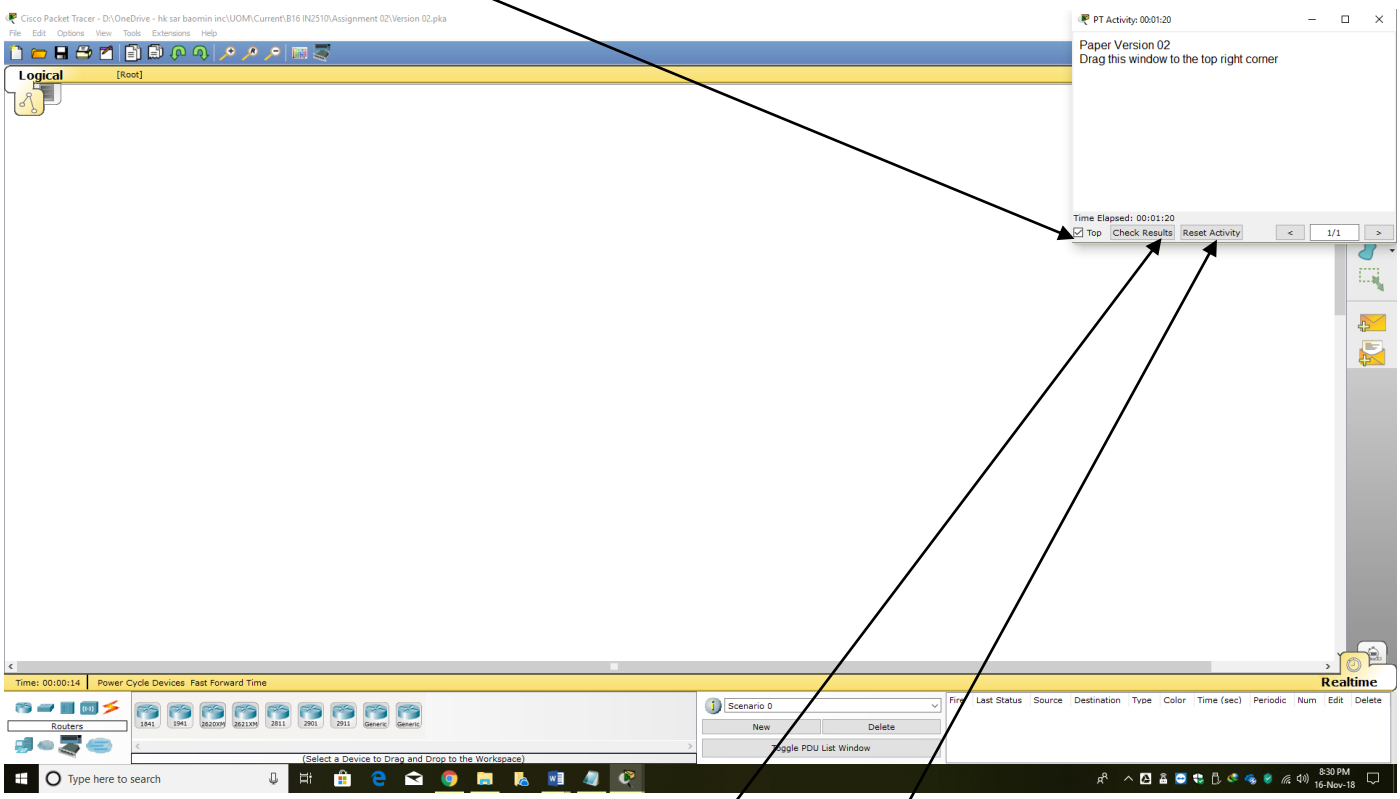
Faculty of Information Technology, University of Moratuwa
Bsc. (Hons) in Information Technology
Computer Networks – IN 2510 – Assignment
Level 2, Semester 2

