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

#define DMAX 200
#define MAX 256
#define SERVER_PORT 45000
#define PENDING 10

int DATA_SEND_RECV(int a);
void s_Chat(int a);
void s_Upload(int a);
void s_Download(int a);
void s_ListFile(int a);
void s_ListUser(int a);
int s_Exit(int a);

void Chat(void);
void Upload(void);
int Download(int a);
void ListFile(void);
void ListUser(void);
int Exit(void);

void error_handling(char* message);
int Receive(int a);

char* Flaglist[6] = {"FLAG_CHAT", "FLAG_UPLOAD","FLAG_DOWNLOAD","FLAG_LIST_FILE","FLAG_LIST_USER","FLAG_EXIT"};
char* tag[3] = {NULL,};
char user[12]="";
char buf[MAX];
char data[DMAX];

int main(int argc, char* argv[])
{
        strcpy(user, argv[1]);
        int sock_flag, conn_flag;
        struct sockaddr_in server_addr;

        if((sock_flag = socket(PF_INET, SOCK_STREAM, IPPROTO_TCP))<0){
                printf("Socket ì\203\235ì\204± ì\213¤í\214¨ ...\n");
                exit(0);
        }
        else
                printf("Socket ì\203\235ì\204± ì\204±ê³µ ...\n");

        server_addr.sin_family = AF_INET;
        server_addr.sin_addr.s_addr = inet_addr("127.0.0.1");
        server_addr.sin_port = htons(SERVER_PORT);

        if((connect(sock_flag, (struct sockaddr*)&server_addr, sizeof(server_addr))) < 0){
                printf("ì\204\234ë²\204-í\201´ë\235¼ì\235´ì\226¸í\212¸ ì\227°ê²° ì\213¤í\214¨ \n");
                exit(0);
        }
else
                printf("ì\204\234ë²\204-í\201´ë\235¼ì\235´ì\226¸í\212¸ ì\227°ê²° ì\204±ê³µ \n");

        DATA_SEND_RECV(sock_flag);

        close(sock_flag);

}

int DATA_SEND_RECV(int sock_flag)
{

        char sBuf[MAX];
        int sflagnum = 0;
        int flagnum = 0;
        int checkfinish = 0;
        int count = 0;

        //char temp[10];
        //while(true){...}


        while(1){
                for(int i = 0;i<6;i++)
                        printf("(%d)%s, ",i+1, Flaglist[i]);
                while(1)
                {       printf("\nEnter flag number: ");
                        if(scanf("%d", &sflagnum)!=0 && sflagnum <7)
                                break;
                        if(count>4)
                                exit(1);
                        count++;

                }sflagnum--;

                memset(buf, 0x00, MAX);
                memset(sBuf, 0x00, MAX);

                switch(sflagnum)
                {
                        case 0:
                                fgets(sBuf, MAX, stdin);
                                s_Chat(sock_flag);
                                break;
                        case 1:
                                s_Upload(sock_flag);
                                printf("ì\227\205ë¡\234ë\223\234ë\201\235");
                                break;
                        case 2:
                                fgets(sBuf, MAX, stdin);
                                s_Download(sock_flag);
                                break;
                        case 3:
                                s_ListFile(sock_flag);
                                break;
                        case 4:
                                s_ListUser(sock_flag);
                                break;
                        case 5:
                                s_Exit(sock_flag);
                                break;
                        default:
                                break;

                }

                ///////ì\206¡ì\213

                printf("\nì\210\230ì\213 ì\213\234ì\236\221\n\n");
                memset(buf, 0x00, MAX);
                read(sock_flag, buf, sizeof(buf));//ì\210\230ì\213
                printf("ì\210\230ì\213 ì\231\204ë£\214\n\n");
                if(read == NULL)
                {
                        printf("ì\210\230ì\213 ë\220\234 ë©\224ì\204¸ì§\200ê°\200 ì\227\220ë\237¬");
                        break;
                }
                printf("receive success: %s\n", buf);

                int i = 0;
                char *ptr = strtok(buf,"|");

                while(ptr!=NULL)
                {
                        tag[i] = ptr;
                        i++;
                        ptr = strtok(NULL, "|");
                }

//              printf("ë\215°ì\235´í\204° ë¶\204ë¦¬ Flag: %s, User: %s, Data: %s\n", tag[0], tag[1], tag[2]);

                for(int i=0;i<6;i++)
                {
                        if(tag[0]!=NULL)
                        {
                                if(strcmp(tag[0],Flaglist[i]) == 0)
                                {
                                        flagnum = i;
                                        break;}}}

                switch(flagnum)
                {
                        case 0:
                                Chat();
                                break;
                        case 1:
                                Upload();
                                break;
                        case 2:
                                Download(sock_flag);
                                break;
                        case 3:
                                ListFile();
                                break;
                        case 4:
                                ListUser();
                                break;
                        case 5:
                                checkfinish = Exit();
                                break;
                        default:
                                break;
                }


                //write(sock_flag, buf, sizeof(buf));//ì\206¡ì\213
                if(checkfinish == 1)
                        break;
                memset(buf,0x00,MAX);
                tag[0]=NULL;
                tag[1]=NULL;
                tag[2]=NULL;

                printf("____________________________________________________________________________________\n");

        }
}


void s_Chat(int sock_flag)
{
        memset(data, 0x00, MAX);
        printf("Enter data: ");
        fgets(data, DMAX, stdin);

        strcat(buf, Flaglist[0]);
        strcat(buf, "|");
        strcat(buf, user);
        strcat(buf, "|");
        strcat(buf, data);

        write(sock_flag, buf, sizeof(buf));
        printf("send success: %s", buf);

