| Course Title:	Data Communications and Computer Networks (LAB)			Course Code:	CSC339	Credit Hours:	3(2,1)
Lab Instructor:	**Sana Latif**			Program Name:	BCS		
Semester:	5th	Batch:FA21-BCS	Section:	A, B	Date:	December 22, 2023.	
Time Allowed:	**165 Minutes**			Maximum Marks:		**50**	
Student's Name:				Reg. No.			

Important Instructions

- Make a neat diagram, also comment the IP addresses of the PCs, Routers and any other useful information in your pkt files.
- You are required to submit two "pkt" files, one for each question, also attach one "txt" file containing the configuration of main router and a "tcl" file containing code of NS2.
- All of your files, folders and zipped files should be named exactly as **RegID_Name_Section_Question#**, also zip all of the files. Name of the folder should also be same
  RegID_Name_Section
- **(Mandatory)** Upload your zip file in response to Terminal Exam Section in Google Classroom.
- **Note: Failure to upload your code file in given time frame will lead to zero. Also, no extra time will be given.**

Question No. 1   CLO: 2, Bloom Taxonomy Level: Apply   **[20]**
 **Recreate the below given network keeping in mind the following constraint:**
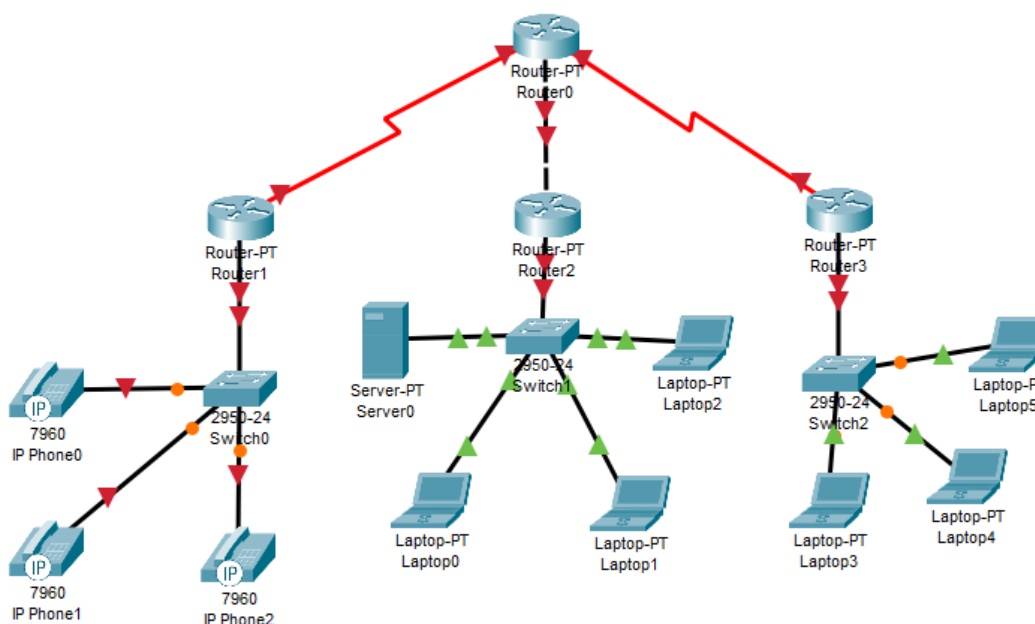
- **Create a private VLAN for laptop 1 and laptop 2. Name the VLAN as your name and ID as your Reg ID's digits, e.g., for FA21-BCS-028, the ID would be 28.** **[3]**
- **Apply VoIP on the router 1.** **[6]**
- **Apply DHCP using the Server 0 in the router 2 area.** **[3]**
- **Apply routing protocol on all of the routers using the OSPF. Make sure the communication across the whole of the network is possible.** **[5]**
- **Apply DHCP using the router in the router 3 area.** **[3]**

