SOCKET PROGRAMMING

Laporan ini disusun untuk memenuhi tugas EL5226 – Jaringan Informasi dan Sosial tentang Socket Programming. Laporan ini beserta source-code dapat juga diunduh di github https://github.com/soedomoto/ITB2015/tree/EL5226/Assignment%201%20-%20Socket%20Programming.

CLIENT-SERVER CHAT

Client-Server chat merupakan sebuah program ringan berbasis python yang dapat digunakan untuk mengirim pesan text. Client-server chat mendukung koneksi multi-client. Program server, berisikan kode server socket, yang bertugas mem-broadcast pesan dari satu client ke seluruh client yang lain. Sementara, program client berisi kode yang dapat menampilkan pesan dari server dan dapat menerima user input.

chat_server.py

```
#!/usr/bin/python

import socket, threading, sys, select

# Use argument to define port
args = sys.argv
if not len(args) == 2:
    print 'Usage : python chat_server.py <port>'
    exit()
else:
    # Define addr where socket server is listening
    host = '0.0.0.0'
    port = int(args[1])

sockets = []
recv_buffer = 4096

# broadcast chat messages to all connected clients
def broadcast (sock_server, sock, message):
    for socket in sockets:
        # send the message only to peer
        if socket != sock_server and socket != sock :
            try :
                socket.send(message)
            except :
                # broken socket connection
                socket.close()
                # broken socket, remove it
                if socket in sockets:
                    sockets.remove(socket)

if __name__ == "__main__":
    try:
        # Create socket server
        sock_server = socket.socket()
        sock_server.bind((host, port))
        sock_server.listen(5)
        print 'Chat server is listening at %s:%s' % (host, port)
```

```
        sockets.append(sock_server)

        while True:
            read_sockets, write_sockets, error_sockets =
select.select(sockets, [], [])
            for sock in read_sockets:
                # a new connection request recieved
                if sock == sock_server:
                    new_sock, addr = sock_server.accept()
                    sockets.append(new_sock)
                    print "[+] Client %s:%s connected" % addr

                    broadcast(sock_server, new_sock, "[%s:%s]\t: Entered our
chatting room\n" % addr)

                # a message from a client, not a new connection
                else:
                    cip, cport = sock.getpeername()
                    # process data recieved from client,
                    try:
                        # receiving data from the socket.
                        data = sock.recv(recv_buffer)
                        if data:
                            # there is something in the socket
                            broadcast(sock_server, sock, "[%s:%s]\t: %s" %
(cip, cport, data))
                        else:
                            # remove the socket that's broken
                            if sock in sockets:
                                sockets.remove(sock)
                            # at this stage, no data means probably the
connection has been broken
                            broadcast(sock_server, sock, "[%s:%s]\t: Now
offline\n" % (cip, cport))

                    # exception
                    except:
                        broadcast(sock_server, sock, "[%s:%s]\t: Now
offline\n" % (cip, cport))
                        continue
    except KeyboardInterrupt:
        print "Chat server is stopping..."
        sock_server.close()
        print "Chat server is stopped"
```

