شبكات كمبيوتر

ENC-254-LAB

Computer Networks (I) Lab Manual

Eng. Nawaf Almudhahka

م. نواف يوسف المضاحكه

قسم الهندسة الإلكترونية

Public Authority for Applied Education and Training
College of Technological Studies
ENC-254 Computer Networks (1)
Fall 2014
Eng. Nawaf Almudhahka

Lab day and time:

Instructor: Engr. Nawaf Almudhahka
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Grading Policy:

Attendance and Lab Work	20
Final Exam	10
Total	30

Lab Rules and Regulations:

- Attend on time and follow the instructor's directions.
- No food or drinks inside the lab.
- Switch your mobile phone OFF or put it on SILENT. You are not allowed to use the mobile phone or take pictures inside the lab.
- No makeup labs. If you have a medical excuse, your will be given a chance to make up your lab at the end of the semester. This chance is granted ONLY ONE TIME during the semester, and extra excuses will be considered as absences.
- Be careful when dealing with the lab equipments and facilities. Keep the working bench clean and return everything to its place before leaving.
- Not following the above rules and regulations will affect your lab work grade.

Lab Plan:

Week No.	*Topic*
1	***Lab-1: Introducing the LAN Components.***
2	***Lab-2: TCP/IP Configuration for a Client Machine.***
3	***Lab-3: Creating a workgroup and sharing a resource.***
4	***Lab-4: ARP and MAC/Physical Address.***
5	***Lab-5: Looking at TCP Connections.***
6	***Lab-6: Configuring and using DHCP.***
7	***Lab-7: Connecting to a Wireless LAN.***

Lab Tools:

Each student should bring the following:

- Crimping tool
- Straight-through LAN cable
- RJ-45 connectors (Quantity: 10)
- CAT 5 or 6 cable (Length = 6 meters)

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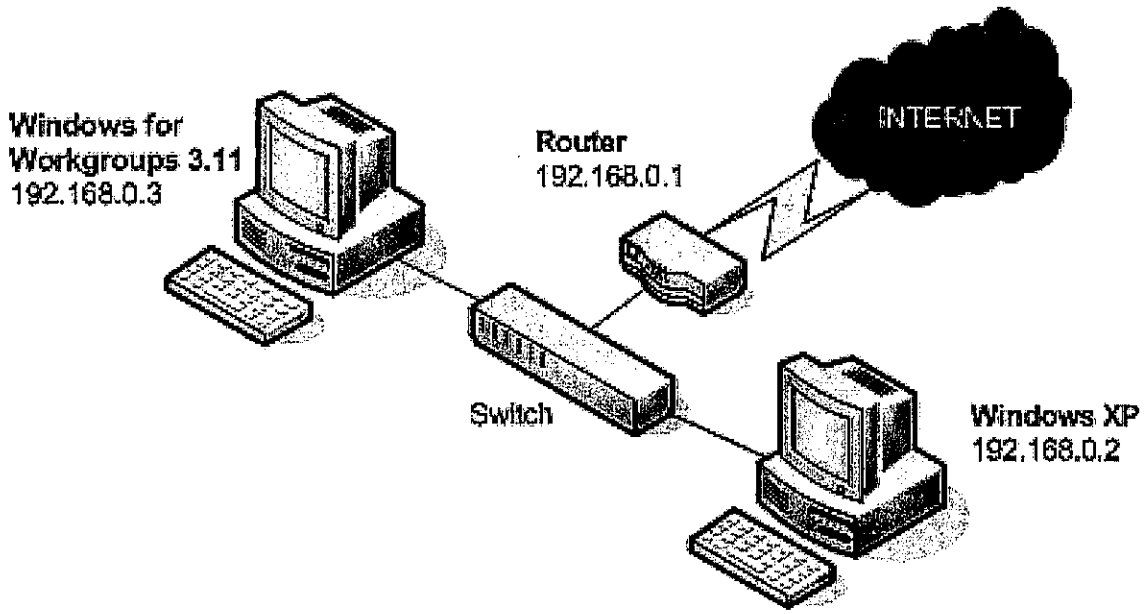
Lab-1: Introducing the LAN Components.



Terms:

Computer network, Local Area Network (LAN), Network Interface Card (NIC), Cable, Connector, Switch/Hub, Router, IP.

Procedure:

The Instructor will explain the basic components of the Local Area Network (LAN) and how the LAN is connected to the Internet.

Questions:

1. What is the type of the cable that is used to connect the components of a LAN in our lab?

   _____

2. What is the name of the networking device that links network segments or network devices?

   _____

3. What is the name of the networking device that connects the LAN to the Internet?

   _____

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Lab-2: TCP/IP Configuration for a Client Machine.

