Report on Self-implemented Memcached-lite

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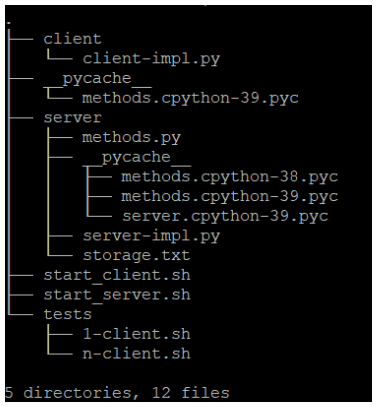
1 Introduction

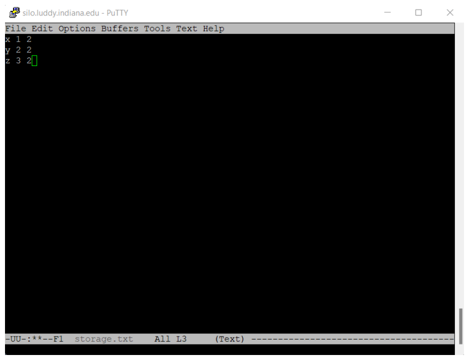
The structure of the entire system is displayed in the image underneath.

1. $ ./start_server will take an argument as the port number of the server.
2. $ ./start_client takes two arguments and establish a connection to a server. The first argument is the server ip that the client will establish a connection to, and the second argument is the port number.
3. the implementation of ./tests/1-client.sh and ./tests/n-client.sh is in the appendix.
4. client-impl.py takes two arguments. The first is the server ip that the client will establish a connection to, and the second is the port number. If arguments are not given or not formatted correctly, the client will establish a connection to the localhost, i.e. '127.0.0.1', with port number of 9889. After taking arguments, client will create a socket and connect to the designated server. It is then available for taking any number of set commands and get commands with corresponding arguments from the command line. Type exit to break connection with the server.



```
.
├── client
│   └── client-impl.py
├── __pycache__
│   └── methods.cpython-39.pyc
├── server
│   ├── methods.py
│   ├── __pycache__
│   │   ├── methods.cpython-38.pyc
│   │   ├── methods.cpython-39.pyc
│   │   └── server.cpython-39.pyc
│   ├── server-impl.py
│   └── storage.txt
├── start_client.sh
├── start_server.sh
└── tests
    ├── 1-client.sh
    └── n-client.sh

5 directories, 12 files
```


silo.luddy.indiana.edu - PuTTY
File Edit Options Buffers Tools Text Help

```
x 1 2
y 2 2
z 3 2
```

```
-UU-:**--F1  storage.txt    All L3     (Text) -------------------------------------
```

Figure 1: see 7.

5. server-impl.py takes an argument as its port number. It is going to create a socket, bind socket to the given port number, and listen to the message from the socket. It will then perform functionalities which the message asks it to offer.

6. methods.py contains all the helper methods used in server-impl.py.

7. storage.txt is the database for storing KV. It has 3 columns with delimiters of whitespace. The first column is the key. The second column is the value. The third column is the byte length of the value. Initial state of storage is displayed in the image above.

2 Test case

A meaningful test case that proves the validity of this KV storage RPC is that:

1. The server starts to run.

2. The client asks for the value of x, which at this moment is still the default value, 1.

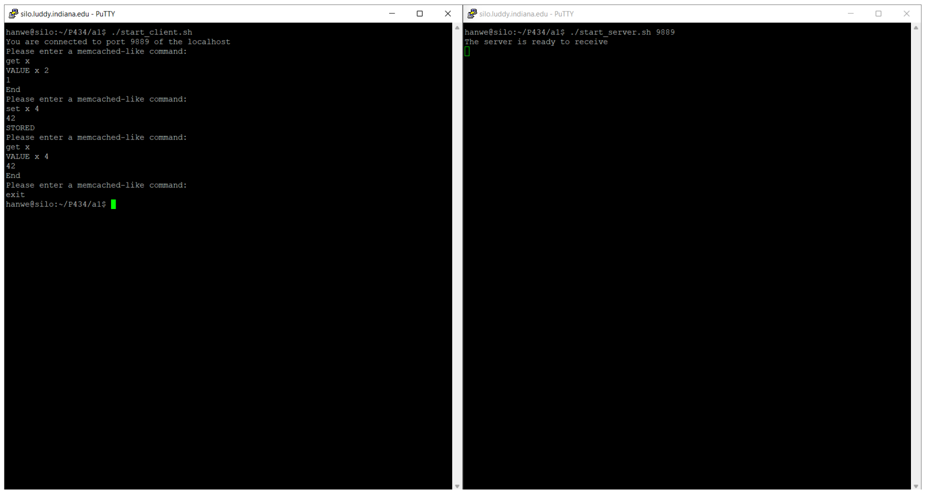
3. The client then changes the value of x to 42.

4. The client asks for the value of x, which at this moment has been changed to 42 by an earlier message.

5. The client asks the server the close the socket and terminate the connection with the server by saying 'exit'.

6. The sever closes the socket and wait to accept another connection.

The image underneath is the screenshot of commands and results of this test case


silo.luddy.indiana.edu - PuTTY
silo.luddy.indiana.edu - PuTTY

```
hanwe@silo:~/P434/a1$ ./start_client.sh
You are connected to port 9889 of the localhost
Please enter a memcached-like command:
get x
VALUE x 2
1
End
Please enter a memcached-like command:
set x 4
42
STORED
Please enter a memcached-like command:
get x
VALUE x 4
42
End
Please enter a memcached-like command:
exit
hanwe@silo:~/P434/a1$
```

```
hanwe@silo:~/P434/a1$ ./start_server.sh 9889
The server is ready to receive
```

Figure 2: test case

3 Limitation

1. The byte field is not utilized in this current version. I have to figure out what the byte field is used for first.
2. Currently, the server only supports one client connection at a time. To support concurrency, a spawn of a fork or a new thread that handles each connection through the socket could be implemented in the future iteration of the server.
3. The server can only support the set method and the get method with valid number of inputs. Error handling for methods other than set and get is implemented. Method calls other than set and get will be sent to the server. However, server won't provide the corresponding functionality but just return a error message back. Error handling for invalid number of inputs in the get method and the set methods is not implemented yet.