chat_client.py

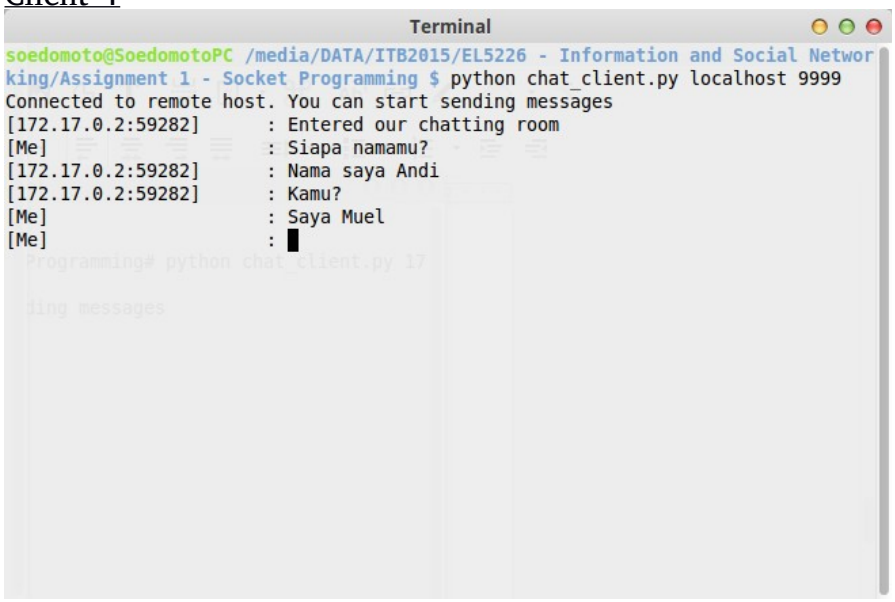
```
#!/usr/bin/python

import socket, threading, sys, select

recv_buffer = 4096

def prompt():
    sys.stdout.write('[Me]\t\t\t: ');
    sys.stdout.flush()
```

```
if __name__ == "__main__":
    # Use argument to define port
    args = sys.argv
    if not len(args) == 3:
        print 'Usage : python chat_client.py <host> <port>'
        exit()
    else:
        # Define addr where socket server is listening
        host = args[1]
        port = int(args[2])

    # Create socket client
    sock = socket.socket()
    try:
        sock.connect((host, port))
    except socket.error:
        print 'Unable to connect'
        exit()

    print 'Connected to remote host. You can start sending messages'
    prompt()

    while 1:
        socket_list = [sys.stdin, sock]
        # Get the list sockets which are readable
        read_sockets, write_sockets, error_sockets = select.select(socket_list
, [], [])

        for s in read_sockets:
            if s == sock:
                # incoming message from remote server, s
                data = s.recv(recv_buffer)
                if not data :
                    print '\nDisconnected from chat server'
                    sys.exit()
                else :
                    #print data
                    sys.stdout.write('\r' + data)
                    prompt()

            else :
                # user entered a message
                msg = sys.stdin.readline()
                sock.send(msg)
                prompt()
```

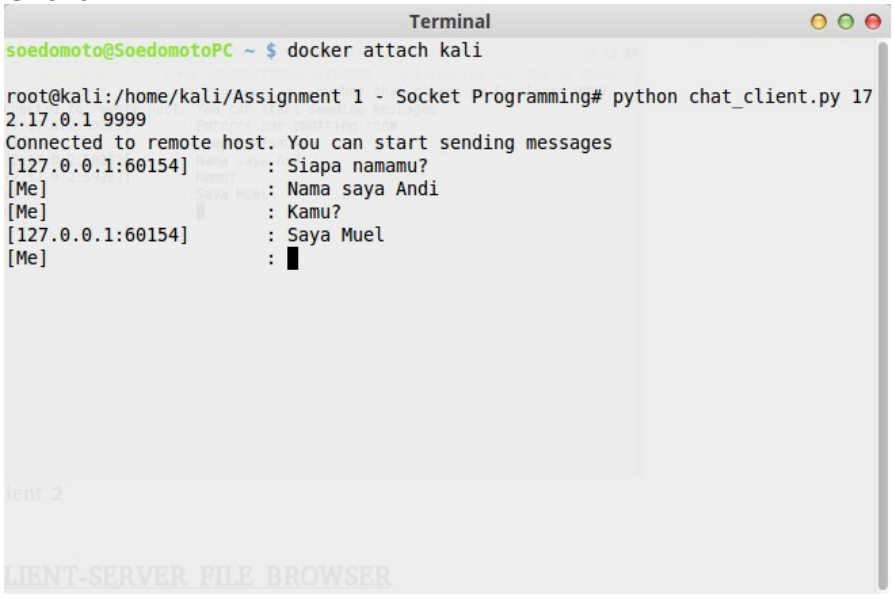
Screenshot

Server

Client 1



Client 2



CLIENT-SERVER FILE BROWSER

Client-Server file browser merupakan sebuah program ringan berbasis python yang dapat digunakan untuk mem-browser file/folder yang ada di server melalui client. Client-server file browser mendukung koneksi multi-client. Program server, berisikan kode server socket, yang memberi response kepada client dalam 2 rule : 1) Jika yang direquest oleh client adalah sebuah folder, maka server akan merensponse dengan mengirimkan list content dari folder tersebut, 2) Jika yang direquest oleh client adalah sebuah file, maka server akan meresponse dengan mengirimkan isi dari file tersebut. Sementara, program client berisi kode yang dapat menampilkan pesan dari server dan dapat menerima user input (dapat diketik).

