UJIAN TENGAH SEMESTER PEMROGRAMAN JARINGAN C INFORMATIKA
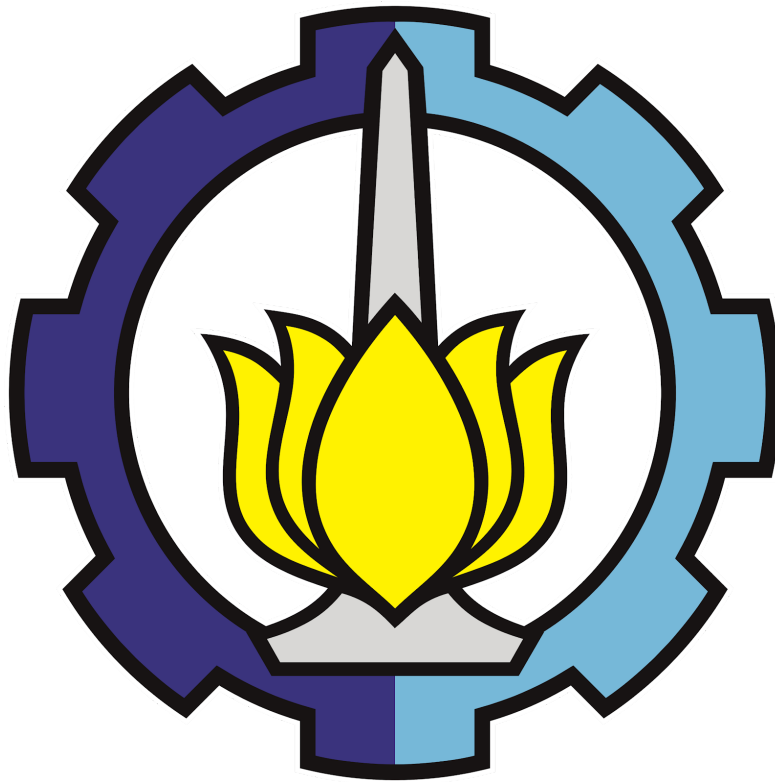
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Pemrograman Jaringan C
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SOAL :
- Buatlah sepasang aplikasi server-client yang mengakomodir CHAT dan File Transfer.
- Di setiap client, akan menampilkan rekap chat (semacam group)
- Tambahan fitur untuk client :
    - UPLOAD <namafile> : mengupload ke server
    - LIST : menampilkan daftar file
    - SENDALL <namafile> : mengirim file ke semua client
    - DOWNLOAD <namafile> : mendownload file dari server
    - REMOVE <namafile> : menghapus file di server
- Akan ada notifikasi jika upload berhasil. Atau ketika anda menerima file karena salah seorang member mengklik sendall.

JAWABAN :
- **CLIENT**
    - Untuk client, pertama - tama membungkus tambahan fitur pada soal kedalam format tertentu
        - **UPLOAD <namafile>**
          `UPLD:<namafile>|<binaryfile>|EOF`

          Client mengupload file ke server
        - **LIST**
          `LIST`

          Client meminta list file server
        - **SENDALL <namafile>**
          `SDAL:<namafile>|<binaryfile>|EOF`

          Client A mengirim ke file ke semua client kecuali client A melalui server
        - **DOWNLOAD <namafile>**
          `DOWN:<namafile>`

          Client meminta mendownload file tertentu dari server
        - **REMOVE <namafile>**
          `DELL:<namafile>`

          Client meminta server untuk menghapus file tertentu
        - **<message>**
          `MESG:<message>`

