Introduction to Networking with Windows 7 (V2_GW)

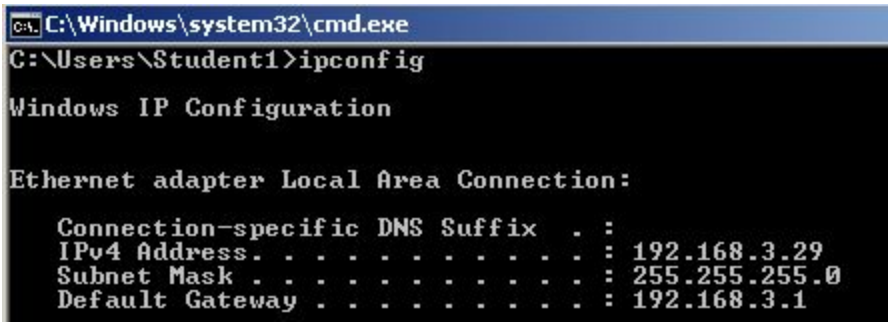
A. Lab Setup

Some activities in this lab require two computers. Please partner with a friend and decide who is going to be PC1 and PC2. Throughout the activity PC1 may have to do something different than PC2, so this will help to differentiate. Please coordinate the activities with your partner. When you completed the activity, please complete the survey at this website:
https://www.surveymonkey.com/s/cvclab_tam

B. Discovering the IP Address of Your Computer

1. Click **Start** and type "**cmd**" into the Search Box and press Enter to open the Command Prompt or find it in the Start Menu (See the figure below).

2. In the Command Prompt, type **ipconfig** and **press Enter**.
3. Verify your TCP/IP settings as shown in the following figure



4. **Record the IP Address of both your computer and your partner's. Later on in the activities, whenever you see <YourIP> and <PartnerIP> replace them with the IP Address that you have recorded in the following *table without using* <>.**

	IPv4 (Do not use <> while typing IP address in the computer)
<YourIP>	
<PartnerIP>	
<Default Gateway>	

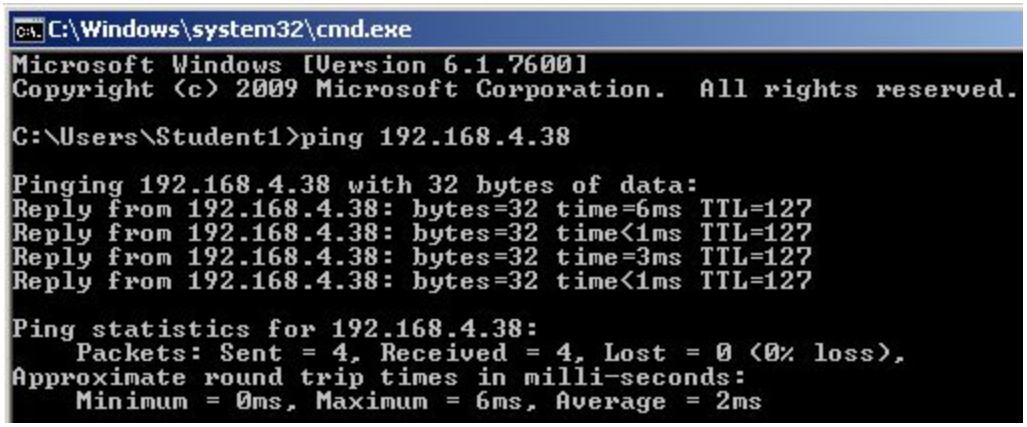
Reflective Observation

- To learn more about the ipconfig command, type **`ipconfig /?`** into the command prompt and press Enter. Carefully read about the options of the ipconfig command and discuss the options and their functions with your teammate. With your teammate, select three examples for the ipconfig command options and list their functions. In the following table, an example is given for **`ipconfig /all`** to get you started.

Command	**Function**
ipconfig /all	shows detailed information about network interfaces.

C. Verifying the Connection Between Two Computers

1. At the command prompt, type **`ping <PartnerIP>`** and press Enter (see an example in the figure below). Only type the IP address without <>.
2. If you get a reply back as shown in the figure below, you have a successful connection between your computer and your partner. Otherwise, check the TCP/IP settings of both computers.



Reflective Observation

Experiment with the following ping commands and discuss with your teammate about what happens in each case.

Command	**What happens?**
`ping -n 10` **<PartnerIP>**	
`ping -r 4 10.0.0.4`	

Conceptualization

- What is the function of the **ping** tool? How can ping be used in computer networks? With your teammate, discuss and list several real-life scenarios that **ping** could be useful.

