Report

- Protocol Specification
- User & Operator Guide
- System & Program Design
- Problem and Solution

Protocol Specification

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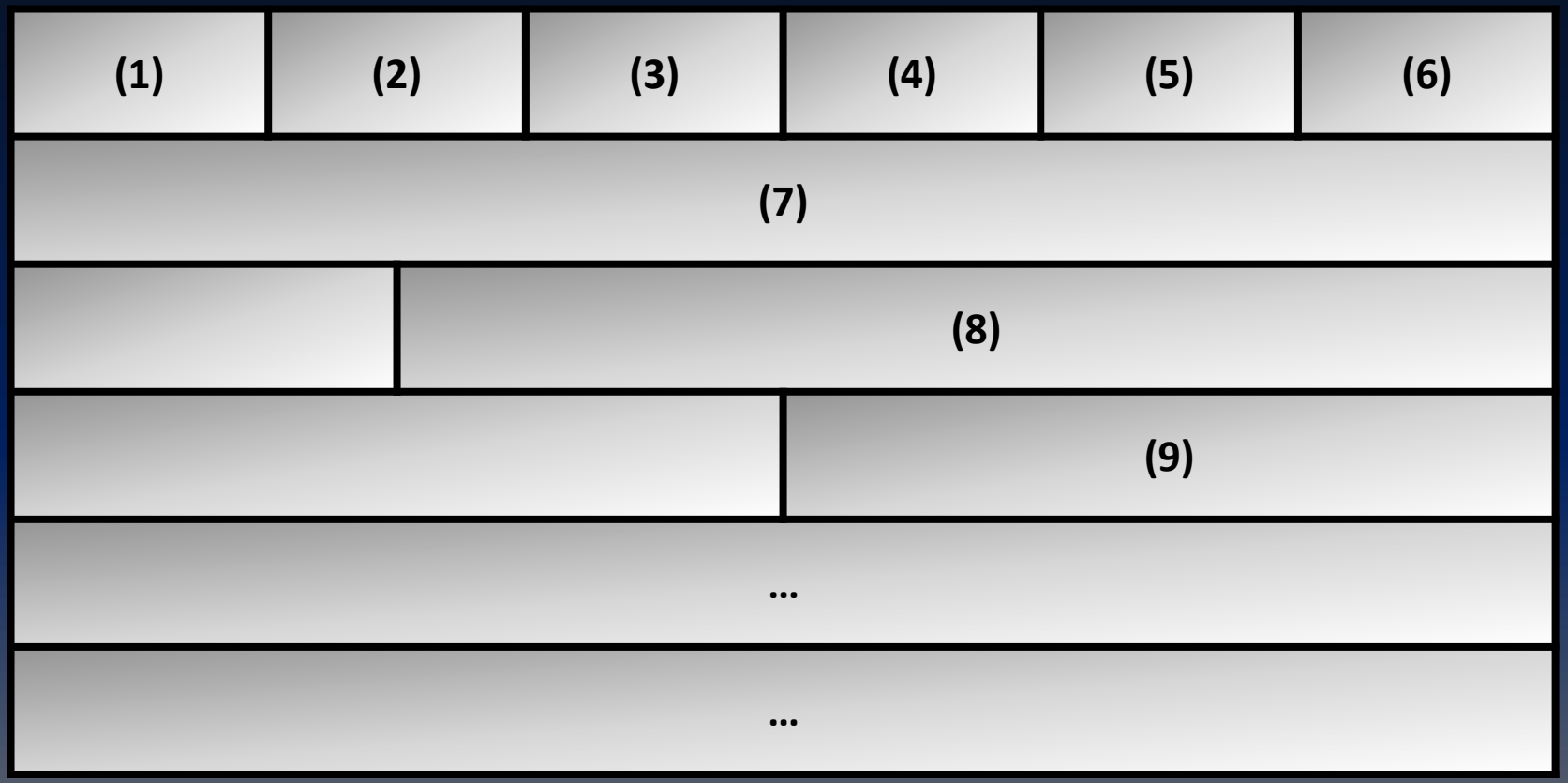
Protocol Specification



Protocol Specification

1. Type
2. Error
3. Self Index
4. Sender Index
5. Receiver Index
6. Data Length
7. ID
8. Password
9. Data

User & Operator Guide

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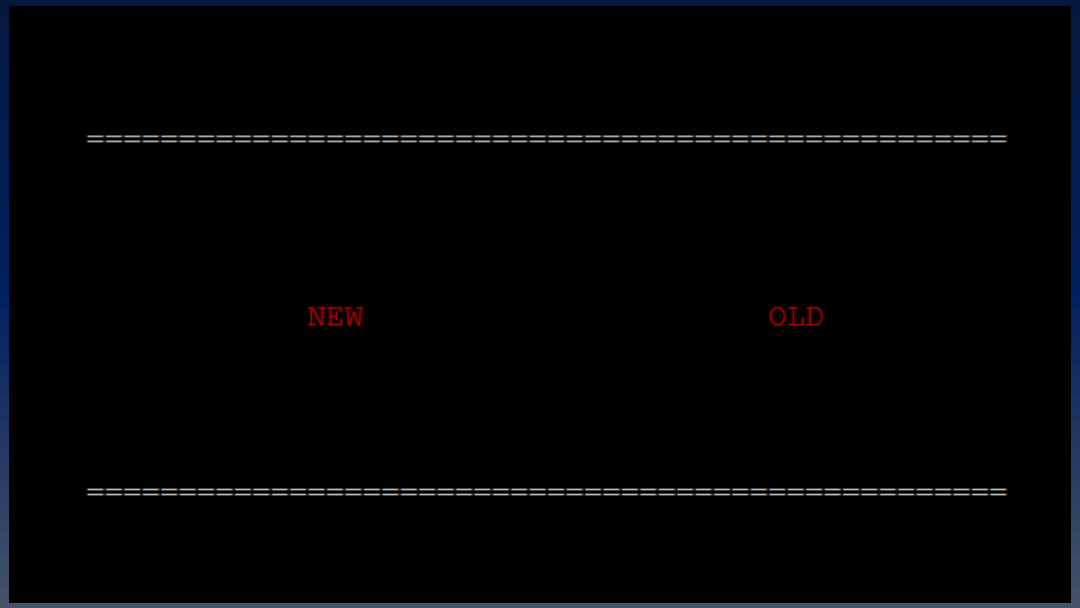
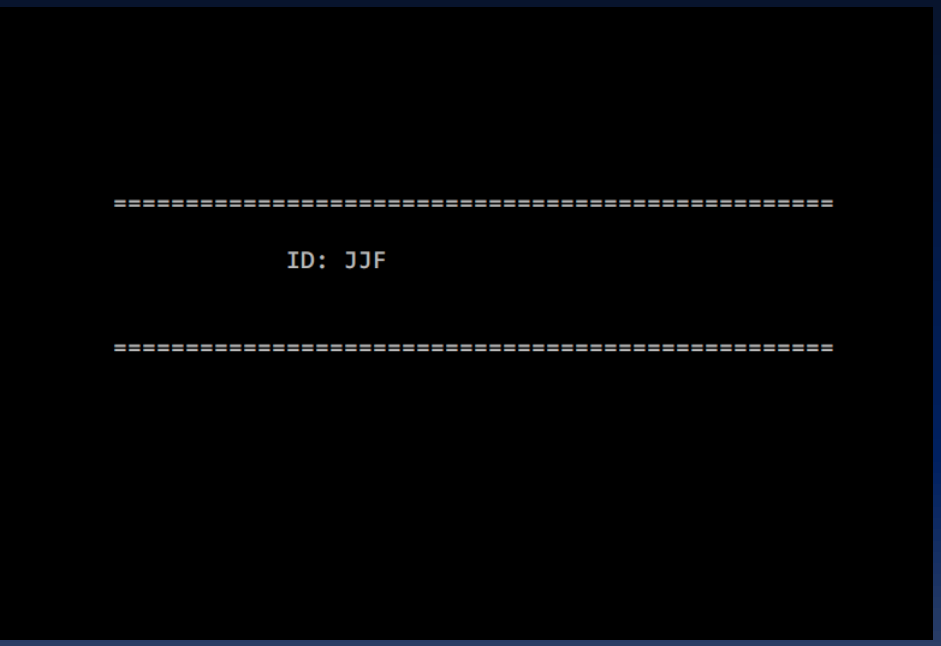
Press Left or Right

