Week 9 Lab:
Planning and Cabling Networks: a Packet Tracer Exercise

Due Date: Saturday November 7, 11:55pm
Submission Requirement: Submit both Lab09_AnswerSheet **and** your Packet Tracer (.pka) file **via Blackboard** for Lab 9
ONLY 1 Lab per pair of lab partners (ie. a team of 2)
RENAME the files as: **Lab09_Surname1Surname2** and **Surname1Surname2.pka** !!!
Marking Scheme: Normal lab; marks as indicated on Lab09_AnswerSheet

Notes: You may not be able to complete this lab during lab period; therefore it is important to read the lab ahead before attending the lab.

Topology Diagram

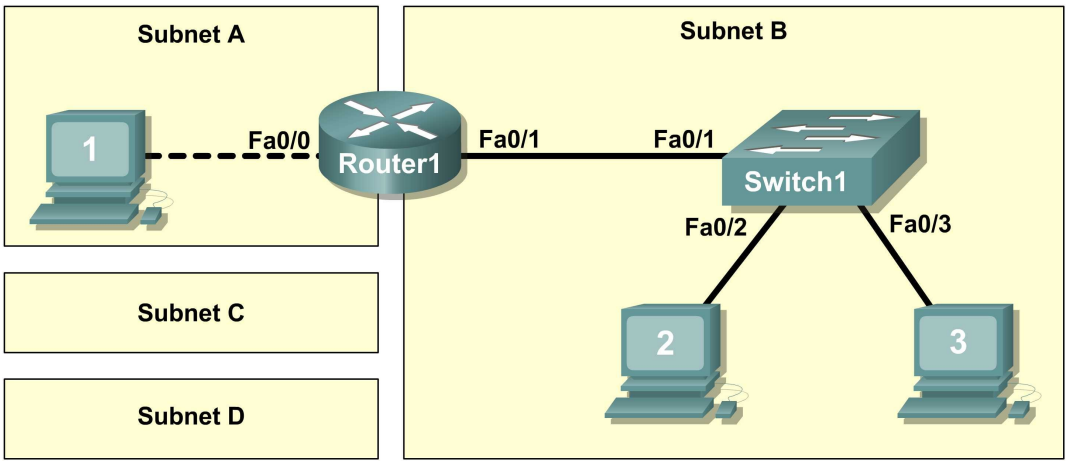

Figure 1. Cabling the Network

Learning Objectives

Upon completion of this lab, you will be able to:

- Design the logical network.
- Configure the physical lab topology.
- Configure the logical LAN topology.
- Verify LAN connectivity.

Background

Gather the necessary equipment and cables. To configure the lab, refer to the equipment and hardware shown in the above FIG (1) topology diagram

Scenario

In this lab you will create a small network that requires connecting network devices and configuring host computers for basic network connectivity. SubnetA and SubnetB are subnets that are currently needed. SubnetC and SubnetD are anticipated subnets, not yet connected to the network.

Note: Appendix 1 (see last page) contains a subnet chart for the last IP address octet.

Task 1: Design the Logical Network.

Given an IP address and mask of **`172.20.{station #}.0 / 24`** (`address / mask`), design an IP addressing scheme that satisfies the following requirements:

Subnet	Number of Hosts
SubnetA	2
SubnetB	6
SubnetC	47
SubnetD	125

Host computers from each subnet will use the first available IP address in the address block. Router interfaces will use the last available IP address in the address block.

Step 1: Design SubnetD address block.

Begin the logical network design by satisfying the requirement of SubnetD, which requires the largest block of IP addresses. Refer to the subnet chart, and pick the first address block that will support SubnetD.

Q1. Fill in the following table with IP address information for SubnetD:

Network Address	x.x.x.x Mask	First Host Address	Last Host Address	Broadcast

What is the bit mask as /nn notation and in binary?

_____

Step 2: Design SubnetC address block.

Satisfy the requirement of SubnetC, the next largest IP address block. Refer to the subnet chart, and pick the next available address block that will support SubnetC.

Q2. Fill in the following table with IP address information for SubnetC:

Network Address	x.x.x.x Mask	First Host Address	Last Host Address	Broadcast

What is the bit mask as /nn notation and in binary?

_____

Step 3: Design SubnetB address block.

Satisfy the requirement of SubnetB, the next largest IP address block. Refer to the subnet chart, and pick the next available address block that will support SubnetB.

Q3. Fill in the following table with IP address information for SubnetB:

Network Address	x.x.x.x Mask	First Host Address	Last Host Address	Broadcast

What is the bit mask as /nn notation and in binary?

_____

Step 4: Design SubnetA address block.

Satisfy the requirement of SubnetA. Refer to the subnet chart, and pick the next available address block that will support SubnetA.

