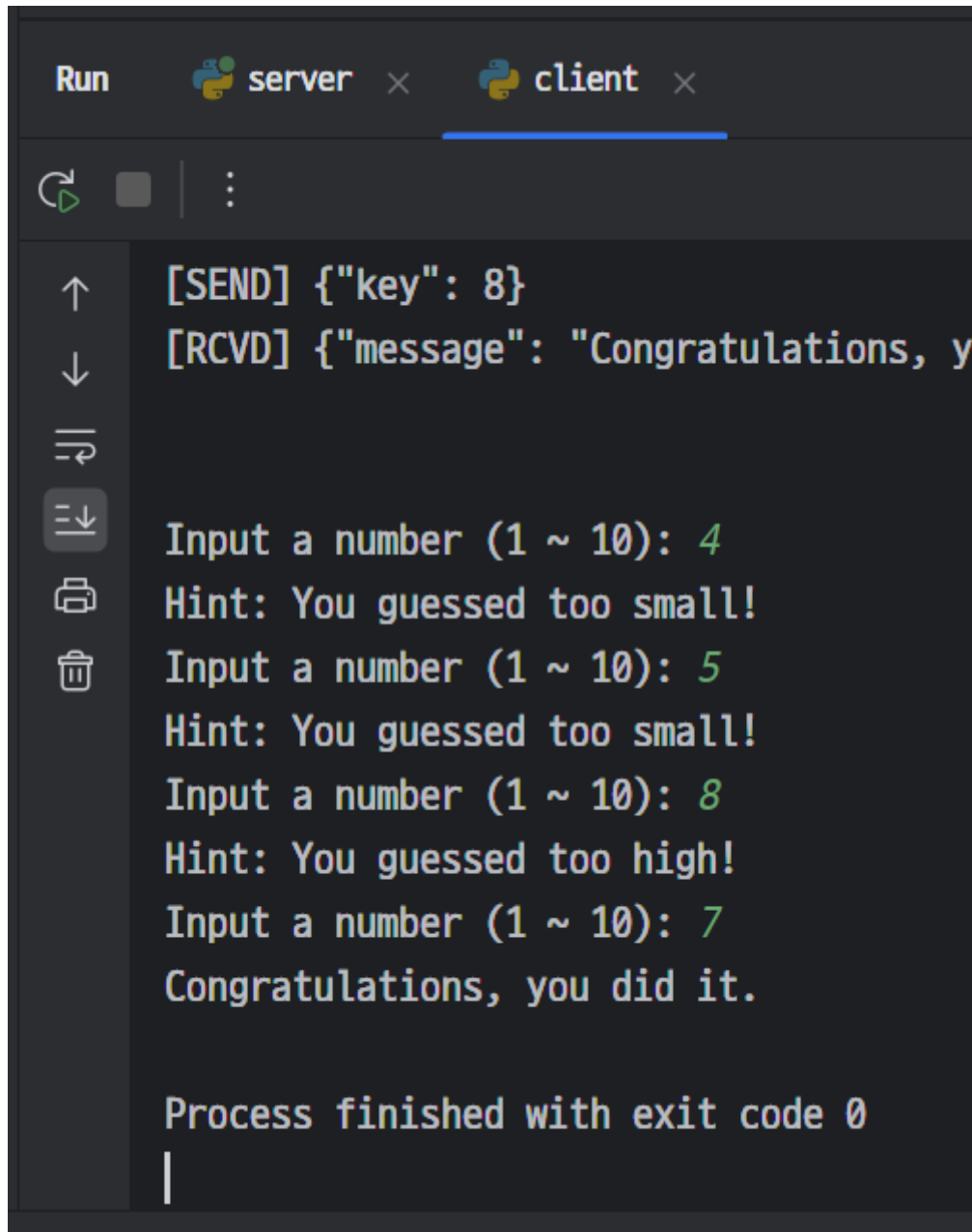


Report

20221494 박찬솔

Server-Client Communication



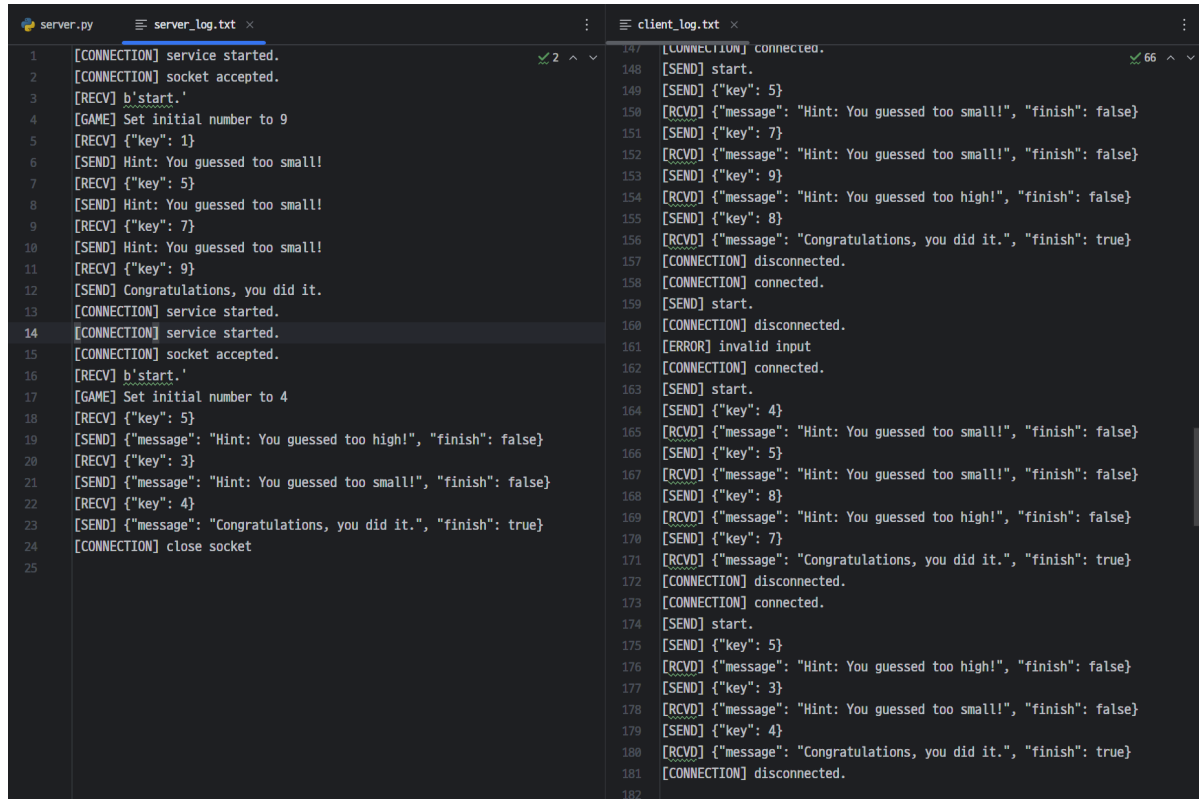
The screenshot shows a terminal window with two tabs: 'server' and 'client'. The 'client' tab is active. The terminal displays the following sequence of events:

```
[SEND] {"key": 8}
[RCVD] {"message": "Congratulations, you did it."}

Input a number (1 ~ 10): 4
Hint: You guessed too small!
Input a number (1 ~ 10): 5
Hint: You guessed too small!
Input a number (1 ~ 10): 8
Hint: You guessed too high!
Input a number (1 ~ 10): 7
Congratulations, you did it.

Process finished with exit code 0
```

