**client.py**

**import socket**

**def mod\_exp(number, mod):**

**return number % mod**

**def client():**

**R\_a = 1567**

**client\_socket = socket.socket(socket.AF\_INET, socket.SOCK\_STREAM)**

**client\_socket.connect(("localhost", 9999))**

**R\_b = int(client\_socket.recv(1024).decode('utf-8'))**

**print("Client received R\_b = ", R\_b, " from server.")**

**remainder\_from\_client = mod\_exp(R\_a, R\_b)**

**print("Client computed remainder: ", remainder\_from\_client)**

**client\_socket.send(str(remainder\_from\_client).encode('utf-8'))**

**auth\_result = client\_socket.recv(1024).decode()**

**print("Authentication result from server: ", auth\_result)**

**client\_socket.close()**

**if \_\_name\_\_ == "\_\_main\_\_":**

**client()**

**server.py**

**import socket**

**import random**

**def mod\_exp(number, mod):**

**return number % mod**

**def server():**

**R\_a = 1567**

**server\_socket = socket.socket(socket.AF\_INET, socket.SOCK\_STREAM)**

**server\_socket.bind(("localhost", 9999))**

**server\_socket.listen(5)**

**print("Server is listening on port 9999.")**

**conn, addr = server\_socket.accept()**

**print("Connected by client at ", addr)**

**R\_b = random.randint(100, 999)**

**print("Server sends R\_b = ", R\_b, " to client.")**

**conn.send(str(R\_b).encode('utf-8'))**

**response = conn.recv(1024).decode('utf-8')**

**remainder\_from\_client = int(response)**

**print("Received client's remainder: ", remainder\_from\_client)**

**remainder\_from\_server = mod\_exp(R\_a, R\_b)**

**print("Server's computed remainder: ", remainder\_from\_server)**

**if remainder\_from\_client == remainder\_from\_server:**

**print("Authentication successful!")**

**conn.send("Authentication successful!".encode('utf-8'))**

**else:**

**print("Authentication failed.")**

**conn.send("Authentication failed!".encode('utf-8'))**

**conn.close()**

**server\_socket.close()**

**if \_\_name\_\_ == "\_\_main\_\_":**

**server()**