Q4. Fill in the following table with IP address information for SubnetA:

Network Address	x.x.x.x Mask	First Host Address	Last Host Address	Broadcast

What is the bit mask as /nn notation and in binary?

_____

Task 2: Configure the Physical Lab Topology.

Step 1: Add host 1 to network topology

Look at the reference topology above and add host 1 to the network. Change the name of the host to Host1

Q5. What is the MAC Address for the Ethernet interface of for host1

_____

Step 1: Physically connect devices.

Cable the network devices as shown in Figure 1.

Q6. What cable type is needed to connect Host1 to Router1, and why? _____

_____

Q7. What cable type is needed to connect Host1, Host2, and Router1 to Switch1, and why?

_____

_____

If not already enabled, turn power on to all devices.

Step 2: Visually inspect network connections.

After cabling the network devices, take a moment to verify the connections. Attention to detail now will minimize the time required to troubleshoot network connectivity issues later. Ensure that all switch connections show green. Any switch connection that does not transition from amber to green should be investigated. Is the power applied to the connected device? Is the correct cable used? Is the correct cable good?

Q8. What type of cable connects Router1 interface `Fa0/0` to Host1?

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Q9. What type of cable connects Router1 interface `Fa0/1` to Switch1?

_____

Q10. What type of cable connects Host2 to Switch1?

_____

Q11. What type of cable connects Host3 to Switch1?

_____

Is all equipment turned on? _____

Task 3: Configure the Logical Topology.

Step 1: Document logical network settings.

The host computer Gateway IP address is used to send IP packets to other networks. Therefore, the Gateway address is the IP address assigned to the router interface for that subnet.

Q12. From the IP address information recorded in Task 1, write down the IP address information for each computer:

Host1 (use first address from subnet A)	
IP Address	
IP Mask	
Gateway Address	

Host2 (use first address from subnet B)	
IP Address	
IP Mask	
Gateway Address	

Host3 (use second address from subnet B)	
IP Address	
IP Mask	
Gateway Address	

Router1 Interface Fa0/0	
IP Address	
IP Mask	

Router1 Interface Fa0/1	
IP Address	
IP Mask	

Step 2: Configure Host1 computer

Click on Host1 icon, the select the configure tab. Assign the correct address, mask and gateway for Host1.

Step 3: Configure Host2 and Host3 computers.

Repeat Step 2 for computers Host2 and Host3, using the IP address information for those computers.

Step 3: Configure interfaces on Router1.

Click on the Router1 icon, then select the configure tab. Assign the correct address and mask to each of the FastEthernet interfaces. Be sure to turn the interface on by selecting Port Status On

Task 4: Verify Network Connectivity.

Switch1 should have a default configuration.

Network connectivity can be verified with the Windows **`ping`** command. Open a windows command prompt by clicking on the host computer icon and selecting the “desktop tab” then the “command prompt” icon.

Use the following table to methodically verify and record connectivity with each network device. Take corrective action to establish connectivity if a test fails:

Q13.

From	To	IP Address	Ping Results
Host1	Gateway (Router1, `Fa0/0`)		
Host1	Router1, `Fa0/1`		
Host1	Host2		
Host1	Host3		
Host2	Host3		
Host2	Gateway (Router1, `Fa0/1`)		
Host2	Router1, `Fa0/0`		
Host2	Host1		
Host3	Host2		
Host3	Gateway (Router1, `Fa0/1`)		
Host3	Router1, `Fa0/0`		
Host3	Host1		

Note any break in connectivity. When troubleshooting connectivity issues, the topology diagram can be extremely helpful.

Q14. In the above scenario, how can a malfunctioning Gateway be detected?

_____

_____

Task 5: Reflection

Review any physical or logical configuration problems encountered during this lab. Be sure that you have a thorough understanding of the procedures used to verify network connectivity.

This is a particularly important lab. In addition to practicing IP subnetting, you configured host computers with network addresses and tested them for connectivity.

It is best to practice host computer configuration and verification several times. This will reinforce the skills you learned in this lab and make you a better network technician.

Task 6: Challenge

Ask your instructor or another student to introduce one or two problems in your network when you aren’t looking or are out of the lab room. Problems can be either physical (wrong UTP cable) or logical (wrong IP address or gateway). To fix the problems:

1. Perform a good visual inspection. Look at the status of the device ports by hovering your mouse over the device icon.

   Use the table provided in Task 3 to identify failed connectivity. List the problems:

   _____

   _____

   _____

Write down your proposed solution(s):

Q15. Test your solution. If the solution fixed the problem, document the solution. If the solution did not fix the problem, continue troubleshooting.

Task 7: Clean Up.

Save your final packet tracer network and submit it to the digital drop box on Blackboard for this lab.

Remove anything that was brought into the lab, and leave the room ready for the next class.

Appendix 1

