COE451 Programming Assignment: FTP client-server

This repository is for a course project: "Introduction to Cyber Security COE451" at KFUPM.

GitHub repository

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Term 191

Description

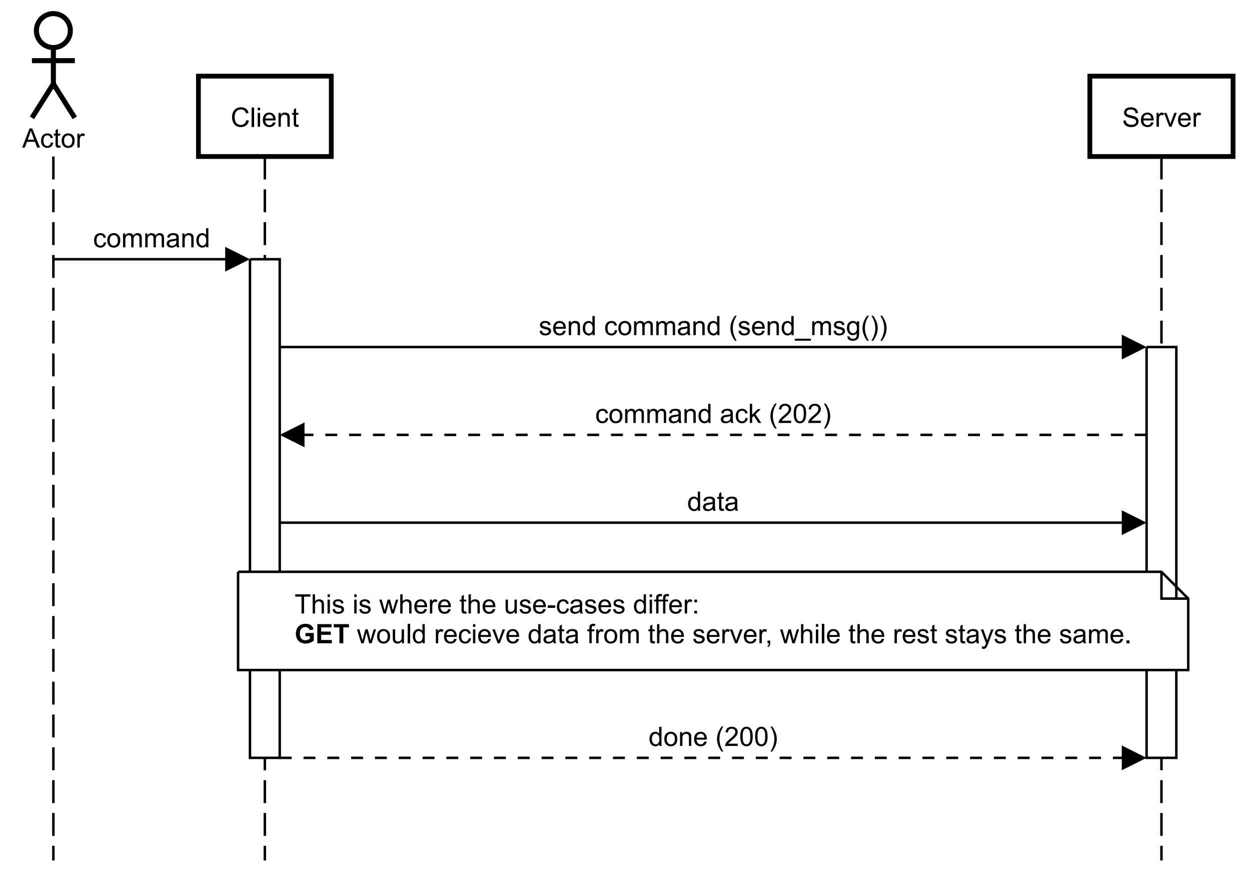
The application is programmed with python and has a command line interface, use `-h`, `--help` to see usage.
There are 2 programs that must be run: the client and the server.

How it works

The server continues to listen for connection requests, each time the user sends a command, the client will issue a connection request.

The bellow diagram demonstrates the use-case of pushing a file to the server (other use-cases are analogous).

Pushing a file to the server


Actor
Client
Server
command
send command (send_msg())
command ack (202)
data
This is where the use-cases differ:
GET would recieve data from the server, while the rest stays the same.
done (200)

Usage

The client application can be invoked via the command line by passing arguments, if no arguments are passed, it will prompt for arguments to be input.

Running the programs

Run the following commands while in the `scripts/` directory

- `python client/client.py`
- `python server/server.py`

An alternative is to run the exe files: `client.exe` and `server.exe` (order doesn't matter). However it is better to use the python scripts as they are more likely up to date.