          Client mengirim pesan yang akan di broadcast ke semua client

○ Pemformatan diatas dapat dilakukan dengan code berikut :

```python
else :
    message = sys.stdin.readline()
    message = message.strip()
    if message.startswith("UPLOAD"):
        message = message[7:]
        server_socket.send(TYPE_UPLOAD+':'+message+'|')
        with open(PATH_CLIENT+message, 'rb') as f:
            chunk = f.read(MAX_BUFFER)
            while chunk:
                server_socket.send(chunk)
                chunk = f.read(MAX_BUFFER)
        server_socket.send(TYPE_END)
        sys.stdout.write("<You> : Sending file to server")
        sys.stdout.write("\n")
        sys.stdout.flush()
    elif message.startswith("LIST"):
        message = message[5:]
        server_socket.send(TYPE_LIST)
    elif message.startswith("SENDALL"):
        sys.stdout.write("<You> : Sending file to all client")
        message = message[8:]
        server_socket.send(TYPE_SENDALL+':'+message+'|')
        with open(PATH_CLIENT+message, 'rb') as f:
            chunk = f.read(MAX_BUFFER)
            while chunk:
                server_socket.send(chunk)
                chunk = f.read(MAX_BUFFER)
        server_socket.send(TYPE_END)
        sys.stdout.write("<You> : ")
        sys.stdout.write("Send file with name "+ message)
        sys.stdout.write("\n")
        sys.stdout.flush()
    elif message.startswith("DOWNLOAD"):
        message = message[9:]
        sys.stdout.write("<You> : Downloading")
        server_socket.send(TYPE_DOWNLOAD+':'+message)
    elif message.startswith("REMOVE"):
        message = message[7:]
        sys.stdout.write("<You> : Remove file")
        server_socket.send(TYPE_REMOVE+':'+message)
    else :
        server_socket.send(TYPE_MESSAGE+':'+message)
        sys.stdout.write("<You> : ")
        sys.stdout.write(message)
        sys.stdout.write("\n")
        sys.stdout.flush()
```

- ○ Untuk menerima pesan dari server, terbagi menjadi 5 format :
  - ■ `UPLD:File uploaded!`
    Setelah user mengupload file, pesan ini menandakan bahwa file berhasil untuk diupload
  - ■ `LIST:<list file from server>`
    Pesan ini mengandung list file dari server
  - ■ `FILE:<namafile>|<binaryfile>|EOF`
    Pesan ini mengandung pengiriman file dari server, merupakan response dari `SENDALL` maupun `DOWNLOAD`
  - ■ `DELL:File Removed!`
    Pesan ini mengandung notifikasi bahwa file telah terhapus
  - ■ `MESG:<message>`
    Pesan ini menandakan bahwa pesan ini merupakan pesan message

```python
message = socket.recv(MAX_BUFFER)
TYPE = message[:4]
if TYPE == TYPE_UPLOAD:
    message = message[5:]
    print message
elif TYPE == TYPE_LIST:
    message = message[5:]
    print message
elif TYPE == TYPE_FILE:
    chunk = message.split('|')
    if len(chunk) == 2:
        filename = chunk[0][5:]
        chunk = chunk[1]
    else :
        chunk = ''
        filename = chunk[0][5:]
    with open(PATH_CLIENT+hash_random+'_'+filename, 'wb') as f:
        lanjut = True
        f.write(chunk)
        if TYPE_END in chunk:
            chunk = chunk.replace(TYPE_END,'')
            f.write(chunk)
            lanjut = False
        while lanjut:
            chunk = socket.recv(MAX_BUFFER)
            if TYPE_END in chunk:
                chunk = chunk.replace(TYPE_END,'')
                f.write(chunk)
                break
            f.write(chunk)
    print 'File received :' + hash_random+'_'+filename
elif TYPE == TYPE_REMOVE:
    print message[5:]
elif TYPE == TYPE_MESSAGE:
    print message[5:]
```

- **SERVER**
  - Server menerima pesan berformat dari client sebagai berikut :
    - **UPLD:<namafile>|<binaryfile>|EOF**
      Client mengupload file ke server, server menerimanya dengan

memparsing namafile serta binary file dari format diatas

```python
if TYPE == TYPE_UPLOAD:
    chunk = message.split('|')
    print chunk
    if len(chunk) == 2:
        filename = chunk[0][5:]
        chunk = chunk[1]
    else:
        filename = chunk[0][5:]
        chunk = ''
    print PATH_SERVER+filename
    with open(PATH_SERVER+filename, 'wb') as f:
        lanjut = True
        f.write(chunk)
        if TYPE_END in chunk:
            chunk = chunk.replace(TYPE_END, '')
            f.write(chunk)
            lanjut = False
        while lanjut:
            chunk = connection.recv(MAX_BUFFER)
            if TYPE_END in chunk:
                chunk = chunk.replace(TYPE_END, '')
                f.write(chunk)
                break
            f.write(chunk)
    connection.send(TYPE_UPLOAD+':File uploaded!')
```

