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server.py
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import socket
import threading
import datetime

client_counter = 0

def handle_client(conn, addr, client_name):
    print(f"{client_name} connected from {addr[0]}:{addr[1]}\n")

    while True:
        data = conn.recv(1024).decode().strip()

        if not data:
            break

        if data == "QUIT":
            print(f"{client_name} disconnected.")
            conn.close()
            return

        if ":" not in data and data not in ["TIME", "DATE"]:
            response = f"ERROR: Unknown command from {client_name}."
            conn.send(response.encode())
            print(f"{client_name} sent: {data} → {response}")
            continue

        # BONUS: TIME & DATE
        if data == "TIME":
            result = datetime.datetime.now().strftime("%H:%M:%S")
            conn.send(result.encode())
            print(f"{client_name} sent: TIME → {result}")
            continue

        if data == "DATE":
            result = datetime.datetime.now().strftime("%Y-%m-%d")
            conn.send(result.encode())
            print(f"{client_name} sent: DATE → {result}")
            continue

        command, message = data.split(":", 1)
        command = command.strip()
        message = message.strip()

        # Execute commands
        if command == "UPPER":
            result = message.upper()
        elif command == "LOWER":
            result = message.lower()
        elif command == "REVERSE":
            result = message[::-1]
        elif command == "COUNT":
            result = str(len(message))
```

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# BONUS: VOWELS
elif command == "VOWELS":
    vowels = "aeiouAEIOU"
    count = sum(1 for ch in message if ch in vowels)
    result = str(count)
else:
    result = f"ERROR: Unknown command from {client_name}."

conn.send(result.encode())
print(f"{client_name} sent: {data} → {result}")

def main():
    global client_counter

    server = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
    server.bind(("0.0.0.0", 2210))
    server.listen()

    print("Server is running on port 2210")

    while True:
        conn, addr = server.accept()

        client_counter += 1
        client_name = f"Client{client_counter}"

        thread = threading.Thread(target=handle_client, args=(conn, addr, client_name))
        thread.start()

main()

```

Run in Terminal :

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

- (dl_env) PS C:\University\Semester 5\Computer Network\Labs\Lab 2> **python server.py**

```

Server is running on port 2210
Client1 connected from 127.0.0.1:55262
Client1 sent: UPPER: Wireshark → WIRESHARK
Client1 sent: LOWER: Wireshark → wireshark
Client2 connected from 127.0.0.1:55308
Client2 sent: REVERSE: Wireshark → krahseriW
Client3 connected from 127.0.0.1:55333
Client3 sent: COUNT: Wireshark → 9
Client3 sent: VOWELS: Wireshark → 3
Client1 sent: TIME → 00:52:50
Client2 sent: DATE → 2025-11-27
Client1 disconnected.
Client3 sent: TIME → 00:53:19
Client3 sent: DATE → 2025-11-27
Client3 disconnected.
Client2 disconnected.

```



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=====
client.py
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import socket

client = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
client.connect(("127.0.0.1", 2210))

print("Connected to server.")

while True:
    msg = input("> ")

    client.send(msg.encode())

    if msg == "QUIT":
        print("Connection closed.")
        client.close()
        break