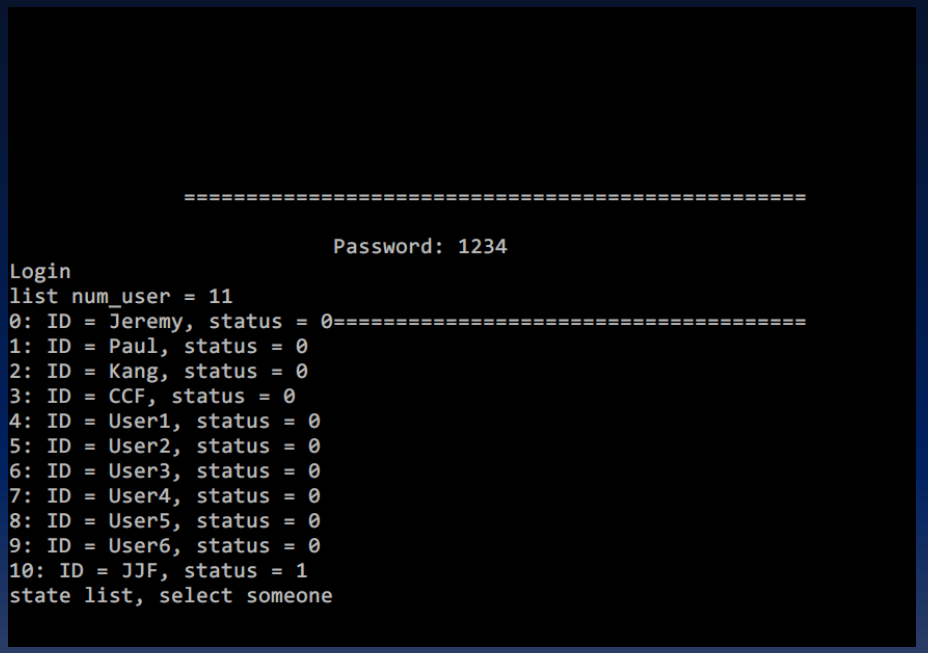
Registration



Press Left to choose new

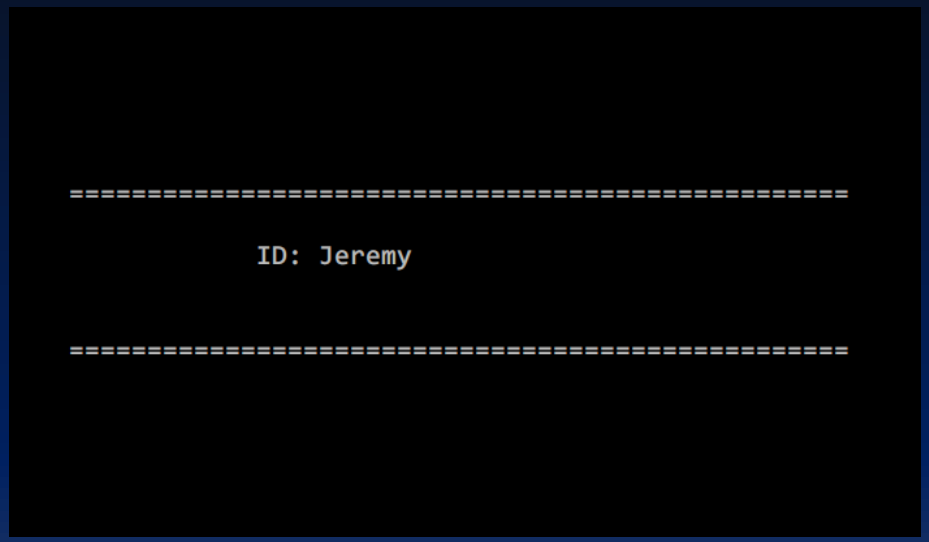
Registration



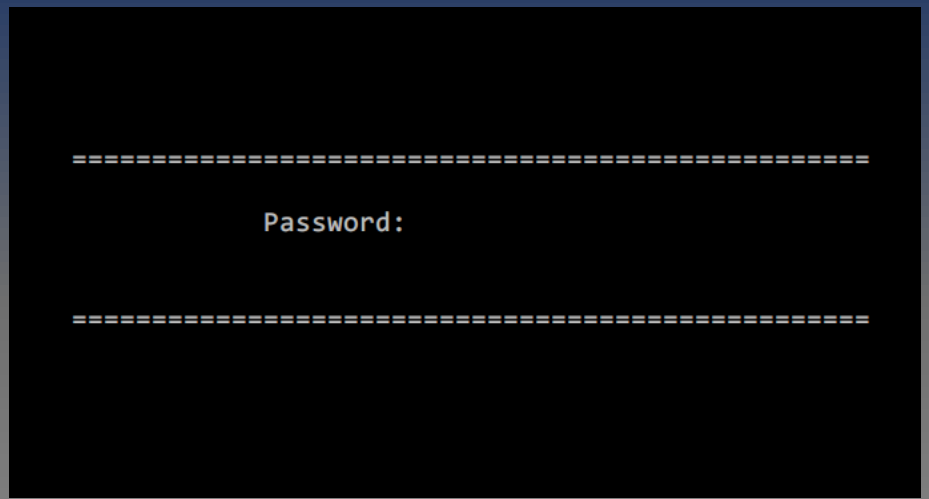


Enter ID and Password, if will auto login if succes

