National University of Computer and Emerging Sciences, Lahore Campus

	Course Name:	Computer Networks Lab	Course Code:	CL-3001
	Program:	BS (Computer Science)	Semester:	Spring 2023
	Duration:	2 hrs (including submission)	Total Marks:	40
	Paper Date:	07-June-2023 (Wednesday)	Weight	40%
	Section:	ALL BS(CS) & BS(SE) sections	Page(s):	02
	Exam Type:	Lab Final Exam		

Name: **Roll No.:** **Section:**

Instruction/Notes: **READ ALL INSTRUCTIONS CAREFULLY.**

1. Understanding the question paper is also part of the exam, so do not ask for any clarification. Make suitable ASSUMPTIONS.
2. Final Submissions should be done on cactus on your respective section folder on **\\cactus1\Xeon\Spring 2023\Salman Shoaib\CN Final Submission**. Each question related file must be in a separate **folder (Question 1, Question 2)** and all the separate folders must be in a single folder. **The final folder must be renamed after your roll number and section e.g., "20L-4125". Multiple submissions are not allowed (if done, only the first one will be considered). In case of missing or corrupt file submission, all the responsibility will be on the student himself.**
3. Your cell phones/smart watches **MUST** be turned off and placed far away from the PCs.
4. It is your responsibility to protect your code and save it from being copied. If you don't protect it, all matching codes will be considered copy/cheating cases. **No leniency on plagiarism.**
5. Any kind of cheat sheet/code if found in your PC will result in immediate disqualification from Final Exam and '**F**' as final grade in Computer Networks Lab. So, make sure you delete everything from the Desktop of your windows as well as Ubuntu. Also delete all the files permanently from Recycle Bin and Trash respectively for Windows and Ubuntu. Delete all files from your Drives before starting the exam.
6. You are immediately disqualified from the exam if:
   i. You are seen talking, whispering, borrowing or looking at someone's PC
   ii. A USB is found attached to your PC
   iii. You are seen using a cell phone/smart watch.
   iv. You are caught accessing internet

Part 1 — TCP SOCKET PROGRAMMING (Marks: 25)

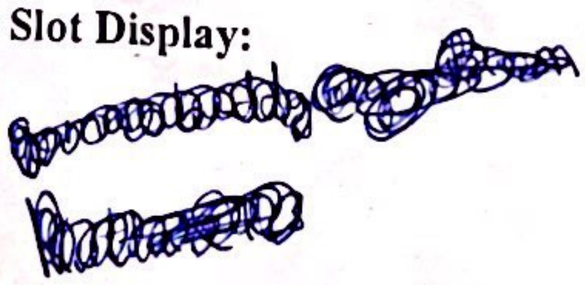
******Submission: You have to submit your (Roll-No_Client.c) and (Roll-No_Server.c) files in a folder named Question 1******

Design a **Restaurant Booking System** with the following requirements:

1. Capacity and Queue Handling: [3]

- The system should handle **up to 5 clients** concurrently.
- If a 6th client attempts to book, they should be sent to a waiting queue.

2. Time Slot Display: [3]



- Display 4 time slots for hi-tea and dinner buffet **each.**

3. Reservation Policy: [3]
- Implement a first-come, first-reserve policy, prioritizing clients based on their joining time.
- Clients should receive priority regardless of whether they make a reservation or not.

4. Client Handling: [3]
- Implement a mechanism to **disconnect unresponsive clients.**

5. Server Operation: [4]
- The **server should run infinitely,** ensuring continuous operation of the hotel booking system.

6. Admin Page and Reservation Storage: [4]
- Create an admin page with username(admin) and password (HotelManager) authentication.
- The admin page should provide access to view reservations.
- Store the reservations in a local file on the server.

Complete working and no errors. [5]

Part 2 Cisco Packet Tracer (Marks: 15)

******Submission: You need to add the screenshot along with the cisco file in a folder named Question 2******

You have been assigned the task of subnetting a specific network in Cisco Packet Tracer. The network is currently using the IP address 192.168.1.0/24 and needs to be subnetted to accommodate multiple sub-networks. However, you must ensure that the IP addressing for each device is assigned in a continuous manner without any wasted IP addresses.

255.255.255.0

Using Cisco Packet Tracer, perform the following tasks:

- Subnet the network 192.168.1.0/24 to create a maximum of four sub-networks.
- Assign IP addresses to each device within the sub-networks, ensuring that IP addresses are assigned sequentially without any gaps or wasted addresses.
- Provide the subnet mask for each sub-network.
- Document the IP address assigned to each device within the sub-networks.
- Please show your calculations and provide detailed explanations for each step. Take into consideration the network and host requirements, as well as the limitations of the IP address range starting from 192.168.1.1.

Note: Use Cisco Packet Tracer to visually represent the subnetting process and provide screenshots or diagrams of your network configuration, including the assigned IP addresses for each device.

Your response will be evaluated based on the accuracy of the subnetting calculations, the proper utilization of IP addresses without any gaps, and the clarity of your explanations and visual representations.

192.168.1.0/24 3 subnets, 2 hosts

→ 192.168.1.0/28
255.255.255.1111 0000
$SG_1 = 2^4 : 16 = 4$
192.168.1.0/28
192.168.1.16/28
192.168.1.32/28
192.169.1.48/28