    data = client.recv(1024).decode()
    print("Response from server:", data)
```

Run in Terminal :

Client 1:

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

- (dl_env) PS C:\University\Semester 5\Computer Network\Labs\Lab 2> **python client.py**
Connected to server.
> UPPER: Wireshark
Response from server: WIRESHARK
> LOWER: Wireshark
Response from server: wireshark
> TIME
Response from server: 00:52:50
> QUIT
Connection closed.
- (dl_env) PS C:\University\Semester 5\Computer Network\Labs\Lab 2> 

Client 2:

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

- (dl_env) PS C:\University\Semester 5\Computer Network\Labs\Lab 2> **python client.py**
Connected to server.
> REVERSE: Wireshark
Response from server: krahseriW
> DATE
Response from server: 2025-11-27
> QUIT
Connection closed.
- (dl_env) PS C:\University\Semester 5\Computer Network\Labs\Lab 2> 

Client 3:

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

- (dl_env) PS C:\University\Semester 5\Computer Network\Labs\Lab 2> **python client.py**
- Connected to server.
- > COUNT: Wireshark
- Response from server: 9
- > VOWELS: Wireshark
- Response from server: 3
- > TIME
- Response from server: 00:53:19
- > DATE
- Response from server: 2025-11-27
- > QUIT
- Connection closed.
- (dl_env) PS C:\University\Semester 5\Computer Network\Labs\Lab 2>

Wireshark:

Using filter `tcp.port == 2210` → *Shows packets that use TCP port 2210 only*

No.	Time	Source	Destination	Protocol	Length	Info
797	56.7556586	127.0.0.1	127.0.0.1	TCP	44	2210 → 55262 [ACK] Seq=1 Ack=17 Win=65280 Len=0
855	63.812616	127.0.0.1	127.0.0.1	TCP	44	2210 → 55262 [ACK] Seq=10 Ack=33 Win=65280 Len=0
1740	132.548571	127.0.0.1	127.0.0.1	TCP	44	2210 → 55262 [ACK] Seq=19 Ack=37 Win=65280 Len=0
1957	150.132652	127.0.0.1	127.0.0.1	TCP	44	2210 → 55262 [ACK] Seq=27 Ack=41 Win=65280 Len=0
1959	150.132818	127.0.0.1	127.0.0.1	TCP	44	2210 → 55262 [FIN, ACK] Seq=27 Ack=41 Win=65280 Len=0
798	56.7556688	127.0.0.1	127.0.0.1	TCP	53	2210 → 55262 [PSH, ACK] Seq=1 Ack=17 Win=65280 Len=9
856	63.812673	127.0.0.1	127.0.0.1	TCP	53	2210 → 55262 [PSH, ACK] Seq=10 Ack=33 Win=65280 Len=9
1741	132.548794	127.0.0.1	127.0.0.1	TCP	52	2210 → 55262 [PSH, ACK] Seq=19 Ack=37 Win=65280 Len=8
668	48.446445	127.0.0.1	127.0.0.1	TCP	56	2210 → 55262 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=65495 WS=256 SACK_PERM
1150	88.340681	127.0.0.1	127.0.0.1	TCP	44	2210 → 55308 [ACK] Seq=1 Ack=19 Win=65280 Len=0
1798	138.580706	127.0.0.1	127.0.0.1	TCP	44	2210 → 55308 [ACK] Seq=10 Ack=23 Win=65280 Len=0
2284	175.189167	127.0.0.1	127.0.0.1	TCP	44	2210 → 55308 [ACK] Seq=20 Ack=27 Win=65280 Len=0
2285	175.189343	127.0.0.1	127.0.0.1	TCP	44	2210 → 55308 [FIN, ACK] Seq=20 Ack=27 Win=65280 Len=0