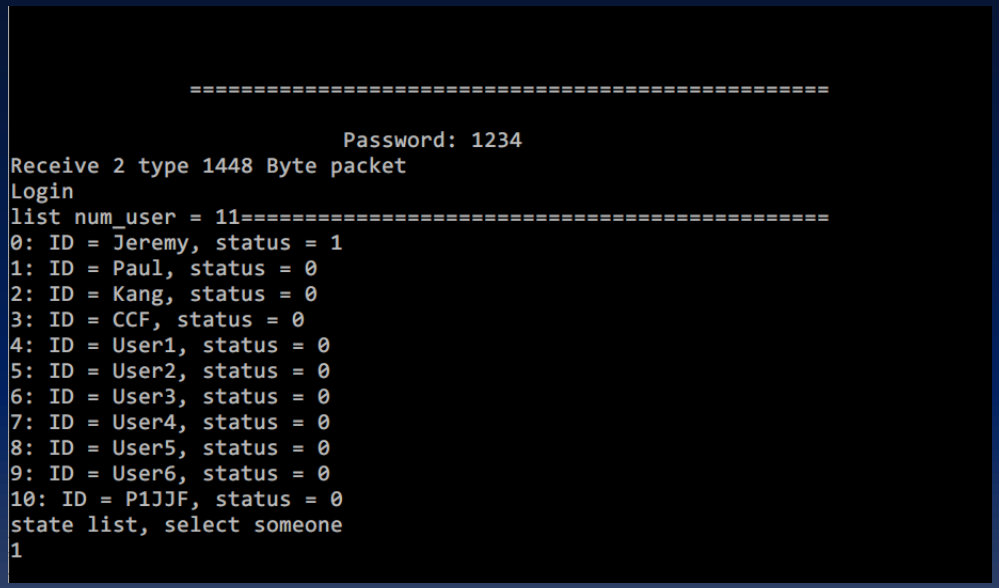
Login



&

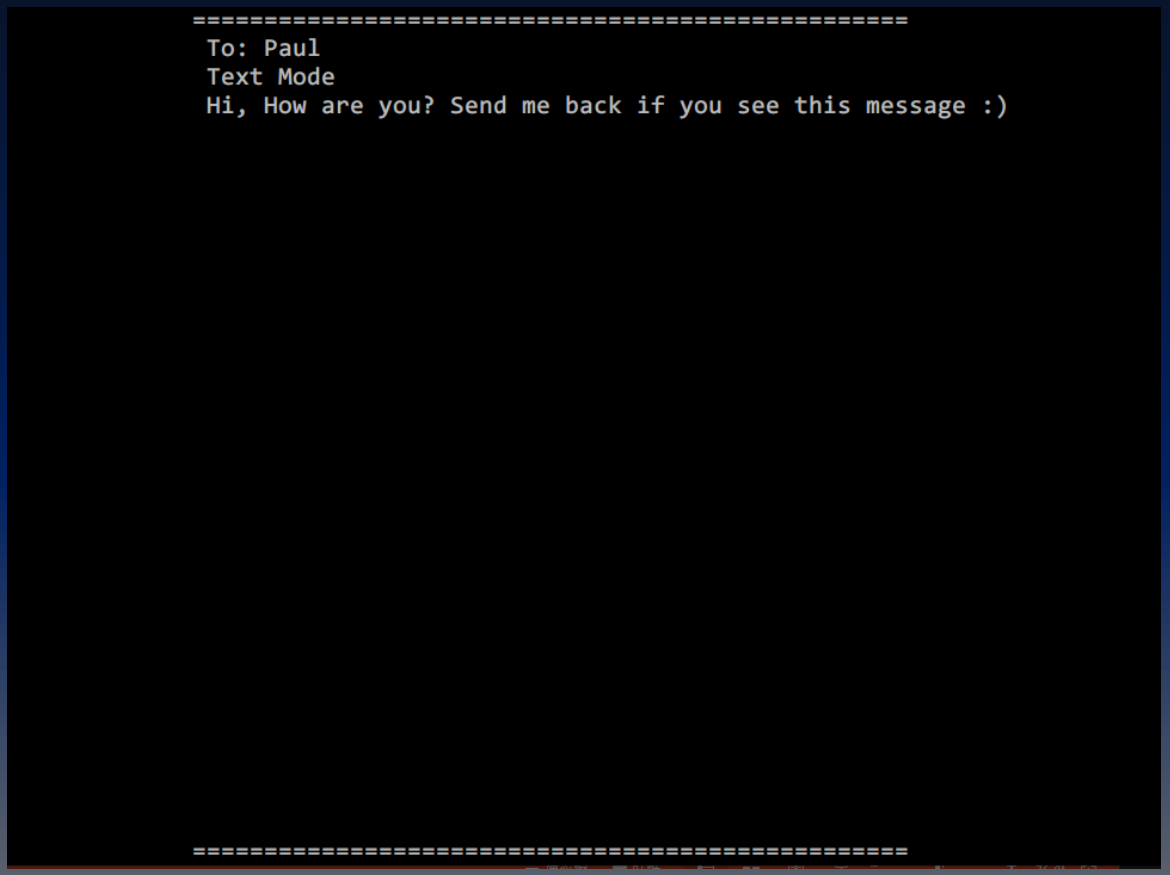


Messaging



After Login, There will appear a user list and you can choose a user to send message
Choose a user and press Enter.