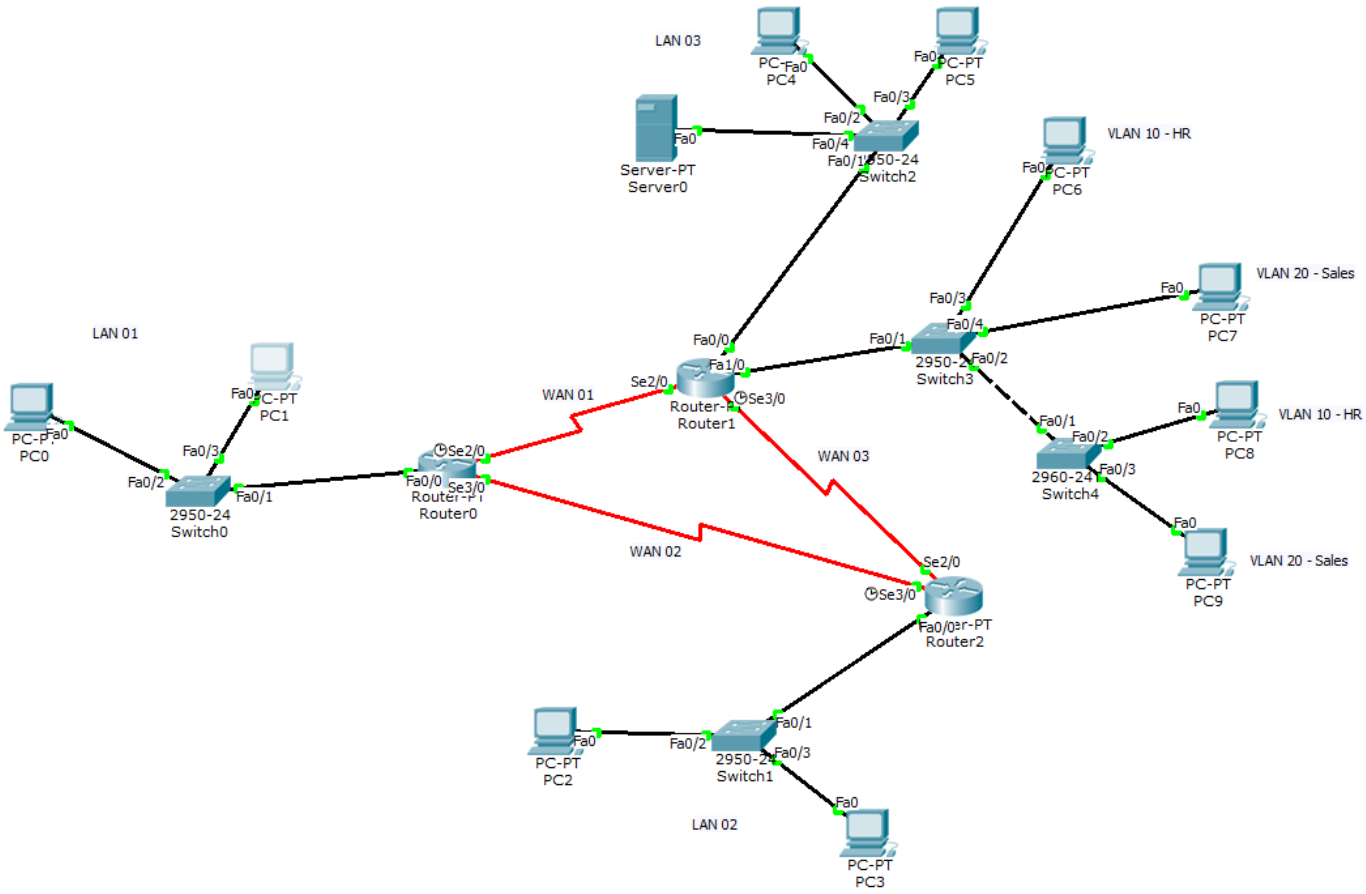
Instructions to candidates

1. Download the "Assignment05.pka" file from Moodle and open it.
2. Tick the top icon on the instruction window and drag it to the top right corner, and it should be displayed on the monitor during the assessment.



3. Design the network diagram, as mentioned in the question paper. (Note: device types, interface port numbers and labels should be the same as in the diagram of the question paper)
4. If your network devices (router, switches, server and PCs) labels do not match with a given diagram, rename those devices' labels as per the given diagram in the question paper. (Note: you can rename labels of devices by clicking on the label name)
5. Do not click the "Check Results" and "Reset Activity" buttons in the instruction window of the packet tracer.

Assume that you are the network administrator of the "Central IT Services" company and the following diagram, illustrate the network for your company.



Design the above network and load it into the packet tracer simulator.
Take the **Generic Router-PT** and **2950 switches** for switch0, switch1, switch2 and switch3. **2960 switch** for switch4.
Note: device types, interface port numbers and device labels should be the same as mentioned in the diagram

Hint: Before starting the configuration, read the entire parts of the paper below.

