CS 342: Computer Networks Lab

(July-November, 2022)

Assignment 5: Learn Cisco Packet Tracer to Configure Switch, Router, VLAN, and Inter VLAN Routing

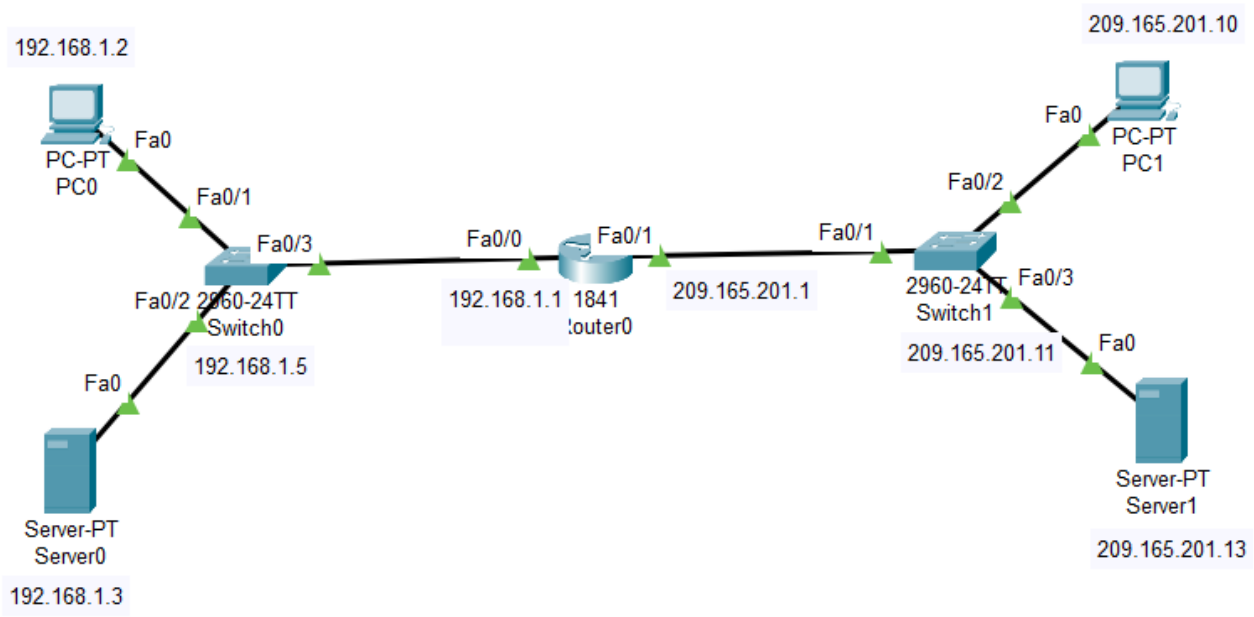
Submission Deadline: 11:55 pm on Monday, 7th November 2022 (hard deadline)

Viva-voce Date & Time: Lab session on Monday, 14th November 2022 (ML-1: 9:00 am to 11:55 am)

Cisco Packet Tracer is a powerful network simulation program that allows students to experiment with network behavior and ask "what if" questions. Packet Tracer provides simulation and visualization capabilities to facilitate the learning of complex technology concepts. Packet Tracer supplements physical equipment in the classroom by allowing students to create a network with an almost unlimited number of devices, encouraging practice, discovery, and troubleshooting. The simulation-based learning environment helps students develop 21st century skills such as decision making, creative and critical thinking, and problem solving. You should download and install in your PC for doing the assignment.

In this assignment you will learn how to:

1. build a network using cisco packet tracer
2. configure switch and router
3. form VLAN
4. perform inter and intra VLAN communication
5. configure port security on switch



As shown in the above diagram the network will consist of two VLANs. Each VLAN consists of a PC, Server and a router connecting each of the VLANs via switches. For each PC, Server, Router, and Switch, the following table contains their network related configuration.