- **LIST**
  Client meminta list file server

```python
elif TYPE == TYPE_LIST:
    list_file = os.popen("ls "+PATH_SERVER).read()
    connection.send(TYPE_LIST+':'+list_file)
```

- **SDAL:<namafile>|<binaryfile>|EOF**
  Server menerima file dari Client, kemudian membroadcast file tersebut
  ke semua client kecuali client yang meminta

```python
elif TYPE == TYPE_SENDALL:
    chunk = message.split('|')
    print chunk
    if len(chunk) == 2:
        filename = chunk[0][5:]
        chunk = chunk[1]
    else:
        filename = chunk[0][5:]
        chunk = ''
    print PATH_SERVER+filename
    with open(PATH_SERVER+filename, 'wb') as f:
        lanjut = True
        f.write(chunk)
        if TYPE_END in chunk:
            chunk = chunk.replace(TYPE_END, '')
            f.write(chunk)
            lanjut = False
        while lanjut:
            chunk = connection.recv(MAX_BUFFER)
            if TYPE_END in chunk:
                chunk = chunk.replace(TYPE_END, '')
                f.write(chunk)
                break
            f.write(chunk)
    broadcast_file(PATH_SERVER+filename, connection)
```

```python
def broadcast_file(filename, connection):
    for client in list_of_clients:
        if client != connection:
            print filename
            with open(filename, 'rb') as f:
                filename_new = filename.replace(PATH_SERVER, '')
                try:
                    client.send(TYPE_FILE+':'+filename_new+'|')
                    chunk = f.read(MAX_BUFFER)
                    while chunk:
                        client.send(chunk)
                        chunk = f.read(MAX_BUFFER)
                    client.send(TYPE_END)
                except:
                    client.close()
                    remove_from_list(client)
```

- **DOWN:<namafile>**
  Client meminta mendownload file tertentu dari server. Server
  mengirimkan file tersebut kepada client

```
elif TYPE == TYPE_DOWNLOAD:
    filename = message[5:]
    with open(PATH_SERVER+filename, 'rb') as f:
        filename_new = filename.replace(PATH_SERVER, '')
        try:
            connection.send(TYPE_FILE+':'+filename_new+'|')
            chunk = f.read(MAX_BUFFER)
            while chunk:
                connection.send(chunk)
                chunk = f.read(MAX_BUFFER)
            connection.send(TYPE_END)
        except:
            connection.close()
            remove from list(connection)
```