1151	88.340749	127.0.0.1	127.0.0.1	TCP	53	2210 → 55308 [PSH, ACK] Seq=1 Ack=19 Win=65280 Len=9
1799	138.580794	127.0.0.1	127.0.0.1	TCP	53	2210 → 55308 [PSH, ACK] Seq=10 Ack=23 Win=65280 Len=10
1057	79.524659	127.0.0.1	127.0.0.1	TCP	52	2210 → 55308 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=65495 WS=256 SACK_PERM
1376	105.716639	127.0.0.1	127.0.0.1	TCP	44	2210 → 55333 [ACK] Seq=1 Ack=17 Win=65280 Len=0
2173	166.163421	127.0.0.1	127.0.0.1	TCP	44	2210 → 55333 [ACK] Seq=11 Ack=42 Win=65280 Len=0
1574	121.012443	127.0.0.1	127.0.0.1	TCP	44	2210 → 55333 [ACK] Seq=2 Ack=34 Win=65280 Len=0
2240	171.333101	127.0.0.1	127.0.0.1	TCP	44	2210 → 55333 [ACK] Seq=21 Ack=46 Win=65280 Len=0
2242	171.333364	127.0.0.1	127.0.0.1	TCP	44	2210 → 55333 [ACK] Seq=21 Ack=47 Win=65280 Len=0
2106	161.029548	127.0.0.1	127.0.0.1	TCP	44	2210 → 55333 [ACK] Seq=3 Ack=38 Win=65280 Len=0
2243	171.333417	127.0.0.1	127.0.0.1	TCP	46	2210 → 55333 [FIN, ACK] Seq=21 Ack=47 Win=65280 Len=0
1377	105.716751	127.0.0.1	127.0.0.1	TCP	45	2210 → 55333 [PSH, ACK] Seq=1 Ack=17 Win=65280 Len=1
2174	166.163575	127.0.0.1	127.0.0.1	TCP	52	2210 → 55333 [PSH, ACK] Seq=11 Ack=42 Win=65280 Len=0
1575	121.012527	127.0.0.1	127.0.0.1	TCP	45	2210 → 55333 [PSH, ACK] Seq=2 Ack=34 Win=65280 Len=1
2107	161.029679	127.0.0.1	127.0.0.1	TCP	52	2210 → 55333 [PSH, ACK] Seq=3 Ack=38 Win=65280 Len=8
1273	97.957368	127.0.0.1	127.0.0.1	TCP	56	2210 → 55333 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=65495 WS=256 SACK_PERM
669	48.4464491	127.0.0.1	127.0.0.1	TCP	44	55262 → 2210 [ACK] Seq=1 Ack=1 Win=65280 Len=0
799	56.756714	127.0.0.1	127.0.0.1	TCP	44	55262 → 2210 [ACK] Seq=17 Ack=10 Win=65280 Len=0
857	63.812689	127.0.0.1	127.0.0.1	TCP	44	55262 → 2210 [ACK] Seq=33 Ack=19 Win=65280 Len=0
1742	132.548813	127.0.0.1	127.0.0.1	TCP	44	55262 → 2210 [ACK] Seq=37 Ack=27 Win=65280 Len=0
1960	150.132840	127.0.0.1	127.0.0.1	TCP	44	55262 → 2210 [ACK] Seq=42 Ack=28 Win=65280 Len=0
1958	150.132799	127.0.0.1	127.0.0.1	TCP	44	55262 → 2210 [FIN, ACK] Seq=41 Ack=27 Win=65280 Len=0

No.	Time	Source	Destination	Protocol	Length	Info
796	56.7556545	127.0.0.1	127.0.0.1	TCP	60	55262 → 2210 [PSH, ACK] Seq=1 Ack=1 Win=65280 Len=16
1958	150.132795	127.0.0.1	127.0.0.1	TCP	44	55262 → 2210 [FIN, ACK] Seq=41 Ack=27 Win=65280 Len=0
1960	150.132841	127.0.0.1	127.0.0.1	TCP	44	55262 → 2210 [ACK] Seq=42 Ack=28 Win=65280 Len=0
1742	132.548813	127.0.0.1	127.0.0.1	TCP	44	55262 → 2210 [ACK] Seq=37 Ack=27 Win=65280 Len=0
857	63.812689	127.0.0.1	127.0.0.1	TCP	44	55262 → 2210 [ACK] Seq=33 Ack=19 Win=65280 Len=0
799	56.756714	127.0.0.1	127.0.0.1	TCP	44	55262 → 2210 [ACK] Seq=27 Ack=40 Win=65280 Len=0
669	48.4464491	127.0.0.1	127.0.0.1	TCP	44	55262 → 2210 [ACK] Seq=41 Ack=1 Win=65280 Len=0