Device	Interface	IP address	Subnet mask	Default Gateway
Router0	fa0/0	192.168.1.1	255.255.255.0	-
Router0	fa0/1	209.165.201.1	255.255.255.0	-
Switch0	VLAN1	192.168.1.5	255.255.255.0	192.168.1.1
Switch1	VLAN2	209.165.201.11	255.255.255.0	209.165.201.1
PC0	NIC	192.168.1.2	255.255.255.0	192.168.1.1
PC1	NIC	209.165.201.10	255.255.255.0	209.165.201.1
Server0	NIC	192.168.1.3	255.255.255.0	192.168.1.1
Server1	NIC	209.165.201.13	255.255.255.0	209.165.201.1

You need to perform following tasks using Command Line Interface (CLI):

A. Assign IP address, subnet mask, default gateway to the PC and Server as described in the above table.
[Marks: 4x0.5 = 2]

B. Configure both the Switches in global configuration mode **[Marks: 4x1 = 4]**

1. Configure Switch hostname: <YourShortName>_Switch
2. Configure password and secret for privileged mode
   Password: cisco
   Secret: cisco123
   Configure the console password for global configuration mode
   Password: cisco123
3. Assign given IP addresses to VLANs and default gateways for the switches;
4. Add corresponding devices to VLANs as show in the diagram

NOTE: For verification, try performing Intra VLAN communication. It should work. But, Inter VALN communication should not work.

C. Configure Router in global configuration mode **[Marks: 1+1+2 = 4]**

1. Configure router hostname: <YourShortName>_Router
2. Configure the password and secret for privileged mode
   Password: cisco
   Secret: cisco123
   Configure the console password for global configuration mode
   Password: cisco
3. Assign given IP address, subnet mask to interface fa0/0 and fa0/1 as mentioned in the table

NOTE: Now you must be able to perform Inter VLAN communication. It should work properly.

D. Configure port security in the switch **[Marks: 7x1 = 7]**

1. Configure port security for the port used by PC0.
    I. Enable port security
    II. Allow only one MAC address.
    III. Configure the first learned MAC address to "stick" to the configuration.

2. Verify port security enabled for fa0/1.
3. Send ping PC0 to Switch0
4. Now verify whether Switch0 added the MAC address for PC0 to the running configuration
5. Remove connection fa0/1 between Switch0 and PC0 using GUI and connect PC2 to port fa0/1 to cause the port to shut down.
6. Viewing the fa0/1 interface shows that line protocol is down, which indicates the security violation
7. Re-connect PC0 with port fa0/1 of Switch 0 using GUI and re-enable the port

E. Manage Configuration files. **[Marks: 3x1 = 3]**

1. Save the current configuration for Switch0 and Router0 to NVRAM.
2. Back up the startup configuration file on Switch0 and Router0 by uploading them to Server0. (While uploading use file name as Router0-config and Switch0-config).
3. Verify that server has Router0-config and Switch0-config file.

General Instructions:

1. The assignment will be **solved in groups** where each group comprised of 3-4 members. The group membership information will be informed separately. The network specifications, the required experiments, and related questions are given below of this document.
2. It is advisable to provide only brief description while answering the questions. While answering, provide snapshots of the command and output in the report and highlight the content as and when required.
3. If something is missing/incorrect in a problem description, clearly mention the assumption with your answer.
4. Be precise with your answers; there is no credit for being unnecessarily verbose (may award you negative marks for the same). Unless specified otherwise, do not describe the tool or application or protocol in general.
5. Submit **a soft copy of the report**, preferably in **PDF** format in Moodle. The name of the zip file should be like "**Your_GroupNo.pdf**" (example: "Group2.pdf").
6. Files submitted without proper naming format will not be evaluated.
7. The assignment will be evaluated through **viva voce** in your lab during your lab session where you also need to explain your source codes and execute them before the evaluator (evaluation schedule and TA allocation will be notified in due time).
8. The report should not contain more than 6-7 pages.
9. **Plagiarism (copy cases) and other unfair means will be strictly punished by awarding NEGATIVE marks (equal to the maximum marks for the assignment).**