■ **DELL:<namafile>**
Server menghapus file sesuai namafile

■ **MESG:<message>**
Server mendapatkan message tersebut kemudian membroadcastkan kesemua client.

```
elif TYPE == TYPE_REMOVE:
    os.remove(PATH_SERVER+message[5:])
    connection.send(TYPE_REMOVE+':File Removed')
elif TYPE == TYPE_MESSAGE:
    message_to_send = "<" + address[0] + "> : " + message[5:]
    print message_to_send
    broadcast_mesg(message_to_send, connection)
```
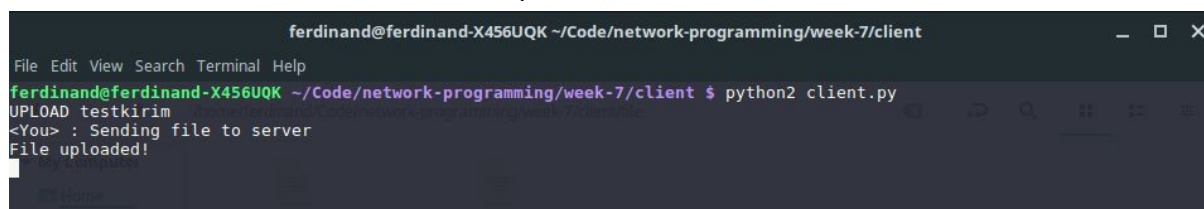
- **TESTING**
  - **UPLOAD**
    User mengupload file 'testkirim' kepada server, kemudian server menerima file 'testkirim' tersebut.
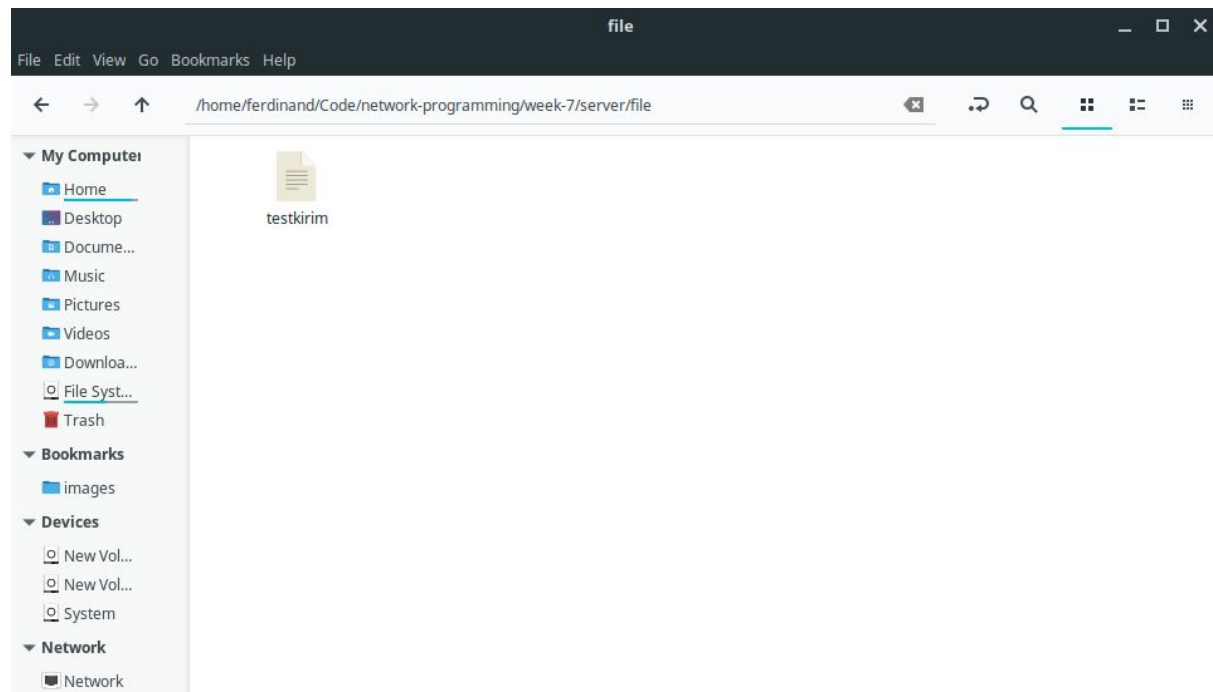   Berikut screenshoot UPLOAD testkirim pada client

