]+3;
bytes[i]=(byte)a;
}
String str=new String(bytes);
System.out.println("Server Message :"+str);
//send result to client
PrintWriter out=new PrintWriter(sd.getOutputStream(),true);
out.println(str);
}
}
catch(Exception i){ System.out.println(i); }
}
System.out.println("Closing connection");
sd.close();

}
catch(Exception i){
System.out.println(i);
}
}
public static void main(String args[]){
Scanner input=new Scanner(System.in);
System.out.print("Enter port no : ");
int portno=input.nextInt();
Server obj=new Server(portno);
}
}
```

Client:

```
import java.net.*;
import java.io.*;
import java.util.Scanner;
public class Client{
private static final String Server_IP="127.0.0.1";
private int port;
private Socket sd=null;
private ServerSocket server=null;
private DataInputStream input= null;
private DataOutputStream out = null;
Client(int port){
try{
sd=new Socket(Server_IP,port);
System.out.println("Connected");
// takes input from terminal
input = new DataInputStream(System.in);
// sends output to the socket
out = new DataOutputStream(sd.getOutputStream());
}
catch(Exception i)
{
System.out.println(i);
}
// string to read message from input
String line = "";
// keep reading until "bye" is input
while (!line.equals("bye")){
try{
System.out.print("Enter the word : ");

line = input.readLine();
//send input data to server for processing
out.writeUTF(line);
//read input got from server
BufferedReader ip=new BufferedReader(new
InputStreamReader(sd.getInputStream()));
String serverResponse=ip.readLine();
System.out.println("Server output : "+serverResponse);
}
catch(IOException i){
System.out.println(i);
}
}
try{
input.close();
out.close();
sd.close();
}
catch(IOException i){
System.out.println(i);
}
}
public static void main(String args[]){
Scanner input=new Scanner(System.in);
System.out.print("Enter port no : ");
int portno=input.nextInt();
Client obj=new Client(portno);
}
}
```

Output:



Document1 - Microsoft Word
sankar@DELL-15R-5537: /mnt/e/sem5/networklab/exer4tcp/lab/java
sankar@DELL-15R-5537: /mnt/e/sem5/networklab/exer4tcp/lab/java

```
sankar@DELL-15R-5537:/mnt/e/sem5/networklab/exer4tcp/lab/java$ java S
Enter port no : 8080
Server started
Waiting for a client ...
Client accepted
Client Message : abc
Server Message :def
Client Message : sankar
Server Message :vdqndu
Client Message : bye
Closing connection
sankar@DELL-15R-5537:/mnt/e/sem5/networklab/exer4tcp/lab/java$
```

```
sankar@DELL-15R-5537:/mnt/e/sem5/networklab/exer4tcp/lab/java$ java Client
Enter port no : 8080
Connected
Enter the word : abc
Server output : def
Enter the word : sankar
Server output : vdqndu
Enter the word : bye
Server output : bye
sankar@DELL-15R-5537:/mnt/e/sem5/networklab/exer4tcp/lab/java$
```

Result:

Thus the above programs were executed successfully.