Assign 5

server.py

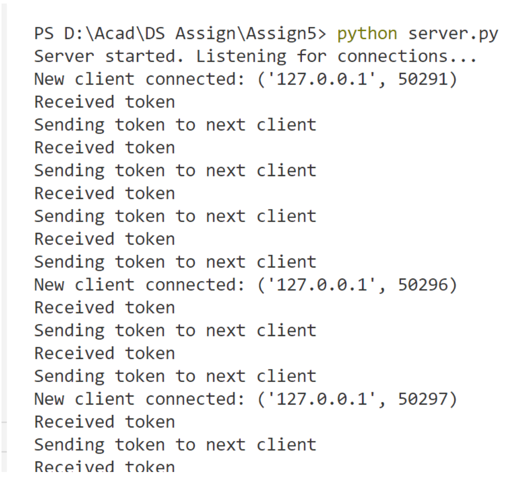
```
import socket
import threading

TOKEN = "TOKEN"
PORT = 8080
BUFFER_SIZE = 1024


class TokenRingServer:
   def __init__(self):
       self.server_socket = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
       self.clients = []
       self.client_threads = []
       self.running = False

   def start(self):
       self.server_socket.bind(("localhost", PORT))
       self.server_socket.listen()
       self.running = True
       print("Server started. Listening for connections...")

       try:
           while self.running:
               ## Accept new connections
               client_socket, client_address = self.server_socket.accept()
               print(f"New client connected: {client_address}")
               self.clients.append(client_socket)

               ## If this is the first client, send the token
               if len(self.clients) == 1:
                   # Send the token to the first client
                   client_socket.send(TOKEN.encode())

               ## Start a new thread to handle the client
               thread = threading.Thread(
                   target=self.handle_client, args=(client_socket,)
               )
               thread.start()

               self.client_threads.append(thread)
```

```
        except KeyboardInterrupt:
            self.stop()

    def handle_client(self, client_socket):
        while self.running:
            ## Receive data from the client
            data = client_socket.recv(BUFFER_SIZE).decode()

            ## select the next client to send the token to
            next_client = self.clients[
                (self.clients.index(client_socket) + 1) % len(self.clients)
            ]

            ## If the client sends CLOSE, remove it from the list of clients and
close the connection
            if data == "CLOSE":
                print(f"Client disconnected: {client_socket.getpeername()}")
                self.clients.remove(client_socket)
                client_socket.close()
                data = TOKEN
                break

            ## If the client sends TOKEN, send it to the next client
            if data == TOKEN:
                print("Received token")
                if len(self.clients) ≥ 1:
                    if self.running:
                        print("Sending token to next client")
                        next_client.send(TOKEN.encode())

                    else:
                        print("Server stopped. Not sending token to next client")
                        break

    def stop(self):
        self.running = False

        print("Closing server..")

        ## Send close signal to all clients
        for client in self.clients:
            print(f"Sending close signal to {client.getpeername()}")
            client.send("CLOSE".encode())
            client.close()
        ## Wait for all threads to finish
        for thread in self.client_threads:
            thread.join()

        self.server_socket.close()



if __name__ == "__main__":
    server = TokenRingServer()
    server.start()
```

Client.py

```
import socket

SERVER_ADDRESS = ("localhost", 8080)
BUFFER_SIZE = 1024



class TokenRingClient:
    def __init__(self):
        self.client_socket = socket.socket(socket.AF_INET, socket.SOCK_STREAM)

    def connect(self):
        self.client_socket.connect(SERVER_ADDRESS)
        print("Connected to server")

    def start(self):
        try:
            while True:
                data = self.client_socket.recv(BUFFER_SIZE).decode()
                if data == "TOKEN":
                    print("Token received. Accessing resource.")
                    # Perform operations on the resource

                    # Simulating work on the resource
                    print("Working on the resource...")
                    # Simulating work by sleeping for 5 seconds
                    import time

                    time.sleep(5)

                    print("Resource access complete. Releasing token.")
                    self.client_socket.send("TOKEN".encode())
                if data == "CLOSE":
                    print("Closing client..")
                    self.stop()
                    break

        except KeyboardInterrupt:
            print("Closing client..")
            self.client_socket.send("CLOSE".encode())
            self.stop()

    def stop(self):
        self.client_socket.close()


if __name__ == "__main__":
    client = TokenRingClient()
    client.connect()
    client.start()
```

