

Chat server (in C):

```
#include <netinet/in.h>
#include <stdlib.h>
#include <sys/socket.h>
#include <stdio.h>
#include <string.h>

int main(int argc, char* argv[])
{
    int ser_sfd, nbytes, addr_len, len, i;
    char buf[1024];
    struct sockaddr_in sa, ca;
    ser_sfd = socket(AF_INET, SOCK_DGRAM, 0);
    if(ser_sfd<0)
    {
        perror("socket() error!");
    }
    sa.sin_family = AF_INET;
    sa.sin_port = htons(atoi(argv[1]));
    sa.sin_addr.s_addr = inet_addr("172.20.1.181");
    len = sizeof(sa);
    bind(ser_sfd, (struct sockaddr*)&sa, len);
    addr_len = sizeof(ca);

    while(1)
    {
        nbytes = recvfrom(ser_sfd, &buf, 1024, 0, (struct
sockaddr *)&ca, &addr_len);
        if(strcmp(buf, "bye\n")==0||strcmp(buf,
"exit\n")==0)
            break;
        write(1, "\nCLIENT> ", 8);
        buf[nbytes] = '\0';
        printf("%s", buf);
        write(1, "\nSERVER> ", 8);
        fgets(buf, 1024, stdin);
        sendto(ser_sfd, &buf, nbytes, 0, (struct sockaddr
*)&ca, addr_len);
        if(strcmp(buf, "bye\n")==0||strcmp(buf,
"exit\n")==0)
            break;
    }

    return 0;
}
```

Chat client (in C)

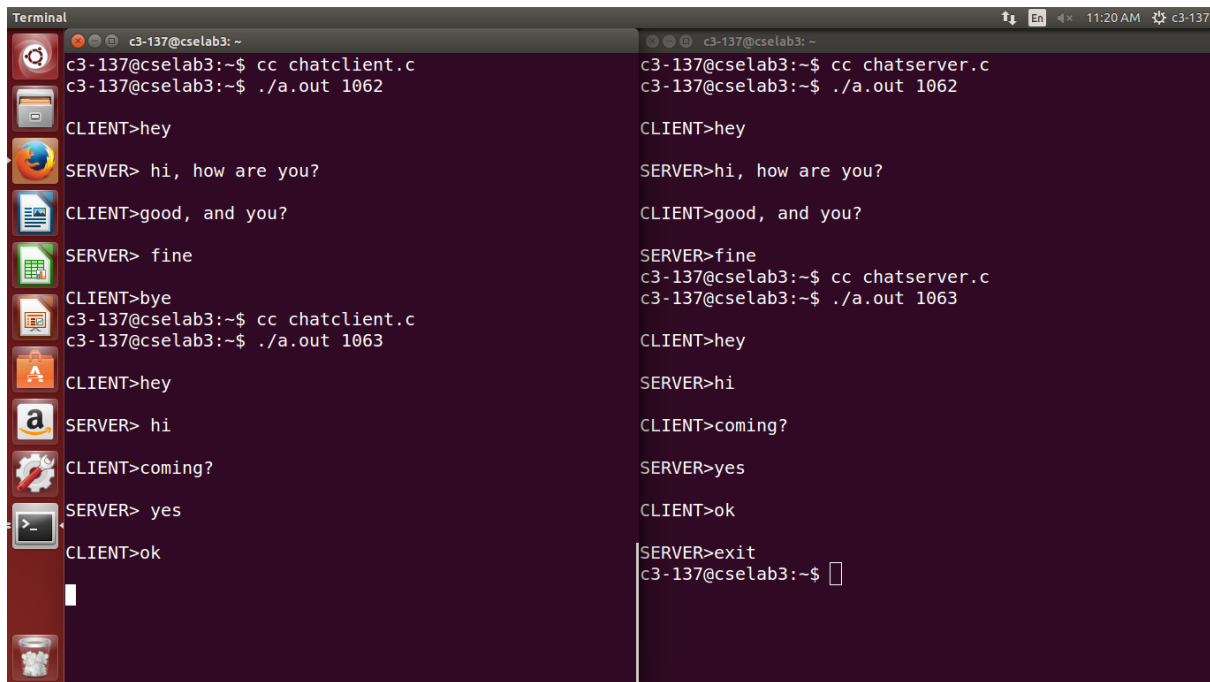
```
#include <netinet/in.h>
#include <stdlib.h>
#include <sys/socket.h>
#include <stdio.h>
#include <string.h>

int main(int argc, char* argv[])
{
    int cli_sfd, nbytes;
    char buf[1024];
    socklen_t addr_size;
    struct sockaddr_in sa, ca;

    cli_sfd = socket(AF_INET, SOCK_DGRAM, 0);
    if(cli_sfd<0)
    {
        perror("socket() error!");
    }
    sa.sin_family = AF_INET;
    sa.sin_port = htons(atoi(argv[1]));
    sa.sin_addr.s_addr = inet_addr("172.20.1.181");
    memset(sa.sin_zero, '\0', sizeof(sa.sin_zero));
    ca.sin_family = AF_INET;
    ca.sin_port = 0;
    ca.sin_addr.s_addr = inet_addr("172.20.1.181");
    memset(ca.sin_zero, '\0', sizeof(ca.sin_zero));

    bind(cli_sfd, (struct sockaddr*)&ca, sizeof(ca));

    addr_size = sizeof(sa);
    while(1)
    {
        write(1, "\nCLIENT> ", 8);
        fgets(buf, 1024, stdin);
        sendto(cli_sfd, &buf, sizeof(buf), 0, (struct
sockaddr*)&sa, addr_size);
        if(strcmp(buf, "bye\n")==0||strcmp(buf,
"exit\n")==0)
            break;
        nbytes = recvfrom(cli_sfd, &buf, 1024, 0, (struct
sockaddr*)&sa, &addr_size);
        buf[nbytes] = '\0';
        if(strcmp(buf, "bye\n")==0||strcmp(buf,
"exit\n")==0)
            break;
        printf("\nSERVER> %s", buf);
    }
    return 0;
}
```

