Course Title	Computer Networks		
Course Code:	Comp-352	**Semester:**	5th (Fall 2025)
Assignment:	1	**Deadline**	Friday September 26 11:59pm PKT

Objective:

Acquiring in depth understanding of existing protocols by investigating and analyzing real world protocols. (CLO 3)

Description:

Task 1:
Find a website that runs on HTTP. Access this website using your device and capture network traces.

Task 2:
Find a website that runs on HTTPS. Access this website from your device and capture network traces.

Task 3:
Find a website that runs on QUIC. Access this website and capture network traces.

Task 4:
For the HTTP based website access, answer the following after analysing collected traces of HTTP:

1. What is the name of website?
2. Find the packet that contains the **first GET request** for the website you have accessed.
3. Describe all **headers and their values** in this GET request message.
4. Identify the **status code** in the first server response.
5. How many **HTTP response messages** are exchanged in total?
6. Determine whether the connection is **persistent** or not. Justify with evidence from packet captures.

Task 5:
For the HTTPS based website access, answer the following:

7. What is the name of website?
8. Find the packet that contains the **ClientHello** message for the website you are accessing.
9. List all the **TLS extensions** included in the ClientHello.
10. Identify the **ServerHello** message. What cipher suite is chosen by the server?
11. Locate the **Certificate message**. Extract the **server's certificate information** (issuer, subject, validity dates).
12. After the TLS handshake, identify the first **encrypted application data packet**. Why can't you directly see the HTTP headers in this packet?

Task 6:
For the QUIC based website access, answer the following:

1. What is the name of website?
2. Find the packet that contains the **Initial QUIC handshake**. What information is exchanged here?
3. Identify the QUIC packet that contains the **TLS ClientHello** (QUIC embeds TLS handshake inside QUIC).
4. Which QUIC version is used in your trace?
5. Locate the packet where **0-RTT or 1-RTT keys** are first used?
6. Find the first packet that carries **application data (HTTP/3)**. How does this differ from HTTP over TCP?

Submission:

This is a group assignment. Group size cannot be more than 3. You can have a smaller group size though.
There should be only ONE submission per group.
Assignment should be submitted via a Github repository. This Github repository must be shared with Github user `adnaaniqbal` and all group members. Last commit should be made before the submission deadline. **Any repository with commits after the deadline shall result in invalid assignment submission and not marked.**

Each group should also send the following details to adnan.iqbal@paf-iast.edu.pk two days before the deadline:
- Class Name on the pattern BSAIF23-Color (where color is RED, GREEN or BLUE)
- Name of the person submitting assignment on behalf of all members
- Registration Number of the person submitting assignment on behalf of all members
- Name of the second group member (if any)
- Registration Number of the of the second group member (if any)
- Name of the third group member (if any)
- Registration Number of the of the third group member (if any)

Submission of this information by email at least **2 days** prior to assignment deadline is necessary. Failure in providing this information in time may result in loss of marks.

Submission Deadline: Friday September 26 11:59pm PKT.

Repository Structure:

Repository should have four folders named http, https, quic and prompts.
Folder named `http` should have two files: One trace file that contains traces collected by you for an HTTP based website. Other file must contain answers to all the assignment questions about HTTP traces.
Folder named `https` should have two files: One trace file that contains traces collected by you for an HTTPS based website. Other file must contain answers to all the assignment questions about HTTPS traces.
Folder named `quic` should have two files: One trace file that contains traces collected by you for a QUIC based website. Other file that contains answers to all the assignment questions about QUIC traces.
Folder named `prompts` is optional. You should create this folder only if you use tools like ChatGPT to help you in the analysis of these traces. In such scenario the `prompts` folder should contain all the prompts used by you to find answers of these questions.

Repository should also have a README.md file. This file should contain names and registration numbers of all group members and your class information. This is basically the replica of information shared by you on email.

Grading:

Total Assignment Marks: 50

Timely submission of group information via email: 2
Repository availability and structure conformance: 4
Self collected HTTP traces: 3
Self collected HTTPS traces: 3
Self collected QUIC traces: 3
http answers: 3
https: answers: 8
quic answers: 10
Contribution (commits on repo): 5
Understanding assessment (viva): 9

Plagiarism Policy / Fair Use of LLMs:
Each group should collect and analyze their own traces. Sharing of traces constitutes plagiarism. Using the Internet search / LLMs to find any HTTP, HTTPS, QUIC based website is fair use of these tools. Each group should analyze their own traces. Using LLMs in the analysis of these traces is permissible. If you have decided to use LLMs in this analysis, you should create your own prompts and share those prompts via Github repo. Sharing of prompts with other groups constitutes plagiarism. Sharing of analysis results with other groups also constitutes plagiarism. Discussion with instructor in understanding of the assignment at any point within working hours before the submission is encouraged.