UDP Client-Server Hash Exchange (Server)

Description

In this problem, you are asked to test the interaction between a server and a client through socket programming. The client will send a text message to the server, the server will calculate the MD5 hash of the received message, and then send this hash back to the client. The client should display the original message and its corresponding hash. Note that you need to use UDP for this problem.

Input

There is no input for this problem as the interaction happens over a network connection established between the server and the client. The server will listen on localhost (127.0.0.1) at port 12345, receive a specific message from the client, calculate its MD5 hash, and send it back to the client. Note that you need to use UDP for this problem.

Output

The server should calculate the MD5 hash of the received message and send it back to the client. The complete output of program is as follows (you do not need to write the unit test as it is provided in the skeleton, and please note that [hashed message] contains a string like '472a37a0e1a7bd2d989c93af9867210a'):

```
Test handle_client_message ...
Received from ('127.0.0.1', 54321): Hello, Server! Please hash this message.
sendto called with: call(b'1df1eb001708d60aa5b8c2f33d99f529', ('127.0.0.1', 54321))
Test start_server ...
UDP server listening on 127.0.0.1:12345 ...
Received from ('127.0.0.1', 54321): Test message for start_server
bind called with: call(('127.0.0.1', 12345))
recvfrom called with: call(1024)
```

Method

Your task is to implement and run both the server and client programs as provided. Ensure the server successfully binds to the specified port, listens for incoming connections, accepts a client connection, receives the message, calculates the MD5 hash, sends it back to the client, and then closes the connection.

- Server program: The server should start, bind to the specified localhost and port, listen for incoming connections, accept a client connection, receive the message from the client, calculate its MD5 hash, send the hash back to the client, and then close the connection. It must handle a single client connection before shutting down for the purpose of this problem.
- Client program: The client should connect to the server's specified host and port, send the message "Hello, Server! Please hash this message." to the server, receive the hash response, print both the original message and the hash in the specified format, and then close the connection.