file_server.py

```
#!/usr/bin/python

import socket, threading, sys, select, os

# Use argument to define port
args = sys.argv
if not len(args) == 2:
    print 'Usage : python file_server.py <port>'
    exit()
else:
    # Define addr where socket server is listening
    host = '0.0.0.0'
    port = int(args[1])

sockets = []
last_data = {}
recv_buffer = 4096

def column(matrix, i):
    return [row[i] for row in matrix]

def list_file(sock, inpdir):
    cip, cport = sock.getpeername()
    data = []

    data.append(['dir ', os.pardir])
    for path, subdirs, files in os.walk(inpdir, topdown=True):
        for name in subdirs:
            data.append(['dir ', name])
        for name in files:
            data.append(['file', name])
        break

    last_data[cip + ':' + str(cport)] = [inpdir, column(data, 1)]

    counter = 1
    str_list = 'Please select folder/file below :\n'
    for f in data:
        str_list = str_list + "[{}] {}".format(counter, '{}
{}\n'.format(f[0], f[1]))
        counter = counter + 1

    sock.send(str_list)
```

```
if __name__ == "__main__":
    try:
        # Create socket server
        sock_server = socket.socket()
        sock_server.bind((host, port))
        sock_server.listen(5)
        print 'File server is listening at %s:%s' % (host, port)

        sockets.append(sock_server)

        while True:
            read_sockets, write_sockets, error_sockets =
select.select(sockets, [], [])
            for sock in read_sockets:
                # a new connection request recieved
                if sock == sock_server:
                    new_sock, addr = sock_server.accept()
                    sockets.append(new_sock)
                    print "[+] Client %s:%s connected" % addr

                    list_file(new_sock, os.getcwd())

                # a message from a client, not a new connection
                else:
                    cip, cport = sock.getpeername()
                    # process data recieved from client,
                    try:
                        # receiving data from the socket.
                        data = sock.recv(recv_buffer)
                        if data:
                            # convert to integer
                            try:
                                data = int(data)
                            except:
                                sock.send('Your selection must be an
integer\n')
                                continue

                            # there is something in the socket
                            if cip + ':' + str(cport) in last_data:
                                l_data = last_data[cip + ':' + str(cport)]
                                try:
                                    f = os.path.join(l_data[0], l_data[1]
[data-1])
                                    if os.path.isdir(f):
                                        f = os.path.abspath(f)
                                        list_file(sock, f)
                                    elif os.path.isfile(f):
                                        with open(f, 'r') as handler:
                                            content = handler.read()
                                            content =
'================================================================================
==\n' + \
                                                    'Content of file : ' +
l_data[1][data-1] + '\n' + \

'--------------------------------------------------------------------------------
--\n' + \
```

```
                                                        content + '\n' + \

'------------------------------------------------------------------------
--\n'
                                            sock.send(content)

                                            list_file(sock, l_data[0])
                                    except:
                                        list_file(sock, l_data[0])
                            else:
                                # remove the socket that's broken
                                if sock in sockets:
                                    sockets.remove(sock)

                        # exception
                        except:
                            continue
    except KeyboardInterrupt:
        print "File server is stopping..."
        sock_server.close()
        print "File server is stopped"
```