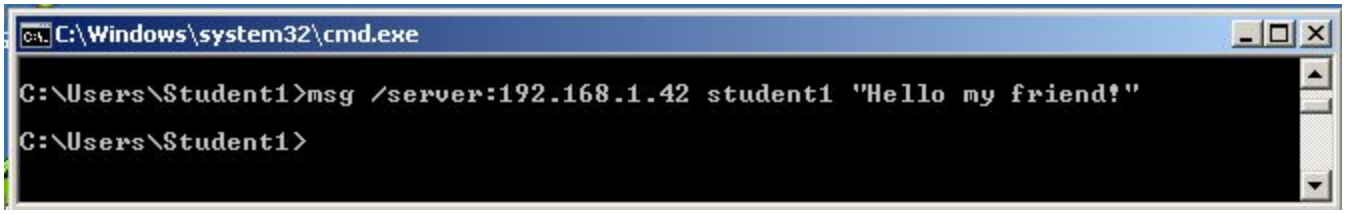
D. Messaging Between Two Computers Through Command Prompt

You can use the **msg** tool to send messages between two computers. The syntax of the msg tool is as follows:

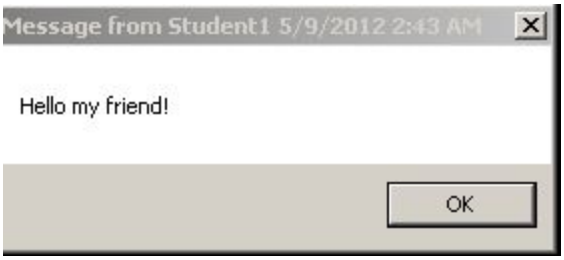
msg /server:<target IP> <username> "Message"

`<target IP>` is the IP address of the computer you are sending a message to.
`<username>` is the user account that your partner is logged on to, or in this case **Student1**.
`Message` is what will be sent your partner's computer.

1. In the command prompt, type
   msg /server:<PartnerIP> student1 "Hello my friend!"
   An example is given in the figure below.



2. The following message should appear in your partner's computer as follows:



3. Now PC2 should send a friendly message to PC1.

Active Experimentation

- Use the ping command to discover two other computers in the network (try similar IP to your and partner), and then send them **friendly** messages using the msg tool.

Technical Note (Do not perform the following steps. This is extra information if you want to try messaging at home.):

The Remote RPC function has already been enabled on the virtual computers. Therefore, you can send messages through the command prompt using the **msg** tool. This command uses RPC (Remote Procedure Call) which can do more than send messages. It allows some level of remote control which makes it possible for an attacker to gain control of a computer and/or crash system. Because of this, RPC is not enabled by default on a newly installed Windows machine, but we can enable it through regedit.

To enable RPC:

1. Click **Start** and type **`regedit`** in the search bar.
2. Go to HKEY_LOCAL_MACHINE, SYSTEM, CurrentControlSet, Control.
3. Click on Terminal Server. (Do not expand the folder)
4. Double click on AllowRemoteRPC.
5. Change the value data to “1” if it is not.
   Setting this value to “0” would disable Remote RPC and all of its features.

E. Netstat

Netstat (network statistics) is a command-line tool that displays incoming and outgoing network connections, routing tables, and various network interface statistics. It has both Linux and Windows versions with minor differences and is frequently used for network troubleshooting and security audits.

1. Open a Command Prompt window. Click **Start** and type "**`cmd`**" into the Search Box and press Enter or find the Command Prompt in the Start Menu.
2. In the command prompt, type **`netstat`** and press enter as shown below

3. In the command prompt, type
   `netstat -an`
   to see the all open ports that your computer is using and their states. List a few TCP and UDP ports open on your computer and their state. Discuss the function of these ports with your teammate.
4. You need to coordinate this step with your teammate.
5. Now ask your teammate to open his/her browser and type your <IP Address> into the browser. As soon as your teammate press enter and connect your web site type
   `netstat -an`
6. Compare the outputs of the previous two steps.
7. Find your teammates IP address in the output and complete the following table. If you cannot repeat the steps. You should type **`netstat -an`** as soon as your teammate connects your web site.

