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**Applied Computing**

**Wales Institute of Science and Art (WISA)**

# Networks and Cybersecurity Essentials (ACCA4024)

## Lab 1: Design and Connect a Simple Network and determine IP Address

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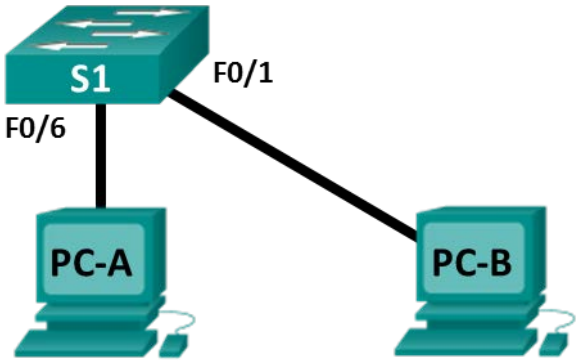
# Task 1: Building a Simple Network

# Task 2: Determine and Verify IP Address

## Topology for Task 1:




### Addressing Table

| Device | Interface | IP Address | Subnet Mask |
|---|---|---|---|
| PC-A | NIC | 192.168.1.10 | 255.255.255.0 |
| PC-B | NIC | 192.168.1.11 | 255.255.255.0 |

### Objectives

**Task 1**

**Part 1: Set Up Packet Tracer**

- Download and Install latest version of Packet Tracer (7.3.1).
- Login using your credentials.

**Part 2: Design the Topology**

- Design the Topology.
- Enter static IP address information on the LAN interface of the hosts referring to Addressing Table.
- Verify that PCs can communicate using the **ping** utility.

**Task 2**

- Document your PC/ Laptop's Network Addressing details.
- Use Traceroute to determine the possible route.

### Background / Scenario

As we discussed during our lecture session, networks are constructed of three major components: hosts, switches, and routers. In this lab, you will build a simple network with two hosts and a switch using Packet Tracer. You will apply IP addressing for this lab to the PCs to enable communication between these two devices. Use the **ping** utility to verify connectivity during Task 1.

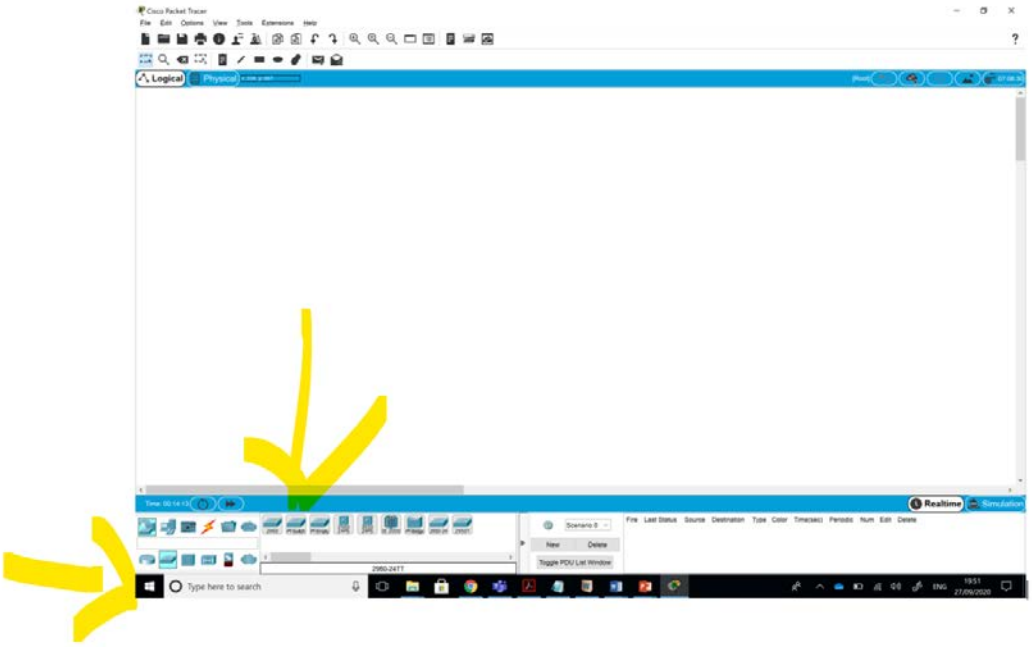
In Task 2, you will determine the IP Address configuration of your PC and use Traceroute to trace the route.

