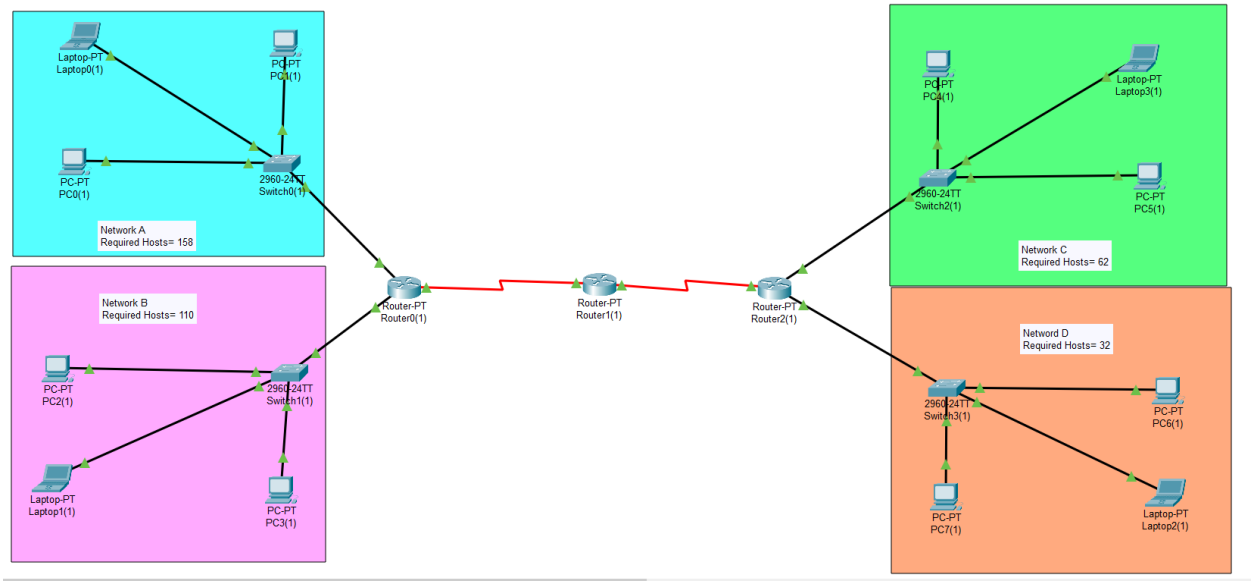
COMSATS UNIVERSITY ISLAMABAD
Lahore Campus
Department of Computer Science

☐ **Mid-Term Examination** ■ **Terminal Examination Fall 2023**

Course Title:	Computer Networks				Course Code:	CSC340	Credit Hours: 4(3,1)
Course Instructor/s:	Inzmam ul haq				Programme	BS Computer Science	
Semester:	4th	Batch:	SP22	Section:	Name:	Date:	22-12-2023
Time Allowed:	**150 Minutes**				**Maximum Marks:**		**50**
Student's Name:					Reg. No.		

Q1. Consider the scenario given below. : [CLO: 6; Bloom Taxonomy Level <Applying>]



Use the given two class C IP address for this network scenario:

192.168.1.0

192.168.2.0

A. Configure and assign IP addresses for each network. For this fill out the subnetting table required fields given below. **(12 marks)**

Network Name	Network IP Address	First Usable IP Address	Last Usable IP Address	Broadcast IP Address	Prefix	Subnet Mask

B. Apply static routing. **(8 marks)**

Q2. Consider the Trace file given and answer the following questions:
[CLO: 6; Bloom Taxonomy Level <Applying>]

A: Find the first **[syn]** on port 80, according to that first syn fill out the table below: **(4 Marks)**

Three way Handshake	Packet Number	Source Port	Destination Port	Flags On	Sequence number (relative)	Acknowledgment number (relative)
First Handshake						
Second Handshake						
Third Handshake						

B: Find the TCP segment with the **HTTP POST** method, what is the TCP segment length of that TCP segment. **(1 Marks)**

C: Consider the Acknowledgment number **16769** in packet **135** as the first segment. Now look for the next 5 segments that receive the acknowledgment upto **34289** ack and calculate the difference between them also calculate the estimated RTT for each of the **6 ack packets**? **(6 Marks)**

D: Are there any retransmitted segments on **Port 80** in the trace file? What did you check for (in the trace) in order to answer this question? **(1 Marks)**

E: What is the **throughput** (bytes transferred per unit time) for the TCP connection? Explain how you calculated this value? **(3 Marks)**

F: Is our client send any **TCP keep alive segment** to the destination in the entire trace, if yes then what is the packet number and destination port number, Also does client receive any Ack to this TCP keep alive segment, if yes then what is the packet number and destination port number? **(2 Marks)**

G: What is the minimum amount of available buffer space advertised at the received for the entire trace?

(1.5 Marks)

H: What is the length of each of the first six TCP segments? **(1.5 Marks)**

Q3. Build a simple **client-server Multi-threaded system**. The protocol between the client and server is as follows.

- The server is first started on a known port.
- The client program is started (server IP and port is provided on the command line).
- The client connects to the server, and then asks the user for input string. The user enter the input string like **"rotator"**. The user's input is sent to the server via the connected socket.
- The server reads the user's input from the client socket, evaluates it whether it is a palindrome or not, and sends the result back to the client.
- The client should display the server's reply to the user, and prompt the user for the next input, until the user terminates the client program with Ctrl+C.

[CLO: 6; Bloom Taxonomy Level <Applying>] **(10 Marks)**