United International University

Department of Computer Science & Engineering

CSE 3712: Computer Networks

Assignment

Total Marks: 10

Part 1: Skeleton Code

Server Side

```python
import socket

# Step 1: Create a socket object
server_socket = socket.socket(socket.AF_INET, socket.SOCK_STREAM)

# Step 2: Bind the socket to an IP and Port
HOST = '0.0.0.0'    # Listen on all network interfaces
PORT = 5000         # Choose a port > 1023
server_socket.bind((HOST, PORT))

# Step 3: Start listening for incoming connections
server_socket.listen(1)
print(f"[SERVER] Listening on {HOST}:{PORT}...")

# Step 4: Accept a client connection
conn, addr = server_socket.accept()
print(f"[SERVER] Connected with {addr}")

# Step 5: Receive data from client
data = conn.recv(1024).decode()
print(f"[CLIENT]: {data}")

# Step 6: Send reply
reply = "Message received by server."
conn.send(reply.encode())

# Step 7: Close connection
conn.close()
server_socket.close()
print("[SERVER] Connection closed.")
```

Client Side

```python
import socket

# Step 1: Create a socket object
client_socket = socket.socket(socket.AF_INET, socket.SOCK_STREAM)

# Step 2: Connect to the server
HOST = '127.0.0.1'    # Use server's LAN IP for real network test
PORT = 5000
client_socket.connect((HOST, PORT))
print(f"[CLIENT] Connected to server at {HOST}:{PORT}")

# Step 3: Send a message to the server
```

```python
message = "Hello from Client!"
client_socket.send(message.encode())

# Step 4: Receive reply from server
reply = client_socket.recv(1024).decode()
print(f"[SERVER]: {reply}")

# Step 5: Close the connection
client_socket.close()
print("[CLIENT] Connection closed.")
```

Part 2: Tasks (Basic Problems)

Complete the following tasks using the above skeleton as a starting point:

1. **Echo Server:** Modify the code so that the server sends back whatever message the client sends until either side types “exit”.
2. **Math Server:** Client sends two numbers and an operation symbol (+, -, *, /). The server performs the operation and sends the result back.

Part 3: What to Submit

You need to submit a short report containing the following sections:

Report Template

1. Objective

State briefly what this lab aims to achieve.

2. Tools and Environment

List the tools used, e.g., Python version, PyCharm or VS Code, and network setup (localhost or LAN).

3. Output Screenshots

Provide clear screenshots of your program running:

- Server console showing connections and received messages.
- Client console showing sent and received messages.

4. Discussion and Observations

Write briefly about:

- How the communication took place between server and client.
- Any problems faced (e.g., port conflicts, firewall, etc.).
- How you verified the connection (e.g., using localhost or LAN IP).

5. Conclusion

Summarize what you learned and how socket programming can be extended to real-world applications.

Submission Guidelines

- One PDF/docx report containing all sections above.
- All the reports will go through strong plagiarism checker (which can detect copies, AI generated, AI generated and modified reports). You should write on your own.
- **Submission Deadline**: 01 NOVEMBER, 2025.
- Any submission after the deadline will be not accepted.