Requirements:

Windows XP machine with NIC, Gateway / Router, two straight cables, and a hub/switch.

Procedure:

On the Windows XP machine, do the following:

1. Click **Start** , **Control Panel** , **Network and Internet Connections** , and then **Network Connections** . Right-click the connection icon and select **Properties** .

2. Click on the **General** tab.

3. A device name should appear under "connect using." If not, there is a hardware issue and Windows is not recognizing the network hardware. This issue must be fixed before continuing.

4. Make sure the following are installed:

   - Client for Microsoft Networks
   - Internet Protocol (TCP/IP)
   - QoS Packet Scheduler
   - File and Printer Sharing for Microsoft Networks

   If any of the above components are not installed, install them by selecting **Add** or **Install** , and then selecting the missing component, and clicking **Add** .

5. Click **TCP/IP (Your Ethernet Adapter name)** and select **Properties**.

   a. At the IP Address tab, select **Use the following IP Address**.

   b. Enter 192.168.0. ___ as the IP Address.

6. In the Subnet mask field enter: 255.255.255.0

7. In the Default gateway enter: 192.168.0.1

   All PCs on the same network use the same Subnet mask.

8. Click **OK**.

9. Connect your machine with the lab hub/switch using a UTP straight cable.

Ref: http://support.microsoft.com/kb/323416/en-us

Testing:

- On the machines, open the **Run** and type **cmd** then **ENTER** to open the command line interface.
- Use the command **ipconfig /all** to check the TCP/IP configuration on your machines, make sure that the configuration is correct.
- On the your machine, enter the command **ping 192.168.0.1** to check the connectivity with the gateway/router. What is the output?

  _____

- Disconnect the UTP cable from your machine then enter the command **ping 192.168.0.1** . What is the output?

  _____

Questions:

1. What are the three basic information that we should enter to configure TCP/IP for a machine?
   - _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
   - _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
   - _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
2. Change your client machine IP to 192.168.0.1. What will happen?

   _

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Lab-3: Creating a workgroup and sharing a resource.

Requirements:

Windows XP machine with NIC, Gateway / Router, two straight cables, and a hub/switch.

Procedure:

A. Connect your machine to the LAN by applying the same steps that were done in Lab-2.

B. Specifying a computer name and workgroup names:

1. Right click **My Computer** icon on the **Desktop** and select **Properties.**
2. On the **Computer Name** tab, click **Change.**
3. In **Computer name,** type your computer name. The computer name must be unique. You cannot use a name already in use on the network.
4. In **Workgroup,** type the workgroup name **ENC254.**
5. Restart your machine.

C. Sharing a folder:

1. Double-click, **My Computer** and browse to a folder you want to share.
2. Create a new folder on the **Desktop** and name it as **YOURNAME.**
3. Right-click the folder you have created and select **Properties.**
4. Click the sharing tab, select **Share this Folder,** and enter a share name that briefly describes the folders contents.
5. Click **OK** and restart the PC when done.

D. Browsing the workgroup computers:

1. Click **Start** and select **My Network Places**
2. In the left column under **Network Tasks,** click on **View workgroup computers.**

Ref: http://www.microsoft.com/resources/documentation/windows/xp/all/proddocs/en-us/windows_network_changename.mspx?mfr=true
Ref: http://www.microsoft.com/resources/documentation/windows/xp/all/proddocs/en-us/file_srv_create_share.mspx?mfr=true

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Lab-4: ARP and MAC/Physical Address.

Requirements:

Windows XP machine with NIC, Gateway / Router, two straight cables, and a hub/switch.

Procedure:

1. Connect your machine to the LAN by applying the same steps that were done in Lab-2.
2. On your machine: open the **Run** and type **cmd** then click **OK.** The command line windows with be opened.
3. On the command line window, type the command **ping 192.168.0.1** and press **ENTER.**
4. Now, type the command **arp –a** and press **ENTER.** This command will display the ARP table on the machine. What is the MAC/Physical address of the router/gateway with the IP 192.168.0.1?

   _____

   And what is the MAC/Physical address of your machine?

   _____

5. Type the command **arp –d 192.168.0.1** and press **ENTER.** This command will delete the router/gateway MAC address from the ARP table on your machine. Try to ping the router/gateway IP address, what is the result?

   _____

6. Type the command:

   arp –s 192.168.0.1 ***ROUTER_MAC_ADDRESS_FROM_STEP_4***

   Press **ENTER.** This command will add the router/gateway MAC address to the ARP table on the **server** machine. Try to ping the router/gateway IP address, what is the result?

   _____

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Lab-5: Looking at TCP Connections.