Messaging



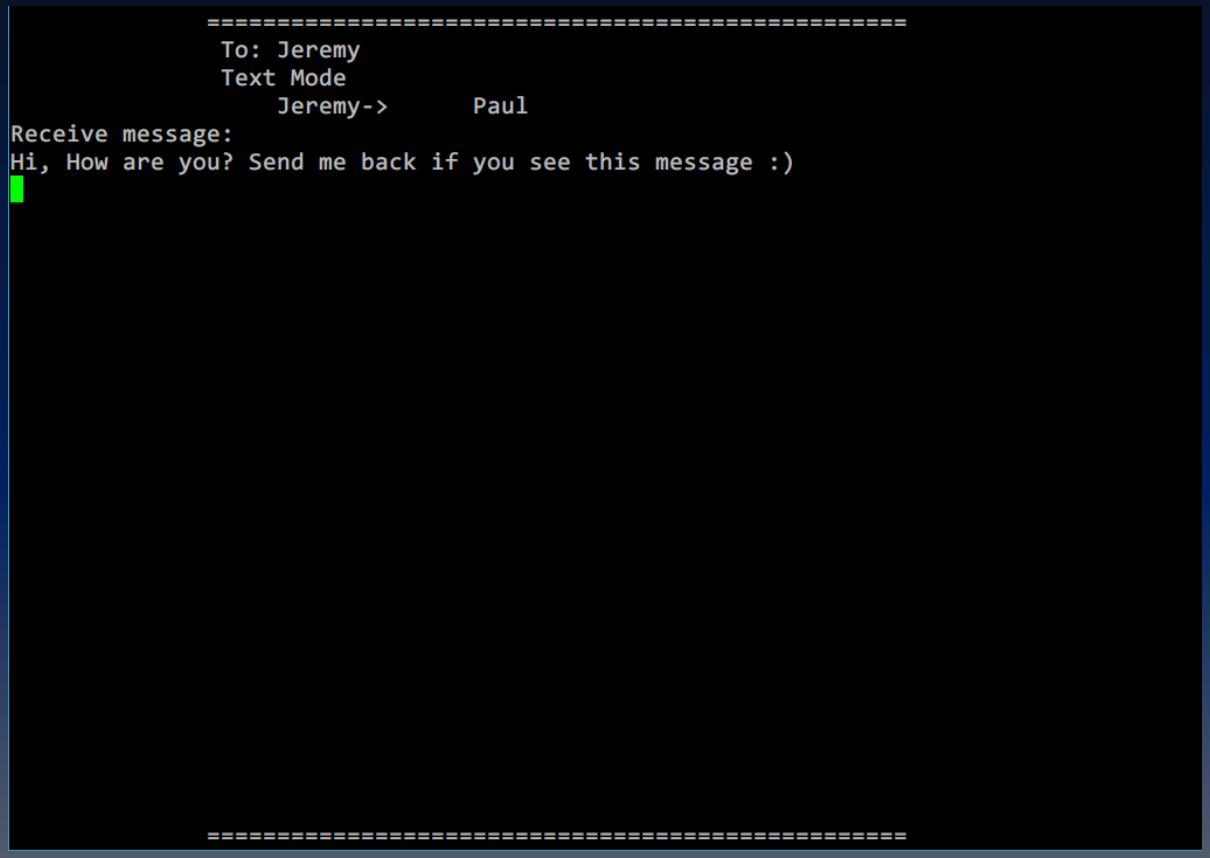
Press Enter to send Message.

If you want to Send multiply lines message you can Press F2 to change into Long Text Mod

Messaging

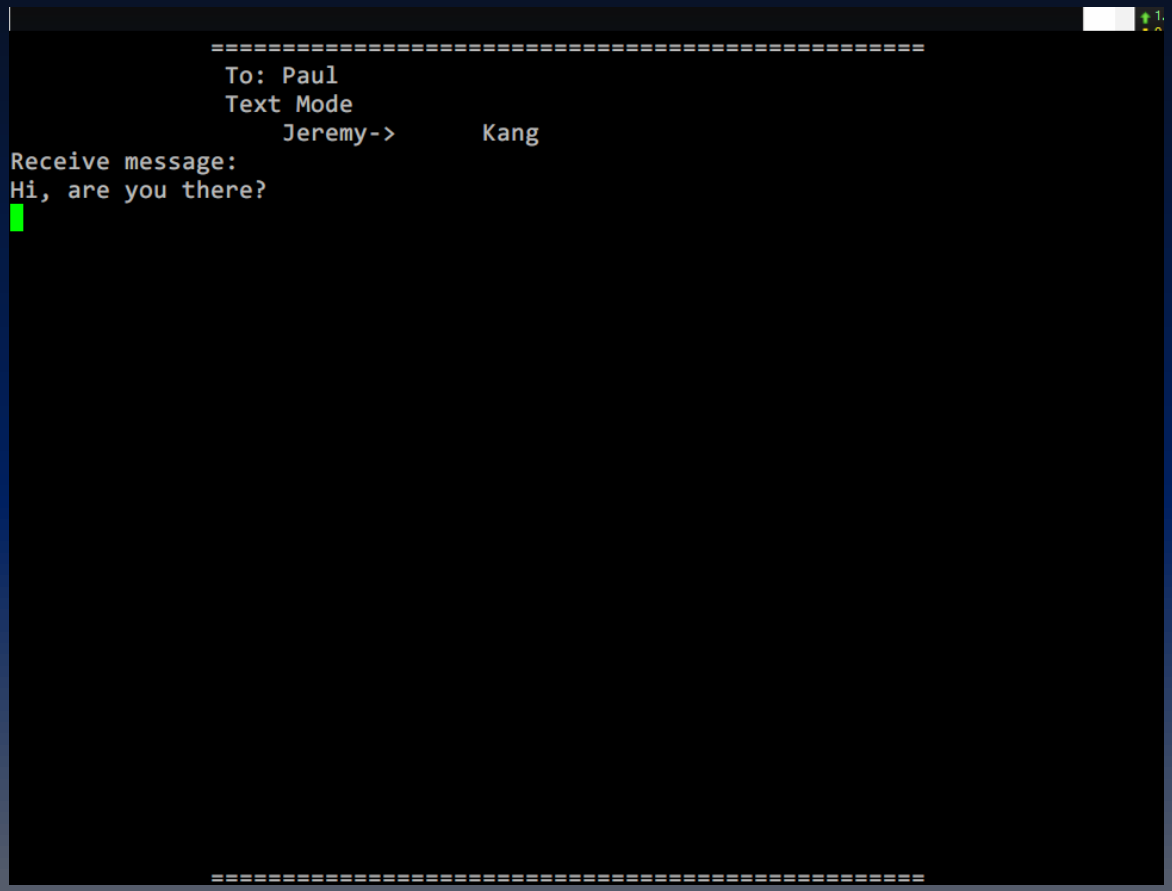
Press F1 to change back to Text Mode and press Enter to send message

Messaging(Online)



The User you sent message to will receive the message if he or she is online.