file_client.py

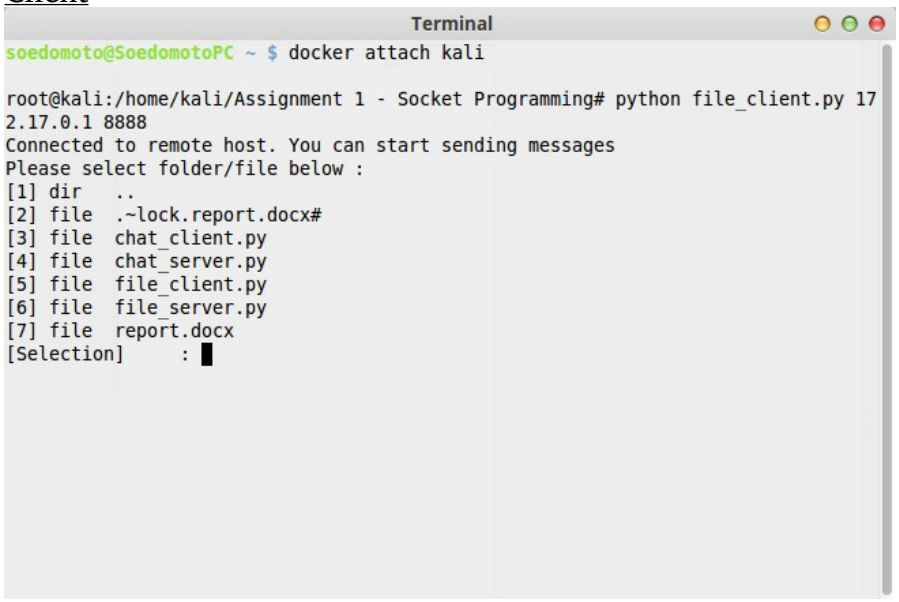
```
#!/usr/bin/python

import socket, threading, sys, select

recv_buffer = 4096

def prompt():
    sys.stdout.write('[Selection]\t: ');
    sys.stdout.flush()

if __name__ == "__main__":
    # Use argument to define port
    args = sys.argv
    if not len(args) == 3:
        print 'Usage : python file_client.py <host> <port>'
        exit()
    else:
        # Define addr where socket server is listening
        host = args[1]
        port = int(args[2])

    # Create socket client
    sock = socket.socket()
    try:
        sock.connect((host, port))
    except socket.error:
        print 'Unable to connect'
        exit()

    print 'Connected to remote host. You can start sending messages'
    prompt()

    while 1:
```

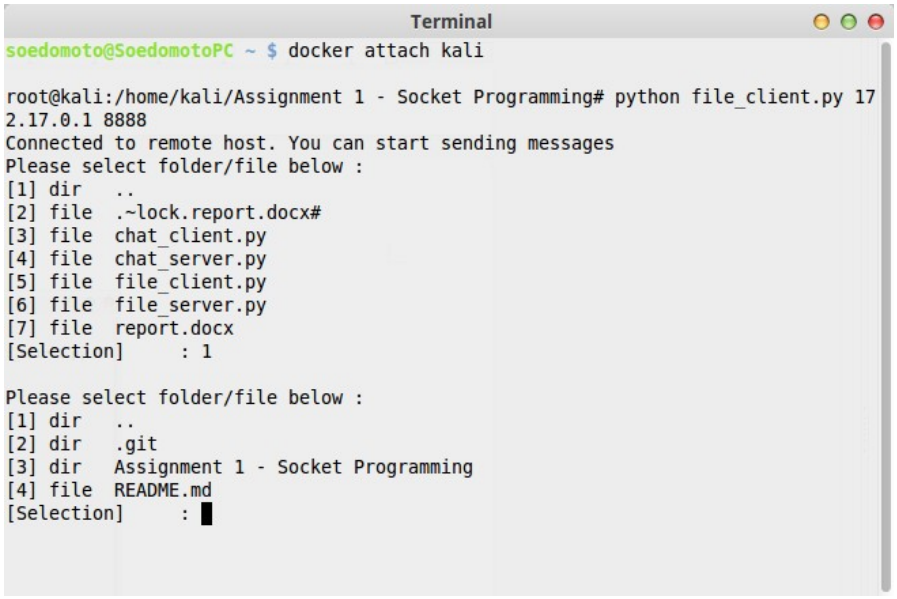
```
        socket_list = [sys.stdin, sock]
        # Get the list sockets which are readable
        read_sockets, write_sockets, error_sockets =
select.select(socket_list , [], [])

        for s in read_sockets:
            if s == sock:
                # incoming message from remote server, s
                data = s.recv(recv_buffer)
                if not data :
                    print '\nDisconnected from chat server'
                    sys.exit()
                else :
                    #print data
                    sys.stdout.write('\r' + data)
                    prompt()

            else :
                # user entered a message
                msg = sys.stdin.readline()
                sock.send(msg)
                sys.stdout.write('\n')
                prompt()
```

