Assignment 3

TCP handshake

Course: CS425: Computer Networks

Instructor: Adithya Vadapalli

TAs Incharge: Mohan, Viren, and Prakhar

Submission Deadline: 10.04.2025, EOD

Objective

The goal of this assignment is to understand the TCP three-way handshake and implement the client side of the handshake using raw sockets. The server-side code has already been provided and can be downloaded from the following GitHub repository: `https://github.com/privacy-iitk/cs425-2025.git`

Background

Raw sockets allow direct access to network protocols, enabling the construction and transmission of custom packets. Unlike standard TCP or UDP sockets, raw sockets bypass the operating system's transport layer handling, allowing manual control over packet fields such as sequence numbers, flags, and checksums.

Your Task

You need to implement the *modified* (client side) of this handshake using raw sockets. The client must:

1. Construct an SYN packet with the correct sequence number.
2. Receive and parse the SYN-ACK response from the server (What should be the sequence number you expect?!).
3. Send a final ACK to complete the handshake.
4. (You can figure these sequence numbers out by looking at the server code). Note that in this simplified handshake, we do not use many fields.
5. Please note that you must adhere to the above sequence numbers to get credit in the Assignment.

Instructions

1. Clone the repository from: `https://github.com/privacy-iitk/cs425-2025.git`
2. Go to the `Homeworks/A3` directory as `cd cs425-2025/Homeworks/A3`
3. You will see `server.cpp` and `README.md`
4. Your goal is to:
   - Write the client code called `client.cpp` (write the code only in `C++`).
   - provide detailed comments for the code that you wrote.
   - Write a README
5. This assignment can be solved in a group of at most three students.
6. Use only Piazza to ask for help in the assignment.

Deliverables

Students must submit the following:

- Source code implementing the client code.
- A README file with instructions on how to run the code.

Submission Instructions

- Submit a zip file containing the source code README
- The filename should be `A3Rollnumberofmember1Rollnumberofmember2Rollnumberofmember3`
- Upload your submission to HelloIITK before the deadline. Only one team member should submit the assignment.

Grading Rubric

- **Correctness (60%)**: The server works as expected and supports all required features.
- **Code Quality (15%)**: Comments in the code.
- **Documentation (25%)**: Clear instructions and explanation in the README.

Note: For any clarifications, post a message on Piazza. Ensure all submissions are made before the deadline. Late submissions will incur a penalty as per the course policy.

Instructor: **Adithya Vadapalli** TA Incharge: **Mohan, Viren, Prakhar**