Requirements:

Windows XP machine with NIC, Gateway / Router, two straight cables, and a hub/switch.

NETSTAT Command:

Displays active TCP connections, ports on which the computer is listening, Ethernet statistics, the IP routing table, IPv4 statistics (for the IP, ICMP, TCP, and UDP protocols), and IPv6 statistics (for the IPv6, ICMPv6, TCP over IPv6, and UDP over IPv6 protocols). Used without parameters, **netstat** displays active TCP connections.

Procedure:

1. Connect your machine to the LAN by applying the same steps that were done in Lab-2.
2. On your machine: open the **Run** and type **cmd** then click **OK.**The command line windows with be opened.
3. On the command line window, type the command **ping 192.168.0.1** and press **ENTER.**
4. Now, type the command **netstat –a** and press **ENTER.** This command will display all the all active TCP connections and the TCP and UDP ports on which the computer is listening. How many. What are the columns that are displayed after running the command?

   _____

   _____

5. Type the command **netstat –e** and press **ENTER.** This command will display the Ethernet statistics, such as the number of bytes and packets sent and received. What are the columns that are displayed after running the command?

   _____

   _____

Ref: http://www.microsoft.com/resources/documentation/windows/xp/all/proddocs/en-us/netstat.mspx?mfr=true

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Lab-6: Configuring and using DHCP.

Requirements:

Windows XP machine with NIC, Gateway / Router, two straight cables, and a hub/switch.

Procedure:

On the Windows XP machine, do the following:

1. Connect your machine to the LAN.
2. Click **Start** , **Control Panel** , **Network and Internet Connections** , and then **Network Connections** . Right-click the connection icon and select **Properties**.
3. Click on the **General** tab.
4. A device name should appear under "connect using." If not, there is a hardware issue and Windows is not recognizing the network hardware. This issue must be fixed before continuing.
5. Make sure the following are installed:

   - Client for Microsoft Networks
   - Internet Protocol (TCP/IP)
   - QoS Packet Scheduler
   - File and Printer Sharing for Microsoft Networks

   If any of the above components are not installed, install them by selecting **Add** or **Install** , and then selecting the missing component, and clicking **Add** .
6. Click **TCP/IP (Your Ethernet Adapter name)** and select **Properties.**
   a. At the IP Address tab, select **Obtain an IP address automatically**.
   b. Also, select **Obtain DNS server address automatically**.
7. Click **OK**.

Testing:

- On the machines, open the **Run** and type **cmd** then **ENTER** to open the command line interface.
- On your machine, enter the command **ping 192.168.0.1** to check the connectivity with the gateway/router. What is the output?

  _____

- Use the command **ipconfig /all** to check the TCP/IP configuration on your machines, make sure that the configuration is correct. And answer the following:
  - What is the Default Gateway address? _____
  - What is the DHCP server address? _____
  - What are the DNS servers' addresses? _____
  - When the DHCP Lease was obtained? _____
  - When the DHCP Lease will expire? _____

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Lab-7: Connecting to a Wireless LAN.

Requirements:

Windows XP machine with Wireless NIC, Wireless Access Point/Gateway.

Procedure:

On the Windows XP machine, do the following:

1. Right-click the network connection icon in the notification area, and then click **View Available Wireless Networks**.
2. In **Connect to Wireless Network**, under **Available Networks**, click the wireless network that you want to connect to.
3. If a network key is required for Wired Equivalent Privacy (WEP), type the key in **Network key**.
4. Click **Connect**.
5. To configure additional wireless network connection settings, or if you are having difficulty making a connection to the wireless network that you selected, click **Advanced**, and then configure the settings in the **Wireless Networks** tab.

ref: http://www.microsoft.com/resources/documentation/windows/xp/all/proddocs/en-us/wlan_client_connect.mspx?mfr=true

Testing:

- On the machines, open the **Run** and type **cmd** then **ENTER** to open the command line interface.
- On your machine, enter the command **ping 192.168.0.1** to check the connectivity with the gateway/router. What is the output?

  _____

- Use the command **ipconfig /all** to check the TCP/IP configuration on your machines, make sure that the configuration is correct. And answer the following:
  - What is the Default Gateway address? _____
  - What is the DHCP server address? _____
  - What are the DNS servers' addresses? _____
  - When the DHCP Lease was obtained? _____
  - When the DHCP Lease will expire? _____
- Go to **Available networks**, click the network name, and then click **Configure** to change the Network key to **%$YG4gh** . Try to connect to the network. What you will be the result? Why?

  _____

ref: http://www.microsoft.com/resources/documentation/windows/xp/all/proddocs/en-us/wlan_client_connect.mspx?mfr=true