Messaging(Offline)



If the user is currently offline, he or she will receive the message when he/she login.

Messaging(Historical)

```
Log:                                Paul->                              Jeremy
Hey

Log:                                Paul->                              Jeremy
How are you
```

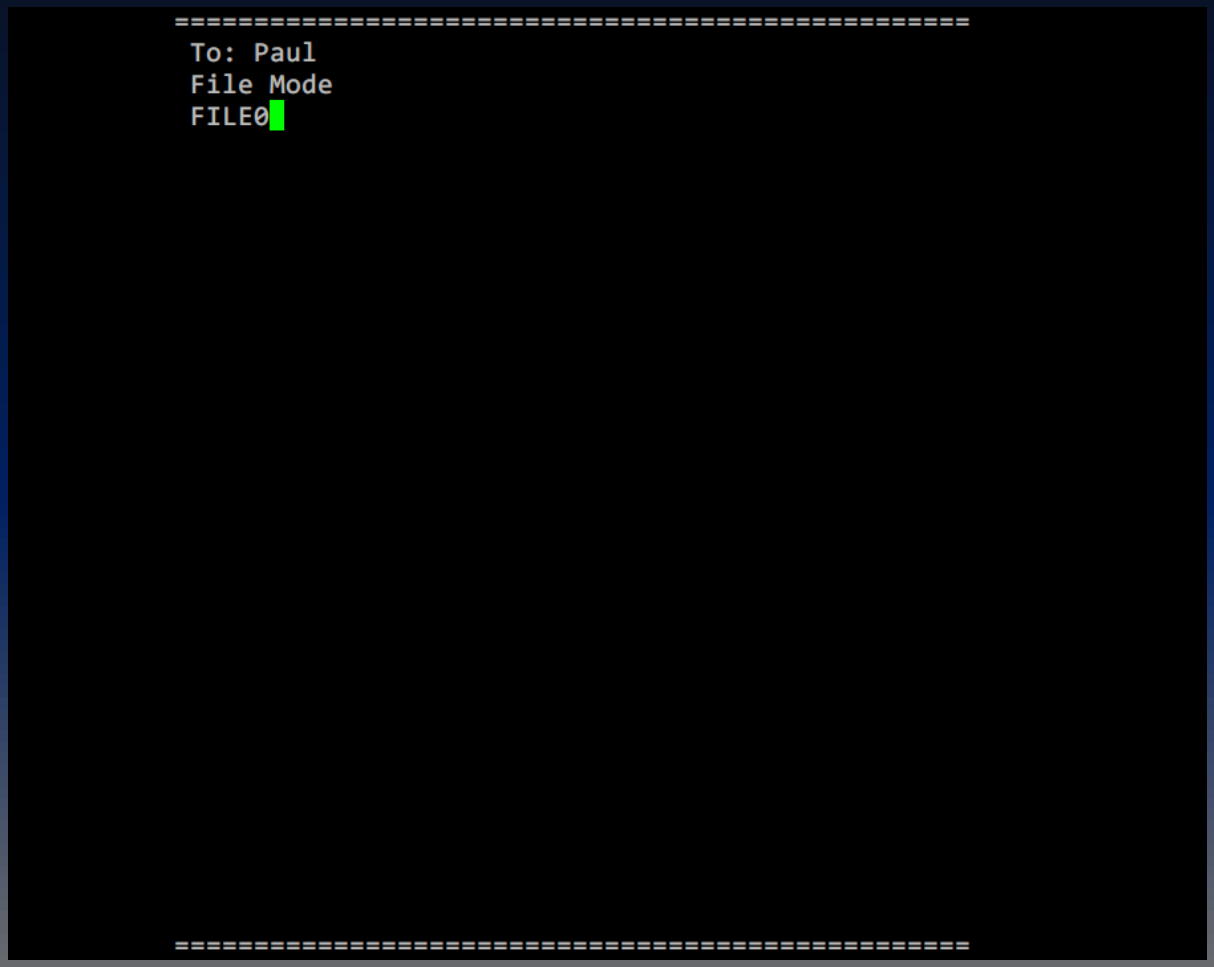
The server side will keep a log on sent and received messages for users to query.

```
write messageQ to file..
size = 2
Backup: 1->0                                              Hey
Backup: 1->0                                  How are you
shut down in 1 sec...
```

Messages will persist after server restarts, they are stored in a file

```
size = 2
Restore: Paul->Jeremy                                     Hey
Restore: Paul->Jeremy                         How are you
```

File Transfer



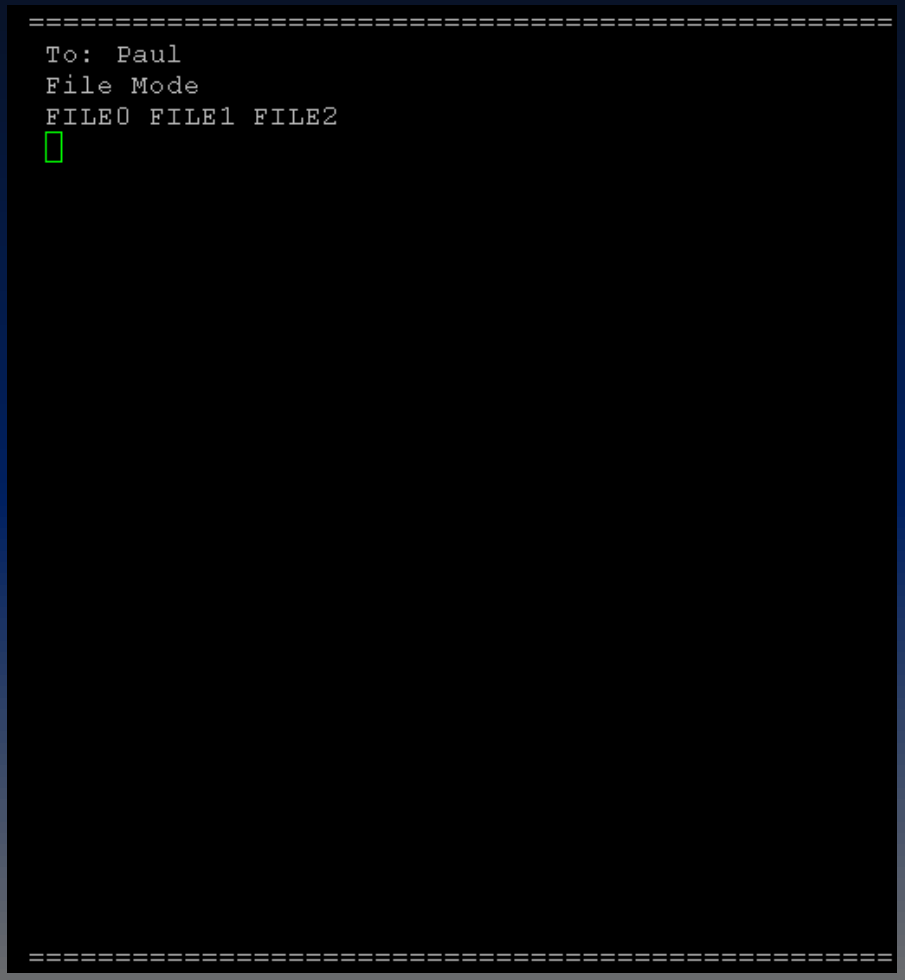
Type in File name and press Enter to transfer