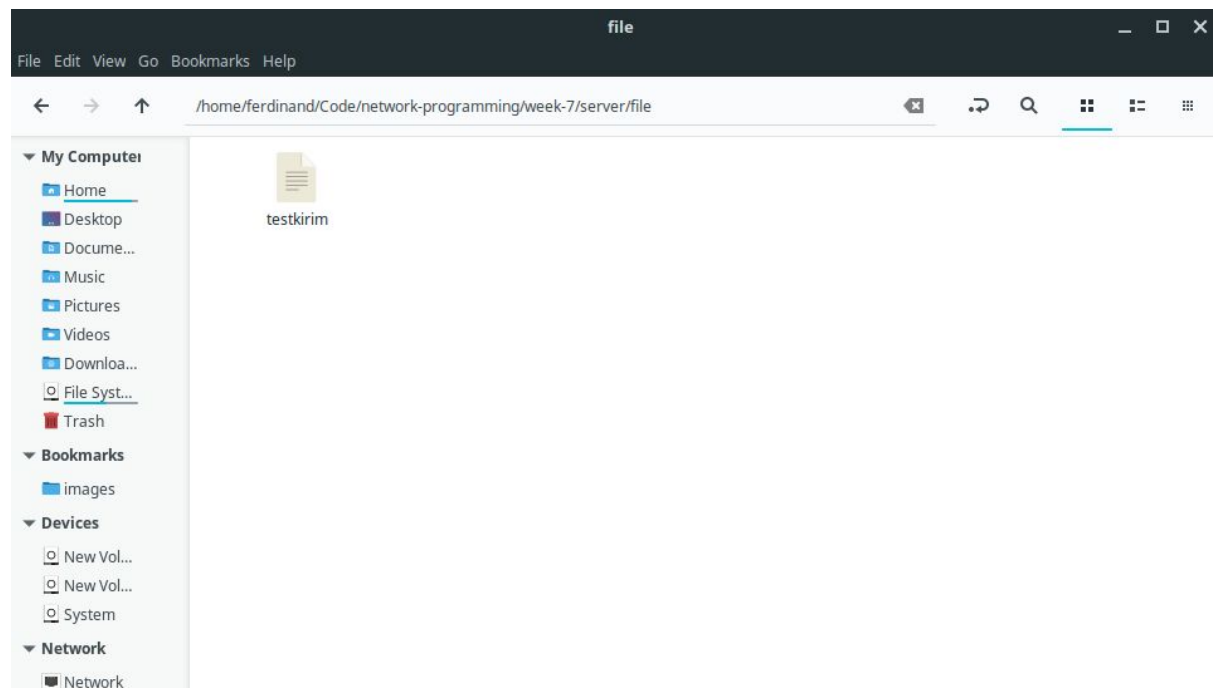Berikut screenshoot folder server yang telah menerima file dari client

○ **LIST**
User mendapatkan List file dari server
Berikut screenshoot LIST pada client

Berikut screenshoot file pada server

○ **SENDALL**
User mengirimkan file ke semua client
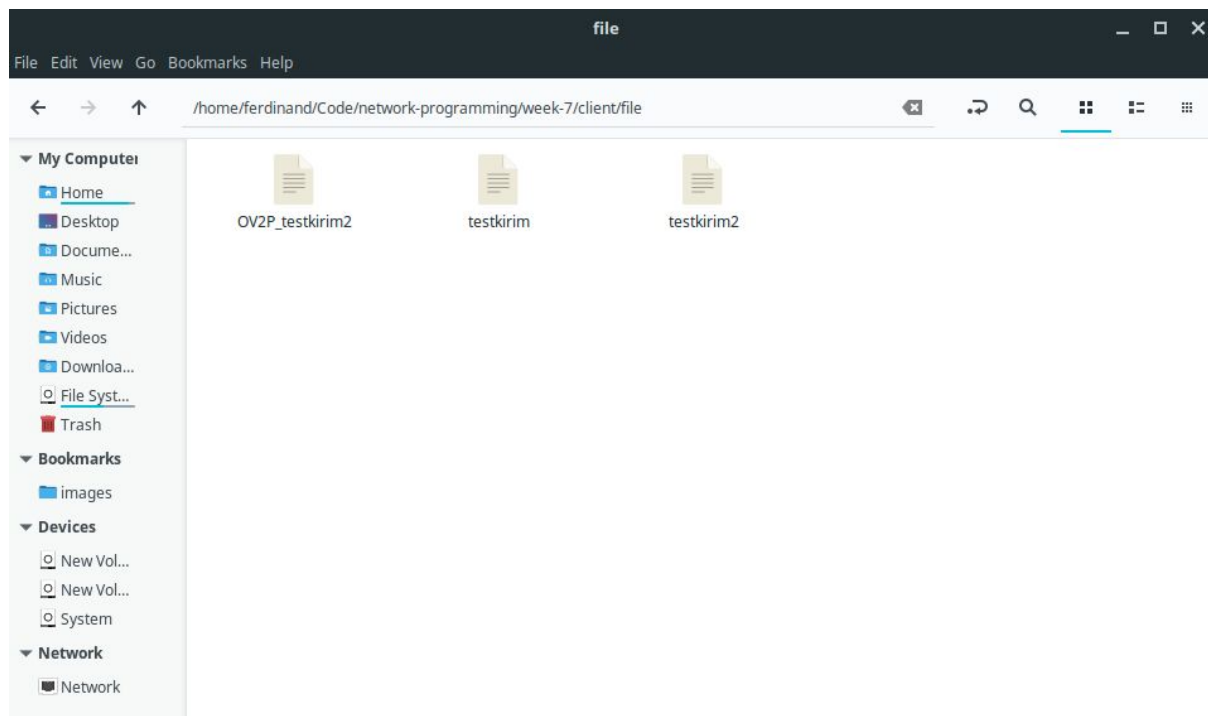
Berikut screenshoot SENDALL testkirim2 pada Client A

```
SENDALL testkirim2
<You> : Sending file to all client<You> : Send file with name testkirim2
```