1273	97.957368	127.0.0.1	127.0.0.1	TCP	56	2210 → 55333 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=65495 WS=256 SACK_PERM
2107	161.029679	127.0.0.1	127.0.0.1	TCP	52	2210 → 55333 [PSH, ACK] Seq=3 Ack=38 Win=65280 Len=8
1575	121.012527	127.0.0.1	127.0.0.1	TCP	45	2210 → 55333 [PSH, ACK] Seq=2 Ack=34 Win=65280 Len=1
2174	166.163575	127.0.0.1	127.0.0.1	TCP	54	2210 → 55333 [PSH, ACK] Seq=11 Ack=42 Win=65280 Len=10
1377	105.716751	127.0.0.1	127.0.0.1	TCP	45	2210 → 55333 [PSH, ACK] Seq=1 Ack=17 Win=65280 Len=1
2243	171.333417	127.0.0.1	127.0.0.1	TCP	44	2210 → 55333 [FIN, ACK] Seq=21 Ack=47 Win=65280 Len=0
2106	161.029549	127.0.0.1	127.0.0.1	TCP	44	2210 → 55333 [ACK] Seq=3 Ack=38 Win=65280 Len=0
2242	171.333364	127.0.0.1	127.0.0.1	TCP	44	2210 → 55333 [ACK] Seq=21 Ack=47 Win=65280 Len=0
2240	171.333101	127.0.0.1	127.0.0.1	TCP	44	2210 → 55333 [ACK] Seq=21 Ack=40 Win=65280 Len=0
1574	121.012443	127.0.0.1	127.0.0.1	TCP	44	2210 → 55333 [ACK] Seq=2 Ack=34 Win=65280 Len=0
2173	166.163421	127.0.0.1	127.0.0.1	TCP	44	2210 → 55333 [ACK] Seq=11 Ack=42 Win=65280 Len=0
1376	105.716639	127.0.0.1	127.0.0.1	TCP	44	2210 → 55333 [ACK] Seq=1 Ack=17 Win=65280 Len=0
1057	95.524659	127.0.0.1	127.0.0.1	TCP	56	2210 → 55308 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=65495 WS=256 SACK_PERM
1799	138.580794	127.0.0.1	127.0.0.1	TCP	54	2210 → 55308 [PSH, ACK] Seq=10 Ack=23 Win=65280 Len=10
1151	88.340749	127.0.0.1	127.0.0.1	TCP	53	2210 → 55308 [PSH, ACK] Seq=1 Ack=19 Win=65280 Len=9
2285	175.189343	127.0.0.1	127.0.0.1	TCP	44	2210 → 55308 [FIN, ACK] Seq=20 Ack=27 Win=65280 Len=0
2284	175.189167	127.0.0.1	127.0.0.1	TCP	44	2210 → 55308 [ACK] Seq=20 Ack=27 Win=65280 Len=0
1798	138.580706	127.0.0.1	127.0.0.1	TCP	44	2210 → 55308 [ACK] Seq=10 Ack=23 Win=65280 Len=0
1150	88.340681	127.0.0.1	127.0.0.1	TCP	44	2210 → 55308 [ACK] Seq=19 Ack=19 Win=65280 Len=0
668	48.446445	127.0.0.1	127.0.0.1	TCP	56	2210 → 55262 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=65495 WS=256 SACK_PERM
1741	132.548794	127.0.0.1	127.0.0.1	TCP	52	2210 → 55262 [PSH, ACK] Seq=19 Ack=37 Win=65280 Len=8
856	63.812673	127.0.0.1	127.0.0.1	TCP	53	2210 → 55262 [PSH, ACK] Seq=10 Ack=33 Win=65280 Len=9
798	56.756688	127.0.0.1	127.0.0.1	TCP	53	2210 → 55262 [PSH, ACK] Seq=1 Ack=17 Win=65280 Len=0
1959	150.132818	127.0.0.1	127.0.0.1	TCP	44	2210 → 55262 [FIN, ACK] Seq=27 Ack=41 Win=65280 Len=0
1957	150.132652	127.0.0.1	127.0.0.1	TCP	44	2210 → 55262 [ACK] Seq=27 Ack=41 Win=65280 Len=0
1740	132.548571	127.0.0.1	127.0.0.1	TCP	44	2210 → 55262 [ACK] Seq=19 Ack=37 Win=65280 Len=0
855	63.812616	127.0.0.1	127.0.0.1	TCP	44	2210 → 55262 [ACK] Seq=10 Ack=33 Win=65280 Len=0
797	56.756586	127.0.0.1	127.0.0.1	TCP	44	2210 → 55262 [ACK] Seq=1 Ack=17 Win=65280 Len=0