File Transfer

```
offset = 18466
    Jeremy->      Paul
receive data part:18466
filename = ../download/FILE0
offset = 19785
    Jeremy->      Paul
receive data part:19785
filename = ../download/FILE0
offset = 21104
    Jeremy->      Paul
receive data part:21104
filename = ../download/FILE0
offset = 22423
    Jeremy->      Paul
receive data part:22423
filename = ../download/FILE0
offset = 23742
    Jeremy->      Paul
receive data part:23742
filename = ../download/FILE0
offset = 25061
    Jeremy->      Paul
receive data part:25061
filename = ../download/FILE0
offset = 26380
    Jeremy->      Paul
receive data part:26380
receive file complete: ../download/FILE0
total file size: 26521
```

Receiver side will show these messages

File Transfer(Multiply Files)



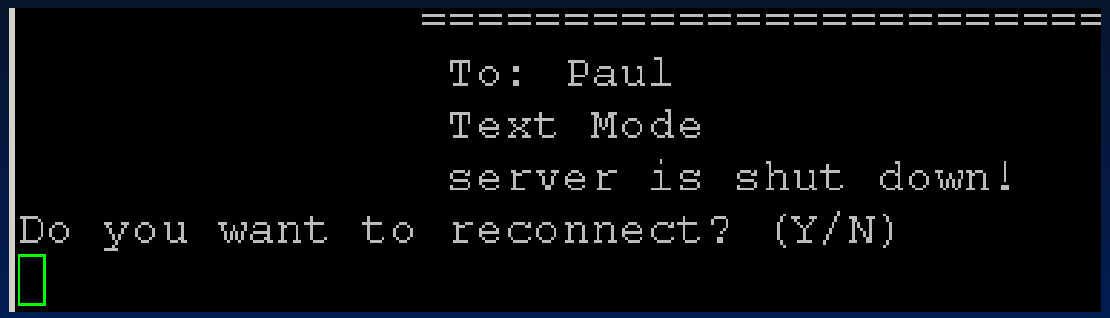
You can keep type in the file names and they will all transfer at the same time

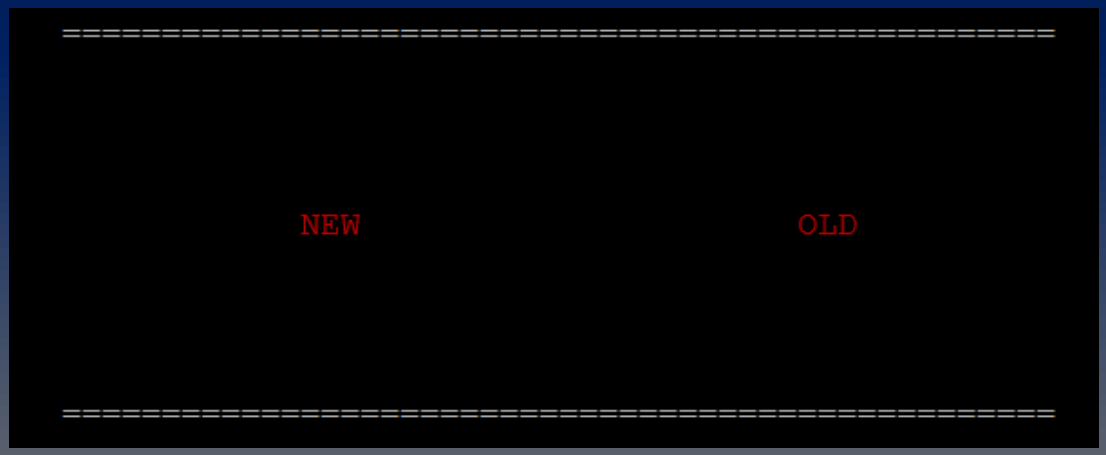
File Transfer(Multiply Files)

```
filename = ../download/FILE0
offset = 25061
      Kang->      Paul
receive data part:25061
filename = ../download/FILE1
offset = 25061
      Kang->      Paul
receive data part:25061
filename = ../download/FILE2
offset = 25061
      Kang->      Paul
receive data part:25061
filename = ../download/FILE0
offset = 26380
      Kang->      Paul
receive data part:26380
receive file complete: ../download/FILE0
total file size: 26521
filename = ../download/FILE1
offset = 26380
      Kang->      Paul
receive data part:26380
receive file complete: ../download/FILE1
total file size: 26521
filename = ../download/FILE2
offset = 26380
      Kang->      Paul
receive data part:26380
receive file complete: ../download/FILE2
total file size: 26521
```

Receiver side will show these messages

Bonus : Auto Reconnect





If Sever is close, client will ask reconnecting or not

Bonus : Encryption

```
unsigned char AES_key[] = {"DoReMiFaDoReMiFa"};
```

Using AES-128 Encryption

```
void write_encrypt(){
    memcpy(enc_buffer, &sendpack, sizeof(sendpack));

    aes.Cipher((void *)&enc_buffer, enc_size);

    memcpy(&sendpack, enc_buffer, sizeof(sendpack));
    write(sockfd, &sendpack, sizeof(sendpack));
}

int read_decrypt(){
    int n = read(sockfd, &recvpack, sizeof(struct packet));
    memcpy(enc_buffer, &recvpack, sizeof(recvpack));

    aes.InvCipher((void *)&enc_buffer, enc_size);

    memcpy(&recvpack, enc_buffer, sizeof(recvpack));
    return n;
}
```