Berikut screenshoot penerimaan notifikasi pada testkirim2 pada Client B

```
ferdinand@ferdinand-X456UQK ~/Code/network-programming/week-7/client $ python2 client.py
File received :OV2P_testkirim2
```

Terdapat random string didepan menandakan file tersebut dari server
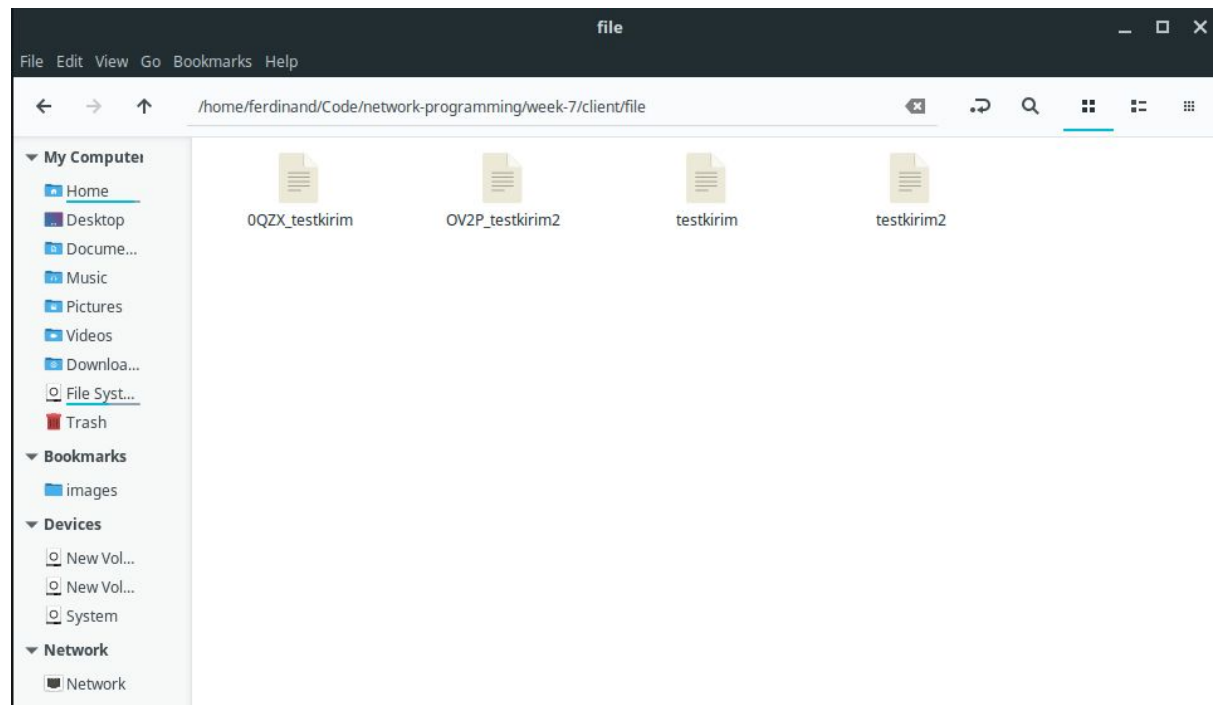Berikut screenshoot folder pada client

