COMSATS University Islamabad, Lahore Campus
SPRING 2021

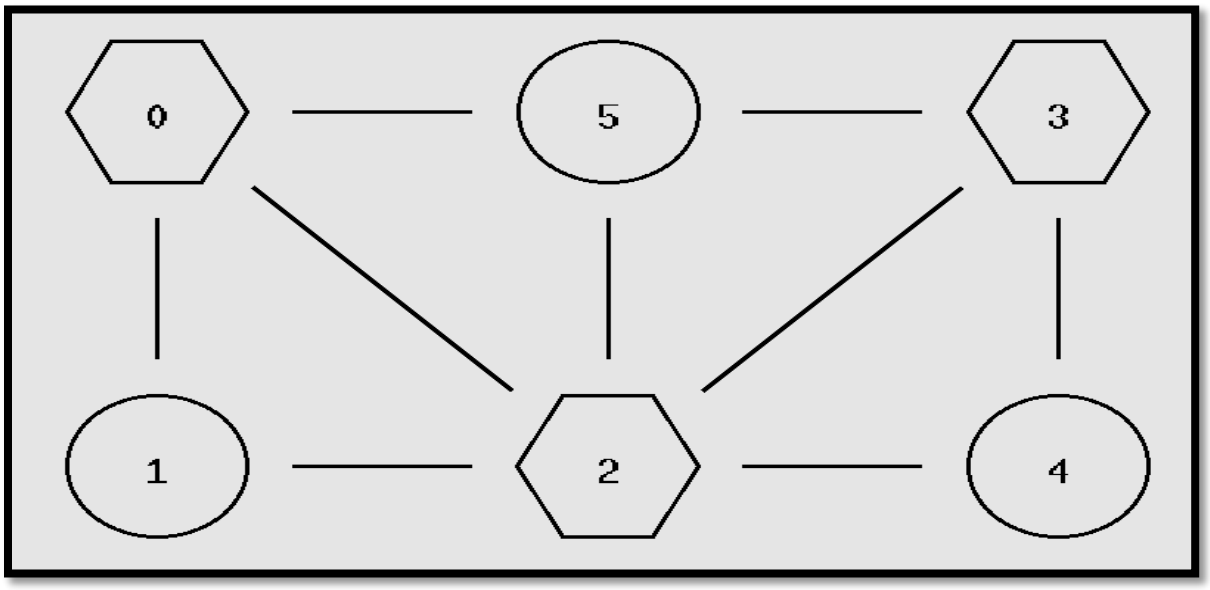
Terminal Examination - Lab

Course Title:	Data Communications and Computer Networks			Course Code:	CSC339	Credit Hours:	1(0,1)
Course Instructor	Muhammad Asad Mumtaz			Program Name:	BS(CS) & BS(SE)		
Semester:	5th	Batch:	SP19	Section:	A, B, & C	Date:	22-06-2021
Time Allowed:	**03 Hours**			**Maximum Marks:**		**50**	
Student's Name:				Reg. No.			

Important Instructions / Guidelines:

- All Questions are compulsory.
- Lab Exams will consist of performing a practical exam using NS2 & Packet Tracer.
- The use of the internet and help from another student is strictly prohibited.

Question 1: **[40 Marks]**



A. Create the above given scenario in NS2 with the exact number, shape & placement of nodes. **Note:** All links use DropTail queuing algorithm and have a **bandwidth of 2Mb** & **delay of 10ms**. **[10 Marks]**

B. Apply **TCP** on **Node_0** and **TCP-Reno** on **Node_3**. **Node_0** will use **FTP** (File Transmission Protocol) to send traffic on **Node_4** and **Node_3** will use **CBR** to send traffic (1 KB) on **Node_1.** **[6 Marks]**

