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**Ex No:6**

## **HALF DUPLEX CHAT USING TCP/IP**

### **OBJECTIVE:**

To implement a half duplex application, where the Client establishes a connection with the Server. The Client can send and the server will receive messages at the same time.

### **METHODOLOGY:**

#### **Server:**

- ❑ Include the necessary header files.
- ❑ Create a socket using socket function with family AF\_INET, type as SOCK\_STREAM.
- ❑ Initialize server address to 0 using the bzero function.
- ❑ Assign the sin\_family to AF\_INET, sin\_addr to INADDR\_ANY, sin\_port to dynamically assigned port number.
- ❑ Bind the local host address to socket using the bind function.
- ❑ Listen on the socket for connection request from the client.
- ❑ Accept connection request from the Client using accept function.
- ❑ Fork the process to receive message from the client and print it on the console.
- ❑ Read message from the console and send it to the client.

#### **Client:**

- ❑ Include the necessary header files.
- ❑ Create a socket using socket function with family AF\_INET, type as SOCK\_STREAM.
- ❑ Initialize server address to 0 using the bzero function.
- ❑ Assign the sin\_family to AF\_INET.
- ❑ Get the server IP address and the Port number from the console.
- ❑ Using gethostbyname function assign it to a hostent structure, and assign it to sin\_addr of the server address structure.
- ❑ Request a connection from the server using the connect function.
- ❑ Fork the process to receive message from the server and print it on the console.
- ❑ Read message from the console and send it to the server.

### **CODE:**

#### **Server:**

```
#include "stdio.h"

#include "stdlib.h"

#include "string.h"

#include <sys/types.h>

#include <sys/socket.h>
```

```

#include <netinet/in.h>

#include <unistd.h>

#include "netdb.h"

#include "arpa/inet.h"

#define MAX 1000

#define BACKLOG 5 // how many pending connections queue will hold

int main()
{
    char serverMessage[MAX];

    char clientMessage[MAX];

    int socketDescriptor = socket(AF_INET, SOCK_STREAM, 0);

    struct sockaddr_in serverAddress;

    serverAddress.sin_family = AF_INET;

    serverAddress.sin_port = htons(9002);

    serverAddress.sin_addr.s_addr = INADDR_ANY;

    bind(socketDescriptor, (struct sockaddr*)&serverAddress, sizeof(serverAddress));

    listen(socketDescriptor, BACKLOG);

    int clientSocketDescriptor = accept(socketDescriptor, NULL, NULL);

    while (1)
    {
        printf("\ntext message here .. :");

        scanf("%s", serverMessage);

        send(clientSocketDescriptor, serverMessage, sizeof(serverMessage), 0)

        recv(clientSocketDescriptor, &clientMessage, sizeof(clientMessage), 0)
    }
}

```

```
printf("\nCLIENT: %s", clientMessage);  
  
}
```

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```
//close the socket  
  
    close(socketDescriptor);  
  
    return 0;  
  
}
```

### **Client:**

```
#include "stdio.h"  
  
#include "stdlib.h"  
  
#include "string.h"  
  
#include <sys/types.h>  
  
#include <sys/socket.h>  
  
#include <netinet/in.h>  
  
#include <unistd.h>  
  
#include "netdb.h"  
  
#include "arpa/inet.h"  
  
int main(){  
  
    char serverResponse[MAX];  
  
    char clientResponse[MAX];  
  
    int socketDescriptor = socket(AF_INET, SOCK_STREAM, 0);  
  
    char hostname[MAX], ipAddress[MAX];  
  
    struct hostent *hostIP; //placeholder for the ip address  
  
    if(gethostname(hostname, sizeof(hostname)) == 0){  
  
        hostIP = gethostbyname(hostname); //the netdb.h function gethostbyname  
  
    }else{
```

```
printf("ERROR:FCC4539 IP Address Not ");
```

```
}
```

```
struct sockaddr_in serverAddress;
```

```
serverAddress.sin_family = AF_INET;
```

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```
serverAddress.sin_port = htons(PORT);
```

```
serverAddress.sin_addr.s_addr = INADDR_ANY;
```

```
connect(socketDescriptor, (struct sockaddr *)&serverAddress, sizeof(serverAddress));
```

```
printf("\nLocalhost: %s\n", inet_ntoa(*(struct in_addr *)&serverAddress.sin_addr));
```

```
printf("Local Port: %d\n", PORT);
```

```
printf("Remote Host: %s\n", inet_ntoa(serverAddress.sin_addr));
```

```
while (1)
```

```
{
```

```
recv(socketDescriptor, serverResponse, sizeof(serverResponse), 0);
```

```
printf("\nSERVER : %s", serverResponse);
```

```
printf("\ntext message here... :");
```

```
scanf("%s", clientResponse);
```

```
send(socketDescriptor, clientResponse, sizeof(clientResponse), 0);
```

```
}
```

```
close(socketDescriptor);
```

```
return 0;
```

```
}
```

**OUTPUT:-**

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us-west-1.console.aws.amazon.com/cloud9/ide/ab7073db400d4ecd932417a93f5c780b

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Go to Anything (Ctrl-P)

- RA1911027010069
- RA1911027010070
- RA1911027010071
- RA1911027010072
- RA1911027010073
- RA1911027010074
- RA1911027010075
- RA1911027010076
- RA1911027010077
- RA1911027010078
  - exp3-tcp
  - exp4-udp
  - exp5-timeserver
  - exp6-half-duplex
    - client
    - client\_78.c
    - server
    - server\_78.c
- New Folder
- RA1911027010079
- RA1911027010080
- RA1911027010081
- RA1911027010068

client\_78.c server\_78.c /server - "ip-172-31-6-144 x /client - "ip-172-31-6-144 x

```
Ameenapriyadarshini:~/environment/RA1911027010078/exp6-half-duplex $ cc -o server server_78.c
Ameenapriyadarshini:~/environment/RA1911027010078/exp6-half-duplex $ ./server

text message here .. :hii

CLIENT: hello
text message here .. :how are you? I am server

CLIENT: fine
```

AWS: (not connected)

31°C Cloudy 11:51

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- RA1911027010068

client\_78.c server\_78.c /server - "ip-172-31-6-144 x /client - "ip-172-31-6-144 x

```
Ameenapriyadarshini:~/environment/RA1911027010078/exp6-half-duplex $ cc -o client client_78.c
Ameenapriyadarshini:~/environment/RA1911027010078/exp6-half-duplex $ ./client

Localhost: 172.31.6.144
Local Port: 9059
Remote Host: 0.0.0.0

SERVER : hii
text message here... :hello

SERVER : how
text message here... :fine

SERVER : are
text message here... :
```

AWS: (not connected)

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