Protocol	Local Address	Foreign Address	State

8. Now you will connect your teammate's website and your teammate will repeat the same steps using netstat

Reflective Observation

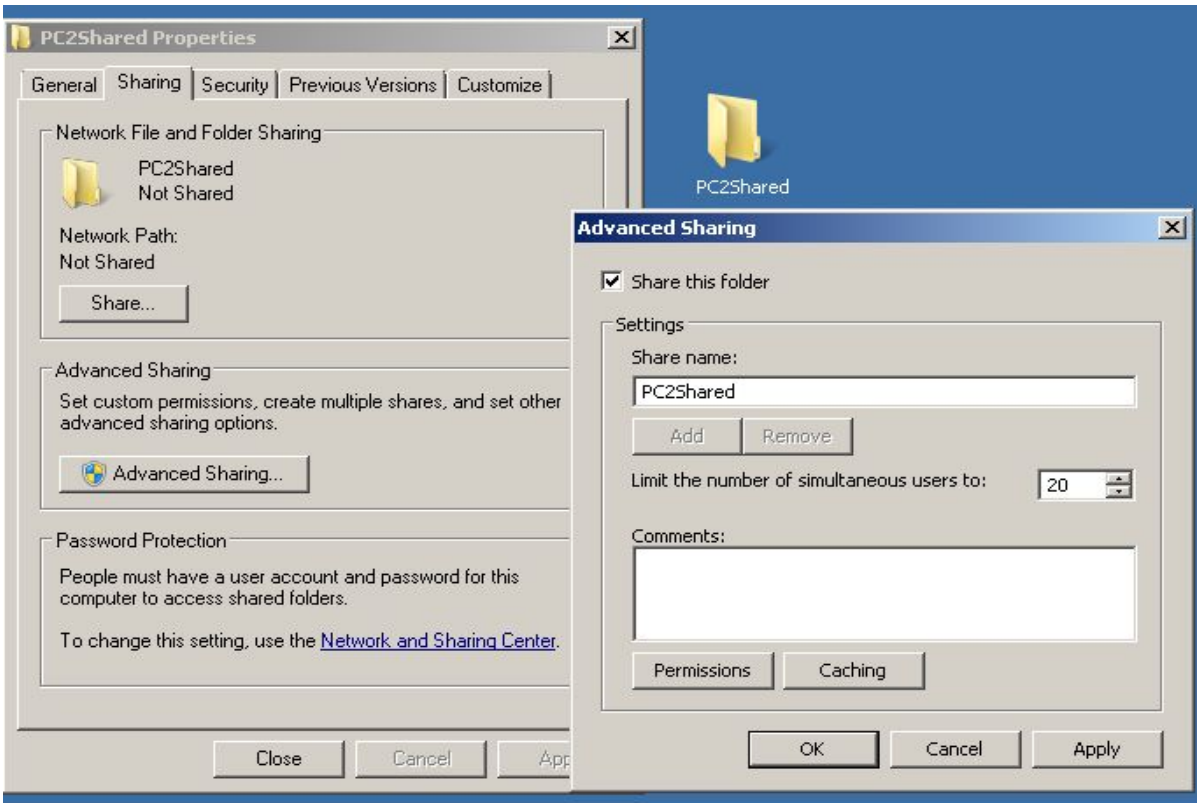
- In the local address a ":" is used after the IP address? What is this value for? Do a web search to answer this question.
- Compare your and your teammate's the Local and Foreign Addresses. What do you observe?
- Discuss how netstat can be used to secure a computer.

F. Sharing Folders

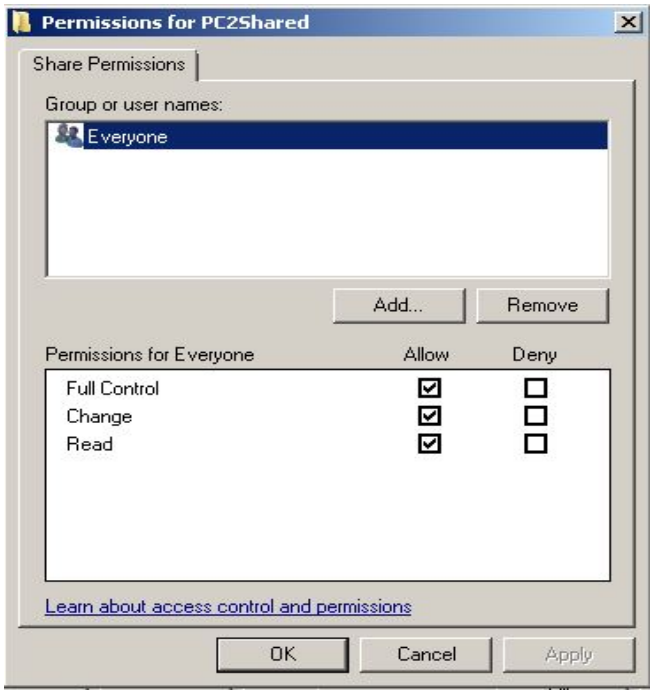
Sharing folders is one of the great ways that you can share files in your local network. In this activity, first PC2 will create a folder and share it with PC1 and then vice versa.

