

Homework 2 Problem 8

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1 How to run the code

```
# move to code dir
cd code

# for server with python
python3 server.py

# for client1 with cpp
g++ client1.cpp -o client1 && ./client1

# for client2 with c
gcc client2.c -o client2 && ./client2
```

2 Steps

1. Client 1 sends a mathematical expression (5+5+5) to the server.
2. The server evaluates the expression manually (without using eval()), and appends the result in the format 5+5+5 = 15.0 to a file named `history.html`.
3. The server responds to Client 1 with only the result (e.g., Result = 15.0).
4. Client 1 sends another expression (square of 15).
5. The server evaluates it, appends the square of 15 = 225.0 to `history.html`.
6. The server responds to Client 1 with the result "Result = 225.0".
7. Client 2 connects and sends an HTTP GET request for `history.html`. (GET `history.html`)
8. The server finds `history.html`, reads its content, and sends the response with the file content.
9. Client 1 sends a GET request for a non-existent file. (GET `XYX.html`)
10. The server checks its file system, does not find `XYX.html`, and sends back a proper 404 File Not Found response.

3 Screenshot

```

~/Desktop/hw2-hyungjunShon/code (0.159s)
pwd
/Users/hyzoen/Desktop/hw2-hyungjunShon/code

~/Desktop/hw2-hyungjunShon/code (0.148s)
ls
-rwxr-xr-x hyzoen staff 44 KB Fri Apr 4 01:34:37 2025 client1
-rwx----- hyzoen staff 1.1 KB Fri Apr 4 00:05:41 2025 client1.cpp
-rwx----- hyzoen staff 489 B Fri Apr 4 00:16:49 2025 client2.c
-rwx----- hyzoen staff 182 B Fri Apr 4 00:32:30 2025 client3.py
-rwx----- hyzoen staff 245 B Fri Apr 4 01:27:54 2025 Makefile
-rwx----- hyzoen staff 4.0 KB Fri Apr 4 00:10:18 2025 server.py

~/Desktop/hw2-hyungjunShon/code
make run-server
python3 server.py
[START] Server is starting...
[LISTENING] on 127.0.0.1:12000
[CONNECTED] ('127.0.0.1', 53141)
[CONNECTED] ('127.0.0.1', 53433)
[DISCONNECTED] ('127.0.0.1', 53141)
[DISCONNECTED] ('127.0.0.1', 53433)

~/Desktop/hw2-hyungjunShon/code (4m 2.33s)
make run-client1
g++ client1.cpp -o client1 && ./client1
Welcome to TCP Calculator Server!
Enter expression or GET filename:
5+5
Result = 15.0

Enter expression or GET filename:
square 15
Result = 225.0

Enter expression or GET filename:
GET YXX.html
HTTP/1.1 404 File Not Found

Enter expression or GET filename:
exit

~/Desktop/hw2-hyungjunShon/code

~/Desktop/hw2-hyungjunShon/code (3m 2.66s)
make run-client2
gcc client2.c -o client2 && ./client2
Welcome to TCP Calculator Server!
Enter expression or GET filename:
GET history.html
HTTP/1.1 200 OK

5+5+5 = 15.0
square 15 = 225.0

Enter expression or GET filename:
exit

~/Desktop/hw2-hyungjunShon/code

```

Figure 1: Example steps in the guideline

- use make for convinience, but same run command in the guideline can be found in screenshot
- client2.c meets the size limit of 500 byte by 485 byte.
- client3.py is additional code for shortest client code but not in use in this homework. (185 byte)

4 Additional Example

```

~/Desktop/hw2-hyungjunShon/code (0.146s)
c

~/Desktop/hw2-hyungjunShon/code (0.147s)
c

~/Desktop/hw2-hyungjunShon/code (0.143s)
c

~/Desktop/hw2-hyungjunShon/code
make run-client1
g++ client1.cpp -o client1 && ./client1
Welcome to TCP Calculator Server!
Enter expression or GET filename:
1+2*3- square -3 + sqrt 16
Result = 2.0

Enter expression or GET filename:
5+5-4+2+4/2
Result = 4.0

Enter expression or GET filename:
-1-4
Result = -5.0

Enter expression or GET filename:
-4+-4
Result = -8.0

Enter expression or GET filename:
GET history.html
HTTP/1.1 200 OK

1+2*3- square -3 + sqrt 16 = 2.0
5+5-4+2+4/2 = 4.0
-1-4 = -5.0
-4+-4 = -8.0
1+1 = 2.0

~/Desktop/hw2-hyungjunShon/code (0.142s)
pwd
/Users/hyzoan/Desktop/hw2-hyungjunShon/code

~/Desktop/hw2-hyungjunShon/code (0.137s)
l
-rw-r--r-- hyzoan staff 1.1 KB Fri Apr 4 00:05:41 2025 client1.cpp
-rw-r--r-- hyzoan staff 485 B Fri Apr 4 00:16:49 2025 client2.c
-rw-r--r-- hyzoan staff 182 B Fri Apr 4 00:32:38 2025 client3.py
-rw-r--r-- hyzoan staff 268 B Fri Apr 4 01:59:42 2025 Makefile
-rwxr-xr-x hyzoan staff 9.5 KB Fri Apr 4 02:37:17 2025 server.py

~/Desktop/hw2-hyungjunShon/code
make run-server
python3 server.py
[START] Server is starting...
[LISTENING] on 127.0.0.1:12000
[CONNECTED] ('127.0.0.1', 53632)
[CONNECTED] ('127.0.0.1', 53648)

~/Desktop/hw2-hyungjunShon/code
make run-client2
gcc client2.c -o client2 && ./client2
Welcome to TCP Calculator Server!
Enter expression or GET filename:
1+1
Result = 2.0

Enter expression or GET filename:
GET history.html
HTTP/1.1 200 OK

1+2*3- square -3 + sqrt 16 = 2.0
5+5-4+2+4/2 = 4.0
-1-4 = -5.0
-4+-4 = -8.0
1+1 = 2.0

Enter expression or GET filename:

```

Figure 2: Additional operations not in the guideline

- Both client1 and client2 support both calculation and HTTP request functionalities.
- Complex arithmetic operations are supported.
- All operations (sum, subtract, multiply, divide, square, sqrt) are all error handled.
 - invalid character
 - invalid operator usage
 - divide by zero
 - sqrt negative number