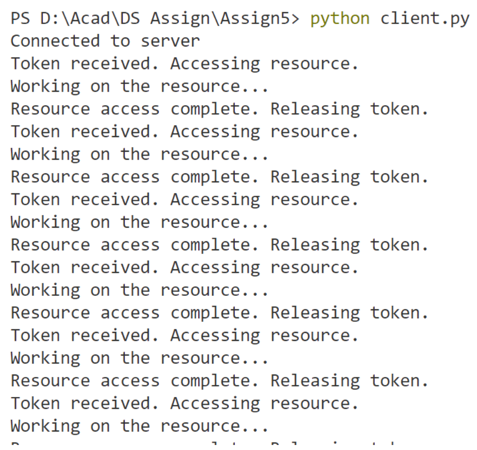
Server



```
PS D:\Acad\DS Assign\Assign5> python server.py
Server started. Listening for connections...
New client connected: ('127.0.0.1', 50291)
Received token
Sending token to next client
Received token
Sending token to next client
Received token
Sending token to next client
Received token
Sending token to next client
New client connected: ('127.0.0.1', 50296)
Received token
Sending token to next client
Received token
Sending token to next client
New client connected: ('127.0.0.1', 50297)
Received token
Sending token to next client
Received token
```

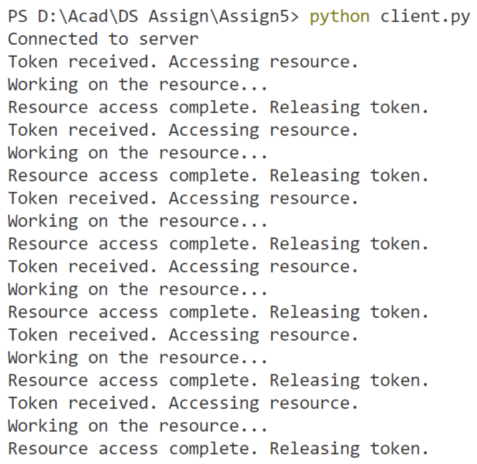
Clients

Client 1



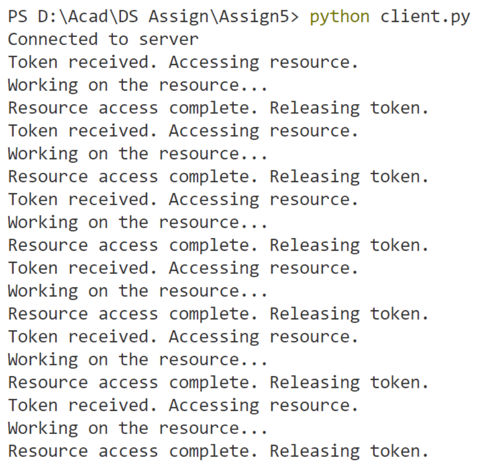
```
PS D:\Acad\DS Assign\Assign5> python client.py
Connected to server
Token received. Accessing resource.
Working on the resource...
Resource access complete. Releasing token.
Token received. Accessing resource.
Working on the resource...
Resource access complete. Releasing token.
Token received. Accessing resource.
Working on the resource...
Resource access complete. Releasing token.
Token received. Accessing resource.
Working on the resource...
Resource access complete. Releasing token.
Token received. Accessing resource.
Working on the resource...
Resource access complete. Releasing token.
Token received. Accessing resource.
Working on the resource...
```

Client 2



```
PS D:\Acad\DS Assign\Assign5> python client.py
Connected to server
Token received. Accessing resource.
Working on the resource...
Resource access complete. Releasing token.
Token received. Accessing resource.
Working on the resource...
Resource access complete. Releasing token.
Token received. Accessing resource.
Working on the resource...
Resource access complete. Releasing token.
Token received. Accessing resource.
Working on the resource...
Resource access complete. Releasing token.
Token received. Accessing resource.
Working on the resource...
Resource access complete. Releasing token.
Token received. Accessing resource.
Working on the resource...
Resource access complete. Releasing token.
```

Client 3



```
PS D:\Acad\DS Assign\Assign5> python client.py
Connected to server
Token received. Accessing resource.
Working on the resource...
Resource access complete. Releasing token.
Token received. Accessing resource.
Working on the resource...
Resource access complete. Releasing token.
Token received. Accessing resource.
Working on the resource...
Resource access complete. Releasing token.
Token received. Accessing resource.
Working on the resource...
Resource access complete. Releasing token.
Token received. Accessing resource.
Working on the resource...
Resource access complete. Releasing token.
Token received. Accessing resource.
Working on the resource...
Resource access complete. Releasing token.
```