Only PC2 performs Steps 1 to 5 and PC1 waits:

1. Right-click the Desktop on PC2, and click **New** and select **Folder**
2. Name the new folder as **PC2Shared.**
3. Right-click this new folder, click **Properties**, and then click the **Sharing** tab.
4. Click **Advanced Sharing**, then click the check box in the front of **Share this folder** as shown in the following picture.

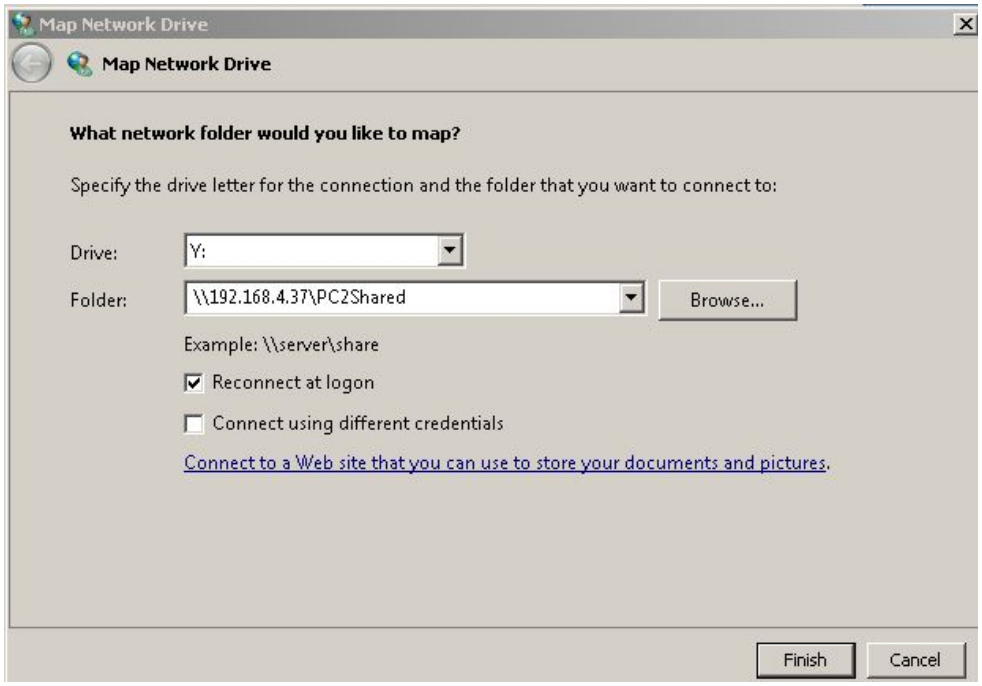


5. Click **Permissions**, check **Allow** for **Full Control** and then click **OK**. Sharing is now enabled for the folder, and the entire content of the folder is available to authorized users on your network. Next, your teammate is going to map a drive on PC1 to this folder.



Now, it is PC1's turn to access this shared folder. PC1 performs Steps 6 to 9.

6. On PC1, double-click **Computer** on the Desktop to open **Windows Explorer**
7. On the top menu, click **Map network drive**
8. Select drive **Y:** and designate **\\<PartnerIP>\PC2Shared** as the folder name (An example is given in the following picture). Click **Finish**. When you open **My Computer,** PC2Shared will be located on drive Y: under **Network Location**.



9. To confirm that PC1 has the correct permissions to the folder, double-click the mapped drive (**Y:**) to open the folder. Right-click and select **New**, then click **Text Document**. If

you receive an error, review Step 5.

10. On PC2, check the content of the PC2Shared folder now. You should see the text document created by PC1.

Active Experimentation

- Use netstat to see the connections to your computer now.
- Create and share a folder on PC1 and map it from PC2 such that PC2 should be able to read the files on the shared folder, but is **not allowed** to change or create new files. Implement and test this requirement with your teammate. What folder permission should be used to achieve this requirement?

Conceptualization

- Discuss the benefits of file sharing and list several ways that you can use file sharing at your home (or dormitory) network.
- Discuss possible security and data integrity problems related to file sharing.