}
void s_Upload(int sock_flag)
{
    int fd, n;
    int DATA_SIZE = 200;
    char DATA[DATA_SIZE];

    memset(buf, 0x00, MAX);
    memset(DATA, 0x00, DATA_SIZE);

    fd = open("2020_NW_Final_Project.pdf", O_RDONLY);
    printf("file open ì\204±ê³µ\n");
    if (fd < 0)
        error_handling("open() error");

    while (1)
    {
        memset(buf, 0x00, MAX);
        memset(DATA, 0x00, DATA_SIZE);

        n=read(fd, DATA, DATA_SIZE-1);
        strcat(DATA, "\0");
        if(n < 0)
                error_handling("read() error");
        if(n == 0)
        {
            printf("this file is finish\n");
            break;
        }

        strcpy(buf, Flaglist[1]);
        strcat(buf, "|");
        strcat(buf, user);
        strcat(buf, "|");
        strcat(buf, DATA);
        write(sock_flag, buf, sizeof(buf));
        printf("%s\n", buf);
    }

    memset(DATA, 0x00, DATA_SIZE);
    memset(buf, 0x00, MAX);
    strcpy(buf, Flaglist[1]);
    strcat(buf, "|");
    strcat(buf, user);
    strcat(buf, "|");
    strcat(buf, "EOF");
    write(sock_flag, buf, sizeof(buf));
    printf("%s\n", buf);
    printf("ì \204ì\206¡ì\231\204ë£\214\n");
    close(fd);
```

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}

void s_Download(int sock_flag)
{
        memset(buf, 0x00, MAX);
        printf("Enter file name: ");
        fgets(data, DMAX, stdin);

        strcat(buf, Flaglist[2]);
        strcat(buf, "|");
        strcat(buf, user);
        strcat(buf, "|");
        strcat(buf, data);

        write(sock_flag, buf, sizeof(buf));
        printf("%s", buf);
}
void s_ListFile(int sock_flag)
{
        strcat(buf, Flaglist[3]);
        strcat(buf, "|");
        strcat(buf, user);
        strcat(buf, "|");
        strcat(buf, "NULL");

        write(sock_flag, buf, sizeof(buf));
        printf("send success: %s", buf);
}
void s_ListUser(int sock_flag)
{
        strcat(buf, Flaglist[4]);
        strcat(buf,"|");
        strcat(buf, user);
        strcat(buf, "|");
        strcat(buf, "NULL");

        write(sock_flag, buf, sizeof(buf));
        printf("send success:%s", buf);
}
int s_Exit(int sock_flag)
{
        strcat(buf, Flaglist[5]);
        strcat(buf, "|");
        strcat(buf, user);
        strcat(buf, "|");
        strcat(buf, "EXIT");

        write(sock_flag, buf, sizeof(buf));
        printf("send success: %s", buf);
}


void Chat(void)
{
        char* Data = tag[2];
        printf("From server data: %s\n", Data);
}

void Upload(void)
{
        char* Data = tag[2];
        printf("From server: %s\n", Data);
}

int Download(int sock_flag)
{
        int fd;
        char temp[200];
        char* Data = tag[2];

        if(strcmp("[ERR] Not found file.", Data)==0)
        {
                printf("From server: %s\n",Data);
                return 0;
        }

        fd = open("download.pdf", O_WRONLY|O_CREAT|S_IXUSR);
        if (fd < 0)
                error_handling("file open error\n");

        memset(temp, 0x00, 200);

        int flag_num;
        while(1)
        {

                flag_num = Receive(sock_flag);
                if(flag_num!=2)
                {
                        printf("Download Error!");
                        break;
                }
                memset(temp, 0x00, 200);
                strcpy(temp,tag[2]);
//              printf("%s", temp);
                if(strcmp(temp, "EOF")==0 || strcmp(temp, "[Download] Done.")==0)
                        break;
                if(write(fd,temp, sizeof(temp))<0)
                        error_handling("write() error");
                lseek(fd, 199, SEEK_CUR);
        }
        close(fd);
        printf("finish download\n");
        return 0;
}
void error_handling(char* message)
{
    printf("%s", message);
    fputc('\n', stderr);
    exit(1);
}
void ListFile(void)
{
        char* Data = tag[2];
        printf("From server: %s\n", Data);
}
void ListUser(void)
{
        char* Data = tag[2];
        printf("From server: %s\n", Data);
}
int Exit(void)
{
        char* Data = tag[2];
        if(strcmp(Data, "BYE")==0)
        {
                printf("ì\204\234ë²\204 ì¢\205ë£\214..\n");
                return 1;
        }
        else
                return 0;
}

int Receive(int sock_flag)
```

```
{
        int flagnum=0;

        memset(buf, 0x00, MAX);
        read(sock_flag, buf, sizeof(buf));//ì\210\230ì\213
        //printf("ì\210\230ì\213 ì\231\204ë£\214\n\n");

        if(read == NULL)
        {
                printf("ì\210\230ì\213 ë\220\234 ë©\224ì\204¸ì§\200ê°\200 ì\227\220ë\237¬");
                return 6;
        }
        int i = 0;
        char *ptr = strtok(buf,"|");
        while(ptr!=NULL)
        {
                tag[i] = ptr;
                i++;
                ptr = strtok(NULL, "|");
        }

        for(int i=0;i<6;i++)
        {
                if(tag[0]!=NULL)
                {
                        if(strcmp(tag[0],Flaglist[i]) == 0)
                        {
                                flagnum = i;
                                break;
                        }}}
        return flagnum;
}
```