C. Apply **UDP** on **Node_2** and use **CBR** to send traffic (800 bytes) on **Node_3.** **[3 Marks]**

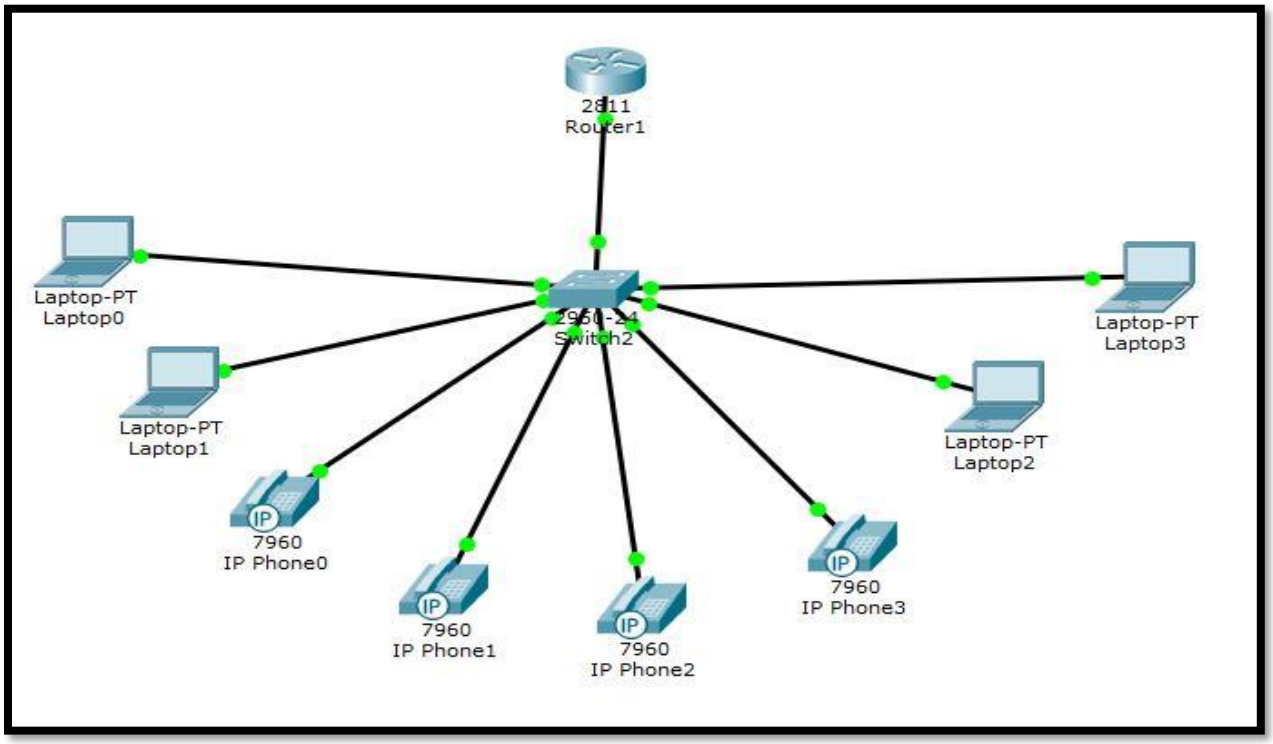
D. Apply Distance Vector (DV) routing protocol and fail the link between **Node_2 & Node_4** for **0.8 seconds** when simulation time arrives at **3 seconds**. **[3 Marks]**

E. Run the simulation for **5 seconds** and note that **Node_2, Node_3, & Node_0** will start the traffic at **0.2, 0.6 & 1.0** seconds respectively and each node's traffic will be stopped at **4.9** seconds of simulation. Moreover, assign a different color to each traffic flow. Limit the queue size between **Node_2 & Node_3** to **10** packets and set the queue position to **0.7**. **[6 Marks]**

F. Present results in X-Graph with the interval of 0.5 and conclude which protocol (TCP, TCP-Reno or UDP) performs congestion control and what is the advantage of using dynamic routing in this scenario. **[6 Marks]**

G. Re-run the simulation but this time all links will use **RED** queuing algorithm with same bandwidth of 2Mb and delay of 10ms. Then compare the result of this simulation with previous simulation's result in which all links use **DropTail** queuing algorithm. **[6 Marks]**

Question 2: [10 Marks]



A. Create the above network in Packet Tracer with the exact number of devices. **[3 Marks]**

B. Apply VOIP where applicable. Also configure IP addresses on each laptop. **[7 Marks]**

Note: *The IP address will contain your roll number in its second octet. For example,* ***192.168.1.0*** *is used as IP address. So here, the* ***168 number*** *will represent your roll number. Moreover, IP address configuration for both* ***(IP-Phones & Laptops)*** *will be based on* ***subnetting.***

Submission Instructions:

You will submit a Zip folder with your registration ID. In you zip folder there should be three following files:

1. Packet Tracer File
2. TCL Code File
3. Word File - It will contain following:
    - **A.** Question # 1
        - **i.** Network Topology Screenshot
        - **ii.** TCL Code
        - **iii.** NAM Output
        - **iv.** X-Graphs of Both Scenarios (DropTail & RED)
        - **v.** Conclusion/Comparison
    - **B.** Question # 2
        - **i.** Network Topology Screenshot
        - **ii.** Configuration Commands of Router
        - **iii.** Configuration Commands of Switch
        - **iv.** Screenshot of a Laptop's IP Configuration
        - **v.** Configured IP_Phone's Screenshot

Good Luck ☺