Question No. 2   **CLO: 2, Bloom Taxonomy Level: Apply**   **[10]**

Recreate the below given network and enable the Inter VLAN communication using the concepts of subnetting using a router on a stick:
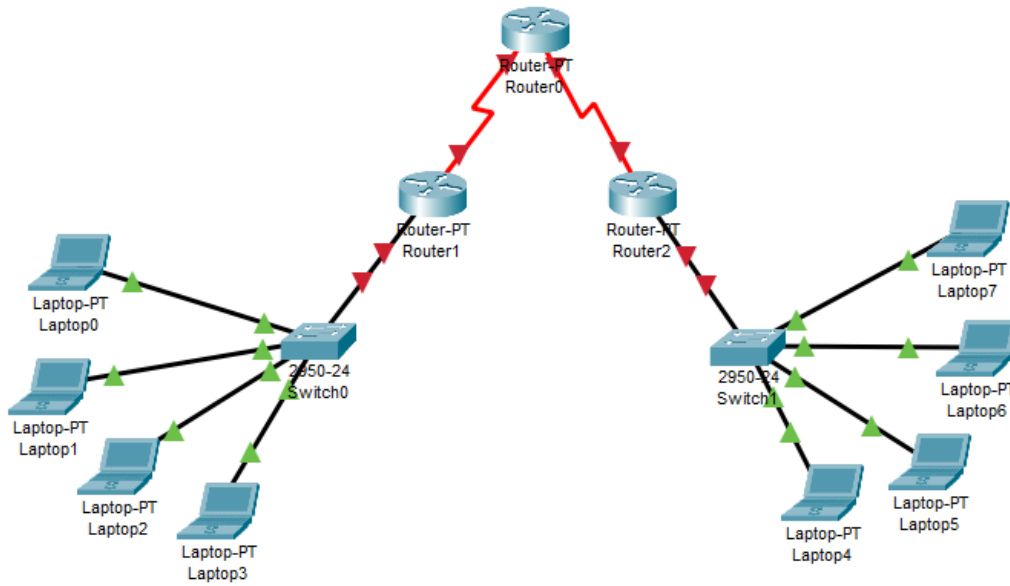

- **Create two private VLANs on each switch, add Laptop 0 and Laptop 1 to first VLAN. Name this private VLAN as CS and ID as 20. Similarly, create another VLAN with name as MS and ID as 40 and add Laptop 6 and Laptop 7 to it.** **[3]**
- **Enable the InterVLAN communication between the private VLANs named CS and MS. While also make sure that the communication among the other devices in the network is also possible.** **[4+3]**

Question No. 3   **CLO: 2, Bloom Taxonomy Level: Apply**   **[20]**
Implement the following given scenario is NS2.
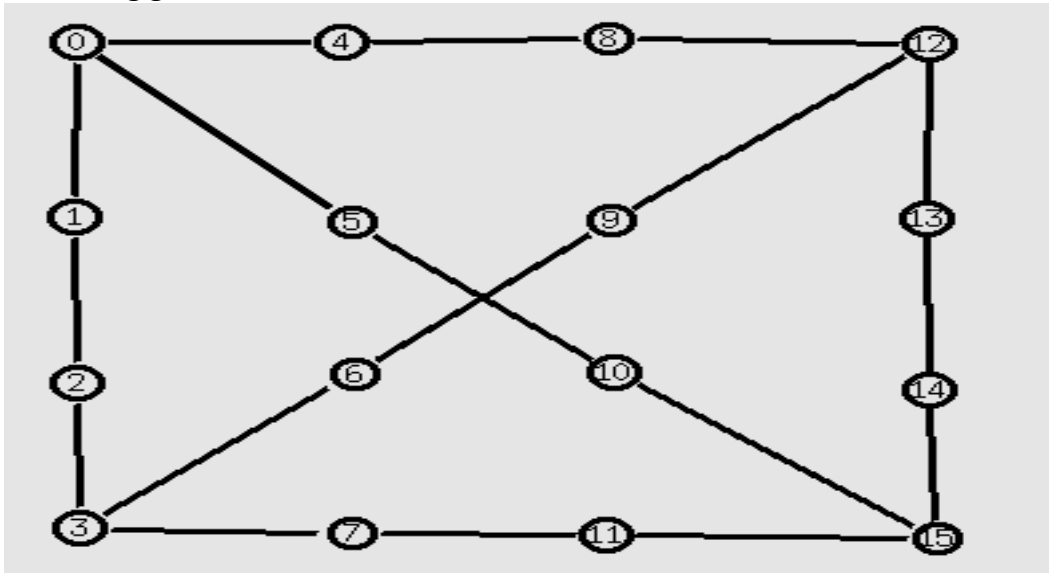
- I.   Create the whole network of nodes and edges as shown in the image above. **[3]**
- II.   Apply UDP on the node 4 and node 8 while TCP on the node 0 and node 12. Generate traffic using the CBR by flowing the traffic from the node 4 to 11, from the node 8 to 7, from the node 0 to 15 and from the node 12 to 3. **[7]**
- III. Compute the XGraph for the throughput of the network while comparing the performance between the RED and the DropTail algorithm implementing them one by one. **[5]**
- IV.   Down the link between the node 1 and 2 and between the node 13 and 14. Apply the routing algorithm to move the traffic to other possible communication paths available until the links are down. **[5]**