○ **DOWNLOAD**
User mendownload file dari server
Berikut screenshoot hasil DOWNLOAD testkirim

```
DOWNLOAD testkirim
<You> : DownloadingFile received :0QZX_testkirim
```

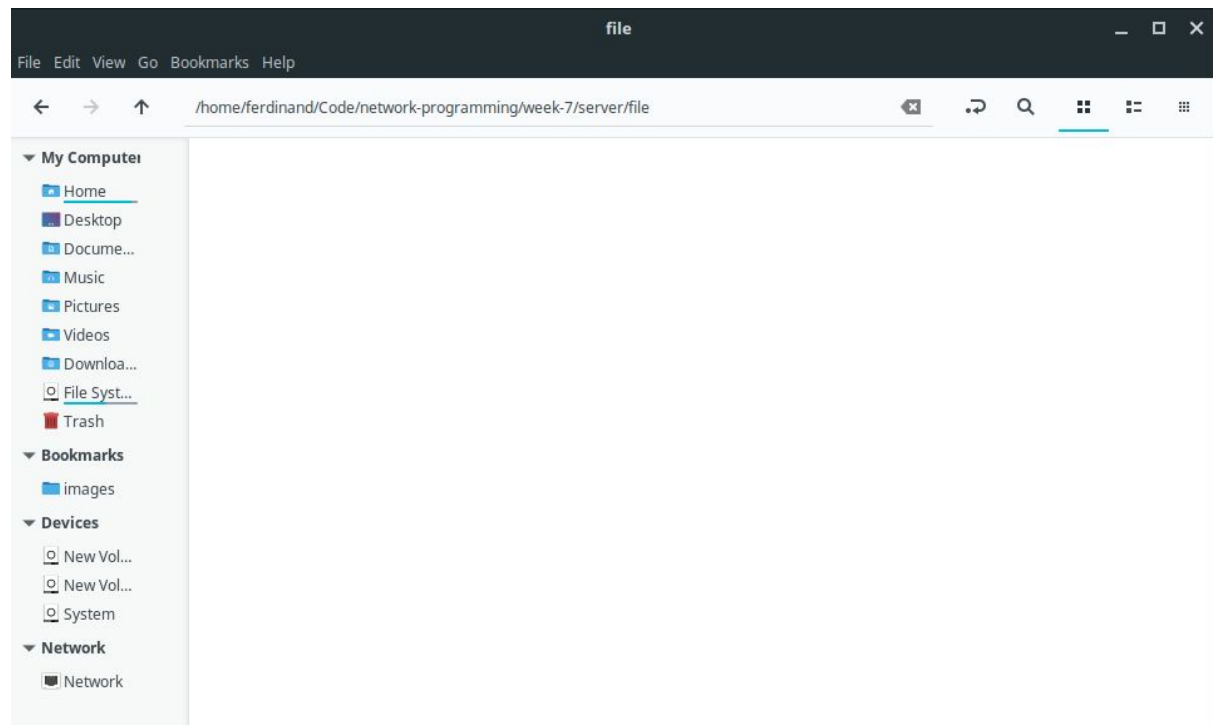Berikut screenshoot folder pada Client

- ○ **REMOVE**

  User meminta menghapus file dari server

  Berikut screenshoot dari REMOVE testkirim1 dan REMOVE testkirim2


```
REMOVE testkirim
<You> : Remove fileFile Removed
REMOVE testkirim2
<You> : Remove fileFile Removed
```

Berikut screenshoot folder pada server

- ○ **CHAT**
  Berikut hasil screenshoot chat


```
HALO
<You> : HALO
<127.0.0.1> : HALO JUGA
<127.0.0.1> : APA KABAR
BAIK BAIK SAJA, KAMU ?
<You> : BAIK BAIK SAJA, KAMU ?
<127.0.0.1> : BAIK JUGA HEHE
```