The image shows two side-by-side terminal windows. The left window is titled 'Terminal' and shows a chat client running on port 1062. The right window is titled 'c3-137@c3elab3: ~' and shows a chat server running on port 1062. The interaction is as follows:
Left window (Client):
c3-137@c3elab3:~\$ cc chatclient.c
c3-137@c3elab3:~\$./a.out 1062
CLIENT>hey
SERVER> hi, how are you?
CLIENT>good, and you?
SERVER> fine
CLIENT>bye
c3-137@c3elab3:~\$ cc chatclient.c
c3-137@c3elab3:~\$./a.out 1063
CLIENT>hey
SERVER> hi
CLIENT>coming?
SERVER> yes
CLIENT>ok
Right window (Server):
c3-137@c3elab3:~\$ cc chatserver.c
c3-137@c3elab3:~\$./a.out 1062
CLIENT>hey
SERVER>hi, how are you?
CLIENT>good, and you?
SERVER>fine
c3-137@c3elab3:~\$ cc chatserver.c
c3-137@c3elab3:~\$./a.out 1063
CLIENT>hey
SERVER>hi
CLIENT>coming?
SERVER>yes
CLIENT>ok
SERVER>exit
c3-137@c3elab3:~\$

Chat server (in Python)

```
import socket
s = socket.socket()
host = socket.gethostname()
port = input("Enter port number: ")
s.connect((host, port))
for i in range(3):
    print "CLIENT: " + s.recv(1024)
    s.send(raw_input("SERVER: "))
s.close
```

Chat client (in Python)

```
import socket
s = socket.socket()
port = input("Enter port number: ")
s.bind(('', port))
s.listen(5)
while True:
    c, addr = s.accept()
    print 'Got connection from', addr
    for i in range(3):
        c.send(raw_input("CLIENT: "))
        print "SERVER: "+c.recv(1024)
    c.close()
    break
```

```
Terminal
c3-137@cselab3: ~
c3-137@cselab3:~$ python chatclient.py
Enter port number: 2468
Got connection from ('127.0.0.1', 34803)
CLIENT: Hey.
SERVER: Hi!
CLIENT: How are you?
SERVER: Good, and you?
CLIENT: Fine.
SERVER: Bye.
c3-137@cselab3:~$

c3-137@cselab3:~$ python chatserver.py
Enter port number: 2468
CLIENT: Hey.
SERVER: Hi!
CLIENT: How are you?
SERVER: Good, and you?
CLIENT: Fine.
SERVER: Bye.
c3-137@cselab3:~$
```