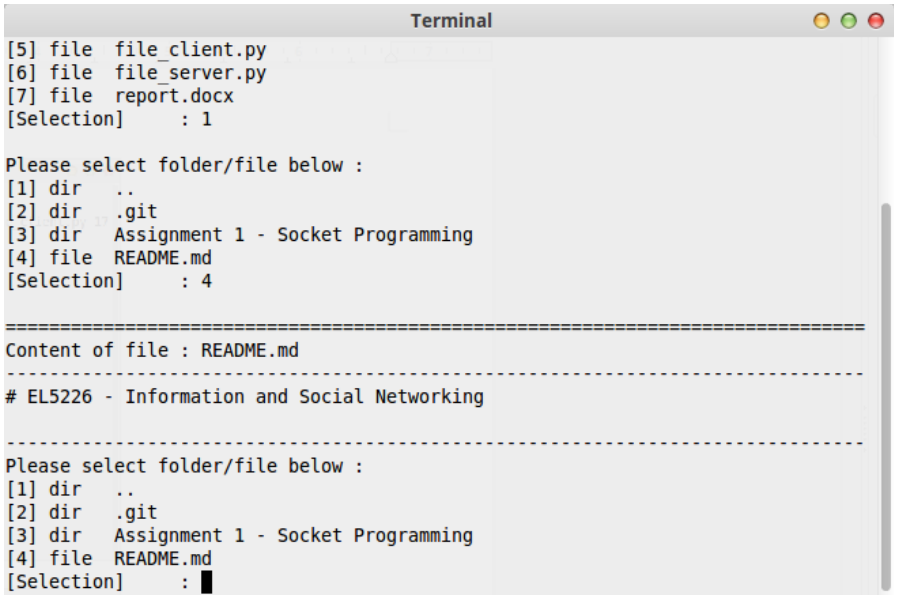
Screenshot

Server

Client


Terminal
soedomoto@SoedomotoPC ~ $ docker attach kali
root@kali:/home/kali/Assignment 1 - Socket Programming# python file_client.py 17
2.17.0.1 8888
Connected to remote host. You can start sending messages
Please select folder/file below :
[1] dir ..
[2] file .~lock.report.docx#
[3] file chat_client.py
[4] file chat_server.py
[5] file file_client.py
[6] file file_server.py
[7] file report.docx
[Selection] :


Terminal
soedomoto@SoedomotoPC ~ $ docker attach kali
root@kali:/home/kali/Assignment 1 - Socket Programming# python file_client.py 17
2.17.0.1 8888
Connected to remote host. You can start sending messages
Please select folder/file below :
[1] dir ..
[2] file .~lock.report.docx#
[3] file chat_client.py
[4] file chat_server.py
[5] file file_client.py
[6] file file_server.py
[7] file report.docx
[Selection] : 1
Please select folder/file below :
[1] dir ..
[2] dir .git
[3] dir Assignment 1 - Socket Programming
[4] file README.md
[Selection] :


Terminal
[5] file file_client.py
[6] file file_server.py
[7] file report.docx
[Selection] : 1
Please select folder/file below :
[1] dir ..
[2] dir .git
[3] dir Assignment 1 - Socket Programming
[4] file README.md
[Selection] : 4
Content of file : README.md
EL5226 - Information and Social Networking
Please select folder/file below :
[1] dir ..
[2] dir .git
[3] dir Assignment 1 - Socket Programming
[4] file README.md
[Selection] :