Data handling (JSON) & Log

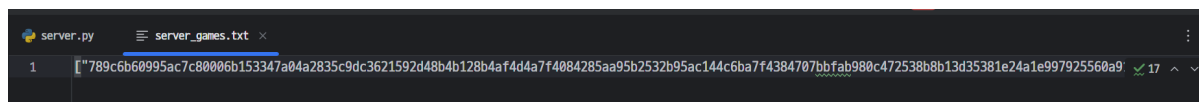


```
server.py  server_log.txt  client_log.txt
1  [CONNECTION] service started.
2  [CONNECTION] socket accepted.
3  [RECV] b'start.'
4  [GAME] Set initial number to 9
5  [RECV] {"key": 1}
6  [SEND] Hint: You guessed too small!
7  [RECV] {"key": 5}
8  [SEND] Hint: You guessed too small!
9  [RECV] {"key": 7}
10 [SEND] Hint: You guessed too small!
11 [RECV] {"key": 9}
12 [SEND] Congratulations, you did it.
13 [CONNECTION] service started.
14 [CONNECTION] service started.
15 [CONNECTION] socket accepted.
16 [RECV] b'start.'
17 [GAME] Set initial number to 4
18 [RECV] {"key": 5}
19 [SEND] {"message": "Hint: You guessed too high!", "finish": false}
20 [RECV] {"key": 3}
21 [SEND] {"message": "Hint: You guessed too small!", "finish": false}
22 [RECV] {"key": 4}
23 [SEND] {"message": "Congratulations, you did it.", "finish": true}
24 [CONNECTION] close socket
25

147 [CONNECTION] connected.
148 [SEND] start.
149 [SEND] {"key": 5}
150 [RCVD] {"message": "Hint: You guessed too small!", "finish": false}
151 [SEND] {"key": 7}
152 [RCVD] {"message": "Hint: You guessed too small!", "finish": false}
153 [SEND] {"key": 9}
154 [RCVD] {"message": "Hint: You guessed too high!", "finish": false}
155 [SEND] {"key": 8}
156 [RCVD] {"message": "Congratulations, you did it.", "finish": true}
157 [CONNECTION] disconnected.
158 [CONNECTION] connected.
159 [SEND] start.
160 [CONNECTION] disconnected.
161 [ERROR] invalid input
162 [CONNECTION] connected.
163 [SEND] start.
164 [SEND] {"key": 4}
165 [RCVD] {"message": "Hint: You guessed too small!", "finish": false}
166 [SEND] {"key": 5}
167 [RCVD] {"message": "Hint: You guessed too small!", "finish": false}
168 [SEND] {"key": 8}
169 [RCVD] {"message": "Hint: You guessed too high!", "finish": false}
170 [SEND] {"key": 7}
171 [RCVD] {"message": "Congratulations, you did it.", "finish": true}
172 [CONNECTION] disconnected.
173 [CONNECTION] connected.
174 [SEND] start.
175 [SEND] {"key": 5}
176 [RCVD] {"message": "Hint: You guessed too high!", "finish": false}
177 [SEND] {"key": 3}
178 [RCVD] {"message": "Hint: You guessed too small!", "finish": false}
179 [SEND] {"key": 4}
180 [RCVD] {"message": "Congratulations, you did it.", "finish": true}
181 [CONNECTION] disconnected.
182
```

- It records all exchanged message, and connection/error/game information.

Game History (And replay)



```
server.py  server_games.txt
1  ["789c6b60995ac7c80006b153347a04a2835c9dc3621592d48b4b128b4af4d4a7f4084285aa95b2532b95ac144c6ba7f4384707bbfab980c472538b8b13d35381e24a1e997925560a9"]
```

- Save play data as json with hex.

```
encoded = pickle.dumps(curr_game)
compressed = zlib.compress(encoded)
game_data.append(compressed.hex())
```

- It is compressed and saved as pickle & zlib.
- Replay game record when client or server start.

```
C:\Users\Chansol\AppData\Local\Programs\Python\Python310\python.exe C:\Users\Chansol\Desktop\ssu\network-2024\hw02\server.py
Showing previous game data log...
0th game data:
[RECV] b'start.'
[RECV] {"key": 5}
[SEND] {"message": "Hint: You guessed too small!", "finish": false}
[RECV] {"key": 7}
[SEND] {"message": "Hint: You guessed too small!", "finish": false}
[RECV] {"key": 9}
[SEND] {"message": "Hint: You guessed too high!", "finish": false}
[RECV] {"key": 8}
[SEND] {"message": "Congratulations, you did it.", "finish": true}

1th game data:
[RECV] b'start.'
[RECV] {"key": 5}
[SEND] {"message": "Hint: You guessed too small!", "finish": false}
[RECV] {"key": 7}
[SEND] {"message": "Hint: You guessed too high!", "finish": false}
[RECV] {"key": 6}
[SEND] {"message": "Congratulations, you did it.", "finish": true}

2th game data:
[RECV] b'start.'
[RECV]

3th game data:
[RECV] b'start.'
[RECV] {"key": 5}
[SEND] {"message": "Hint: You guessed too small!", "finish": false}
[RECV] {"key": 7}
[SEND] {"message": "Hint: You guessed too small!", "finish": false}
[RECV] {"key": 9}
[SEND] {"message": "Hint: You guessed too small!", "finish": false}
[RECV]

4th game data:
[RECV] b'start.'
```

Error Handling

- It handles all errors of socket, and record them to log.

Security

Communication between client and server is protected by TLS with self-signed private key using locally generated CA.

```
context = ssl.SSLContext(protocol=ssl.PROTOCOL_TLS_SERVER)
context.load_cert_chain(certfile="cert.crt", keyfile="key.pem")
context.check_hostname = False

print("Server listening on 127.0.0.1:12345")
logs.write("[CONNECTION] %s" % "service started.\n")

while True:
    raw_sock, _ = sock.accept()
    sc = context.wrap_socket(raw_sock, server_side=True)
```