Terminal menu

```
usage: client.py [-h] [--port PORT] [--host HOST]
                 {help,quit,q,exit,get,put,ls} ...

Connect to server

positional arguments:
  {help,quit,q,exit,get,put,ls}
                        commands help...
    help                Display help message and usage
    quit (q, exit)      quit the program
    get                 pull a file from the server
    put                 push a file to the server (or loca
lly)
    ls                  list available files on th
optional arguments:
  --port PORT           port to listen on (non-privileged ports are >
                        1023).Default: 65432
  --host HOST           hostname or ipv4 address to connect to (use ip addr
ess
                        for consistency).Default: "127.0.0.1"
usage: client.py [-h] [--port PORT] [--host HOST]
                 {help,quit,q,exit,get,put,ls} ...
```

Subcommands

For each subcommand, you can view even more usage details by using `--help`

- get

  ```
  usage: client.py get [-h] [-i] filename

  positional arguments:
    filename

  optional arguments:
    -h, --help        show this help message and exit
    -i, --file-index  Enable file-access by index, rather than by specifying
                      path. Use "ls" to see the corresponding index to each
  ```

- put

  ```
  usage: client.py put [-h] [-i] filename

  positional arguments:
    filename

  optional arguments:
    -h, --help        show this help message and exit
    -i, --file-index  Enable file-access by index, rather than by specifying
                      path. Use "ls -l" to list local files and see the
                      corresponding index to each file
  ```

Note: there are issues with the filenames when using `put --file-index`, so it's advised to just use the regular `put filename`

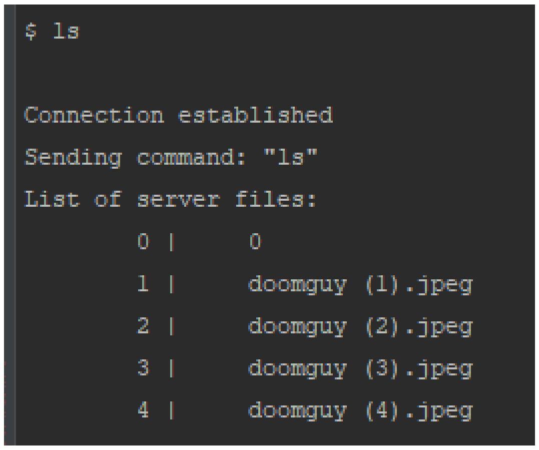
- ls

```
usage: client.py ls [-h] [-l]

optional arguments:
    -h, --help   show this help message and exit
    -l, --local  List files found locally (client side)
```

Examples

1. Use `ls` to see what files are available



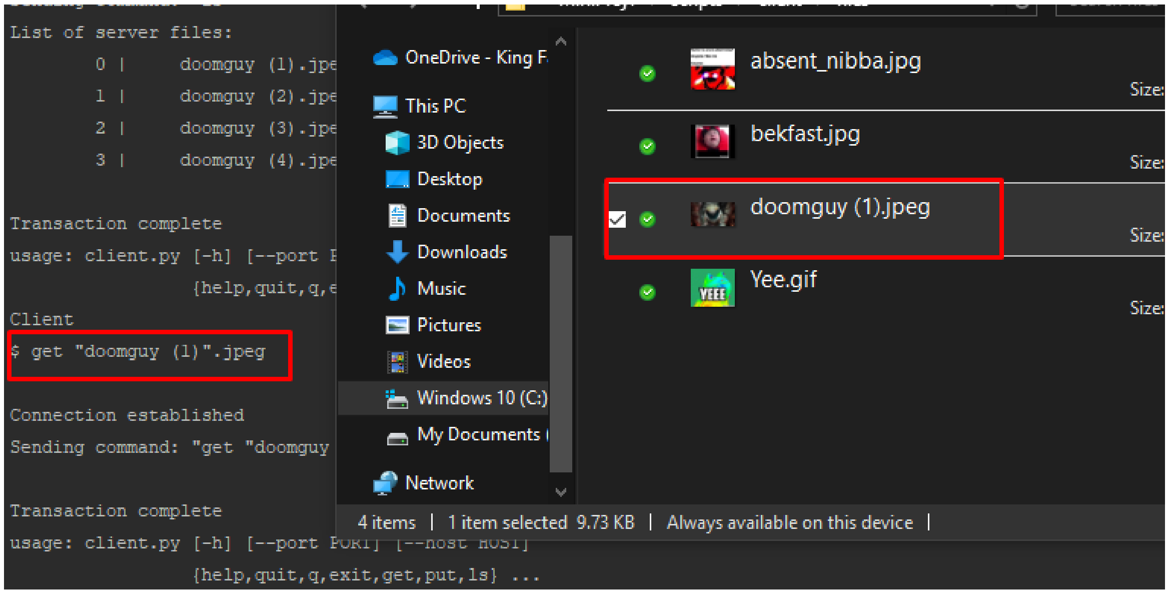
```
$ ls

Connection established
Sending command: "ls"
List of server files:
        0 |     0
        1 |     doomguy (1).jpeg
        2 |     doomguy (2).jpeg
        3 |     doomguy (3).jpeg
        4 |     doomguy (4).jpeg
```

2. Request a specific file, for example by typing:

```
get "doomguy (1).jpeg"
```

3. Once the file is downloaded from the server, the client app will open it in the explorer:



```
List of server files:
        0 |     doomguy (1).jpe
        1 |     doomguy (2).jpe
        2 |     doomguy (3).jpe
        3 |     doomguy (4).jpe


Transaction complete
usage: client.py [-h] [--port P
                 {help,quit,q,e
Client
$ get "doomguy (1)".jpeg

Connection established
Sending command: "get "doomguy

Transaction complete
usage: client.py [-h] [--port PORT] [--host HOST]
                 {help,quit,q,exit,get,put,ls} ...
```

Credits and notes

I've taken the socket programming part of the code from this tutorial here.

I had issues with receiving messages, since TCP is not a message protocol, rather it is a stream protocol. So I found a way to solve this issue by building a small protocol on top of the TCP, it appends 4 bytes containing the length of the message, this way the sender knows how long it should keep accumulating the fragments (see solution from this answer on stackoverflow here).