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1. You are given class B private network address of 172.16.0.0/16 and you are required to create 05 subnets. Note: You are required **to use** the Subnet Zero and All-Ones subnet.
   Find how many minimum numbers of Host bits taken into the Network bits for this purpose and find the subnet mask.
   Assign 1st subnet to LAN 01, 2nd subnet to LAN 02, 3rd subnet to VLAN 10, 4th subnet to VLAN 20 and 5th subnet to LAN 03, respectively.

   Design static IP address plan for the above network according to the following.
   a. In LAN 01(1st subnet), take 1st and 2nd usable IP Addresses to the PC0 and PC1 respectively.
   b. In LAN 01, take last usable IP address as the default gateway.
   c. In LAN 02(2nd subnet), take 1st and 2nd usable IP Addresses to the PC2 and PC3 respectively.
   d. In LAN 02, take last usable IP address as the default gateway.
   e. In VLAN 10(3rd subnet), take 1st and 2nd usable IP Addresses to the PC6 and PC8 respectively.
   f. In VLAN 10, take last usable IP address as the default gateway.
   g. In VLAN 20(4th subnet), take 1st and 2nd usable IP Addresses to the PC7 and PC9 respectively.
   h. In VLAN 20, take last usable IP address as the default gateway.
   i. In LAN 03(5th subnet), take 1st, 2nd and 3rd usable IP Addresses to the Server0 PC4 and PC5 respectively.
   j. In LAN 03, take last usable IP address as the default gateway.
   k. Create two VLANs (VALN 10 and VLAN 20) and Name VLAN 10 as HR and VLAN 20 as Sales.
   l. Create all VLANs and set the VLAN names on all switches.

      Note: use VLAN Trunking Protocol (VTP) server name as **CentralVTP**

   m. Configure all switch ports, as mentioned in the network diagram.

   n. Create 02 sub-interfaces in fastEthernet 1/0 of Router1 and assign VLANs, respectively.

      (1st sub-interface to VLAN 10 and 2nd sub-interface to VLAN 20)

2. Your ISP is given classless public network address of 154.28.32.0/28 and you are required to create 03 subnets. Note: You are required **to use** the Subnet Zero and All-Ones subnet.
   Find how many minimum numbers of Host bits taken into the Network bits for this purpose and find the subnet mask.
   Assign 1st subnet to WAN 01, 2nd subnet to WAN 02, 3rd subnet to WAN 03, respectively.

   a. In WAN 01 take 1st and 2nd usable IP Addresses to serial 2/0 of Router0 and serial 2/0 of Router1 respectively.
   b. In WAN 02 take 1st and 2nd usable IP Addresses to serial 3/0 of Router0 and serial 3/0 of Router2 respectively.
   c. In WAN 03 take 1st and 2nd usable IP Addresses to serial 2/0 of Router2 and serial 3/0 of Router1 respectively.
   d. Assign clock rate as 64000 in necessary routers.
3. Use **Dynamic** routing **RIP** for all the routers.

4. Access control requirements.
   Create **standard** access control list(s) for the following requirements.
   a. PC3 is not allowed to access VLAN 10
   b. Any other network traffic should be permitted.

   Create **extended** access control list(s) for the following requirements.
   a. PC9 is not allowed to access the web Server of Server0.
   b. PC7 is not allowed to access the FTP Server of Server0.
   c. PC0 is not allowed to access any other networks but is allowed to access the FTP Server of Server0.
   d. Any PCs in LAN 02 are not allowed to access VLAN 20
   e. Any other network traffic should be permitted.

   Note: You must consider the order of ACL lines in the access-list. If more than one above condition to be included in one access-list, use the above order in the access-list. Example: If condition 'a', 'b' and 'd' to be included in one access-list, use them in the order of 'a' as the 1st condition, 'b' as the 2nd condition and 'd' as the 3rd condition so on. Use minimum ACL lines. No marks are given for **unnecessary** ACL lines. You are permitted only to use the following access-list number ranges in necessary routers.

Router	**Allowed Access-List Number Range**	
	Standard	**Extended**
Router0	From 1 to 9	From 100 to 109
Router1	From 10 to 19	From 110 to 119
Router2	From 20 to 29	From 120 to 129

If it required only one access-list number, use the first access list number from the given range. And if it required more than one access-list per router, use consecutive access-list numbers start with the first number. Example: If only one extended access-list is required for the Router2, use the extended access-list number as 120. If it required 3 extended access-lists for Router2, use extended access-list numbers as 120 for 1st access-list, 121 for 2nd access-list and 122 for 3rd access-list etc.

Note: Find the relevant access-list number(s) from the above table according to the given example. Apply the ACL(s) in most appropriate interface(s) and direction(s) of the relevant router(s).

-------End of question paper-------