When sending or receiving pack, encryption or decryption it

System & Program Design

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FSM Client

- while (1) {

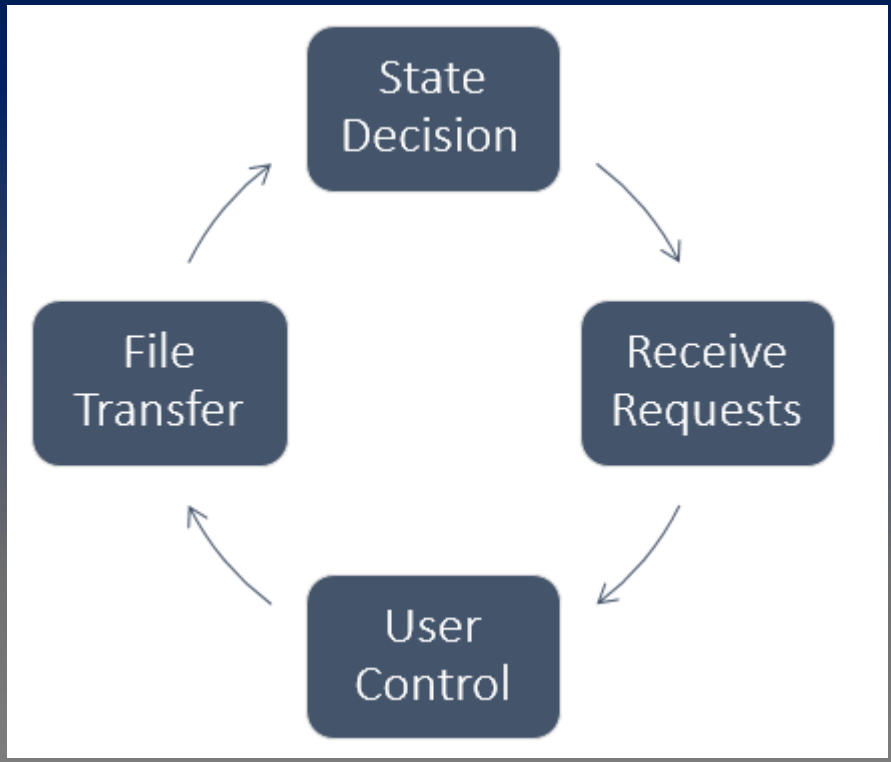
  State Decision;

  Receive Requests;

  User Control;

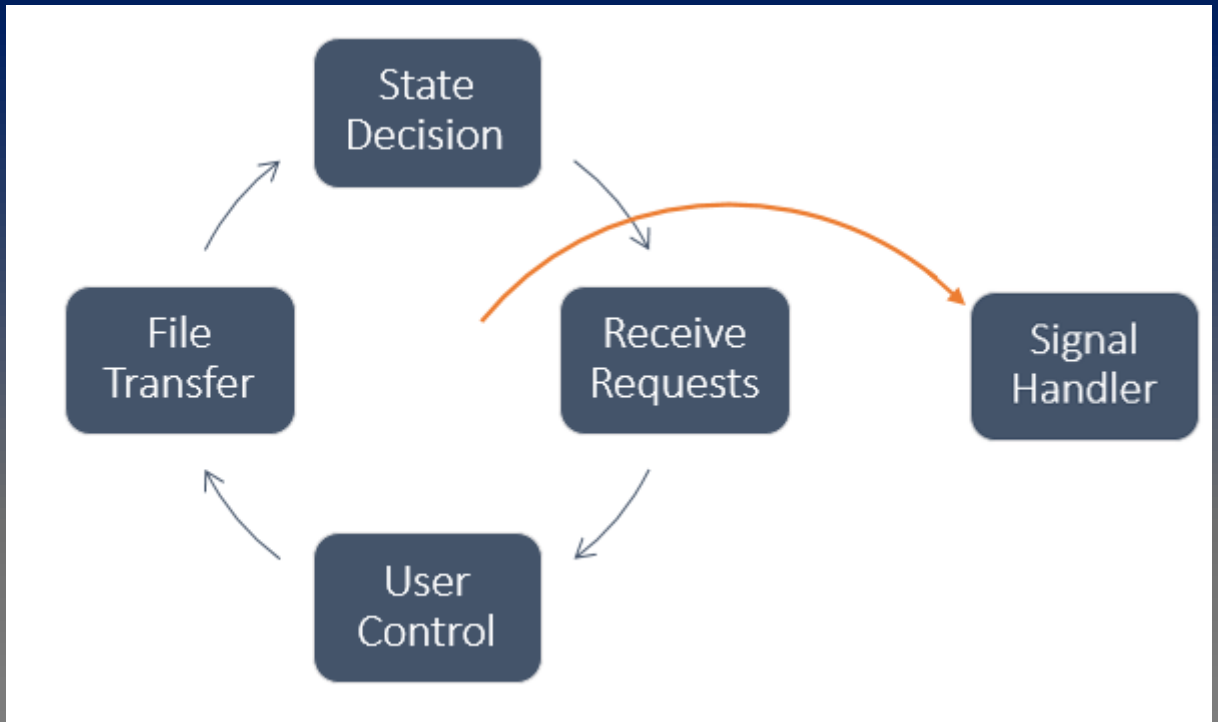
  File Transfer;

- }



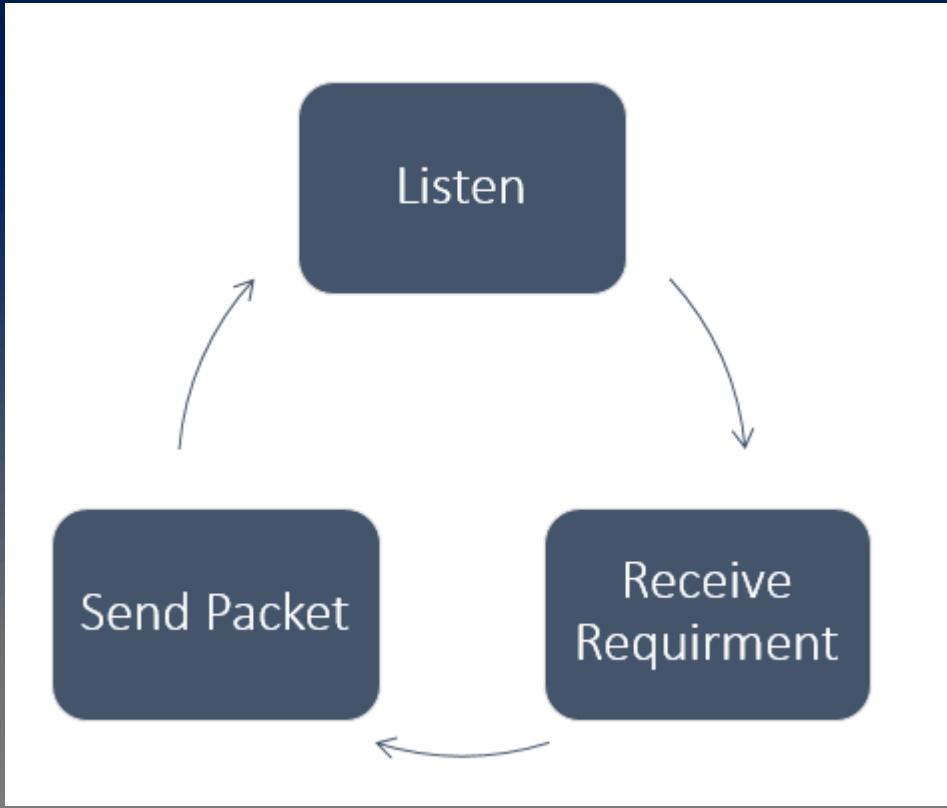
FSM Client (signal handler)

- void sigint_shut_down
- void sigpipe_shut_down

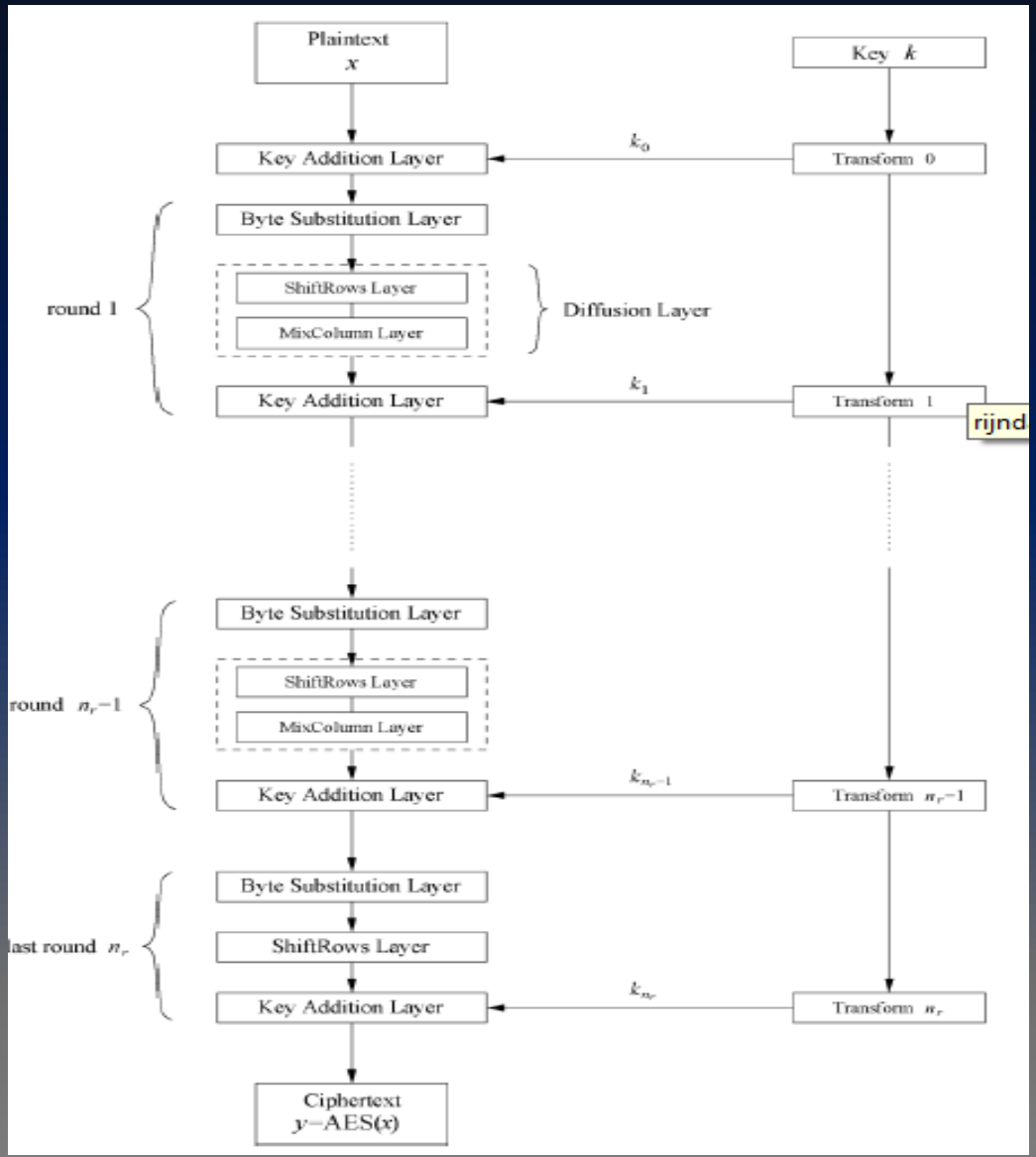


FSM Server

- Receive a packet
- According to packet type do different things



AES Encryption



Problem & Solution

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Problem and Solution

- Problem: 用Command Line做檔案傳輸需要輸入許多複雜指令，不夠人性化。

- Solution: 自行設計simple interface，使用直覺化，除了測試時比較方便，新使用者也容易上手。

Problem and Solution

- Problem: 封包傳送過程會遺失或不齊全, 傳送出去跟接收端收到的大小不同，因為我們封包大小太大(2048 Byte)，每次傳出去後半段的封包都會遺失。

- Solution: 將封包大小壓到1488Byte以下，封包傳送就不會遺失了。

Problem and Solution

- Problem:封包中的data陣列如果被資料全填滿，將會因為沒有終止字元使得讀取發生錯誤。

- Solution: 在char陣列最後面留幾個byte來存放終止字元，問題即解決。