# Part 1: Download and install Packet Tracer

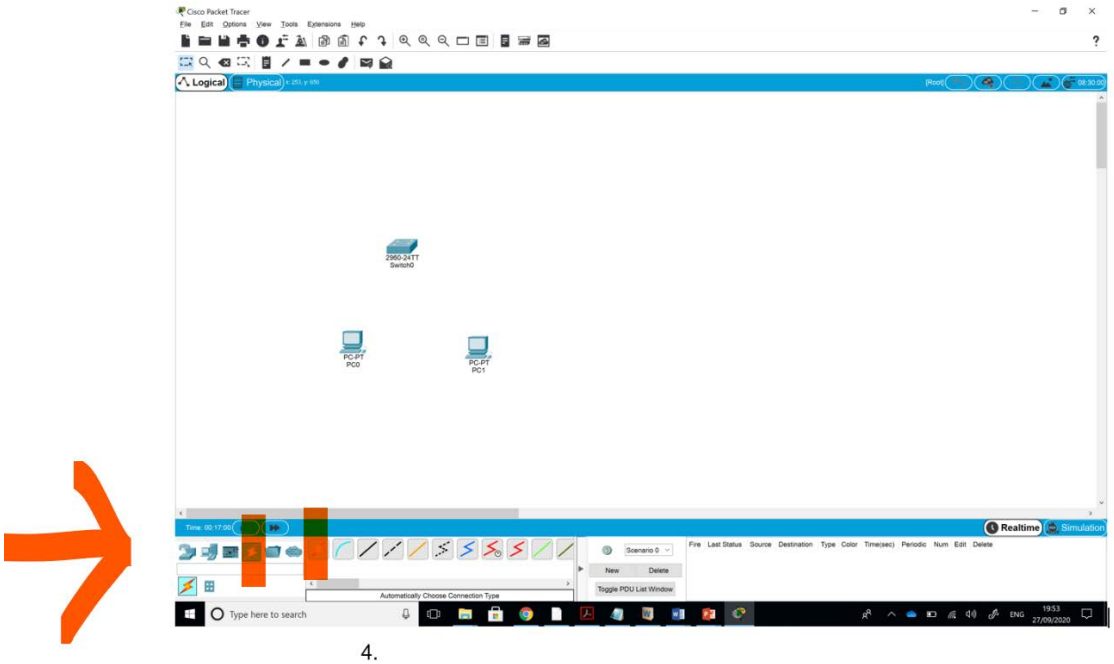
**https://www.netacad.com/courses/packet-tracer/introduction-packet-tracer**

# Part 2: Design the Topology

1. Open Packet Tracer
2. Drag and Drop devices as per the Topology stated. (For this lab, 1 switch and 2 PC's)

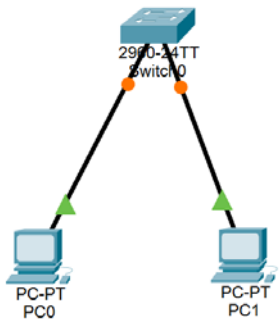


3. Select Connections (First highlighted red) and Automatic connection type (Second red highlight).

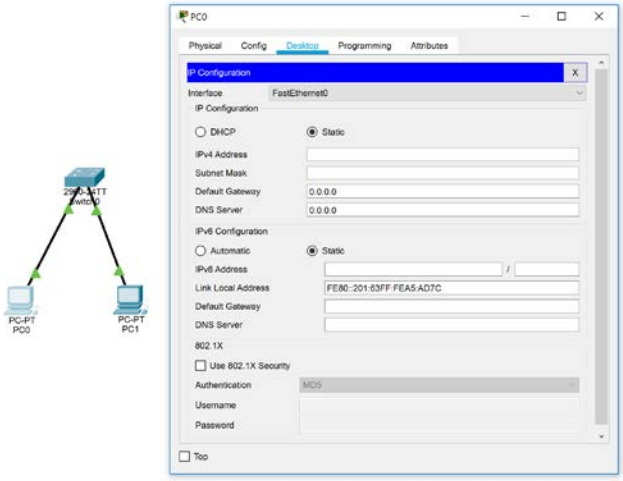


4.

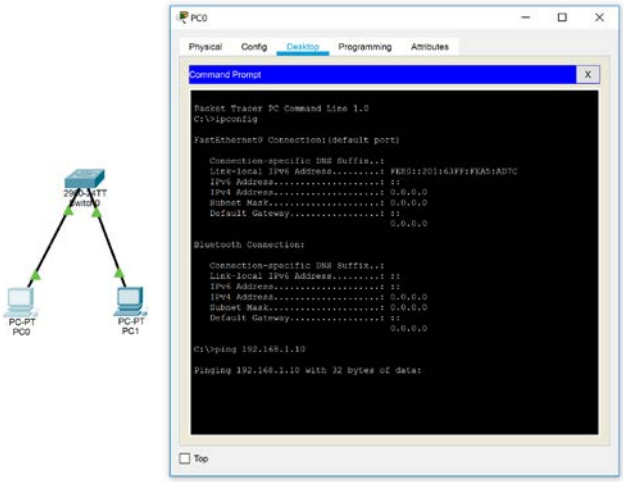
4. Connect from PCA (PC0) to Switch0 (S1) and Switch0 (S1) to PCB (PC1).




5. Click PCA (PC0)→ Desktop → IP Configuration → Configure IPv4 Address and Subnet mask as per the addressing table.




6. Exercise step 5 in PCB (PC1).
7. Click PCA (PC0)→ Desktop → Command Prompt →



a. Ipconfig

What is the IP address of the computer?

192.168.1.10

---

What is the subnet mask of the computer?

255.255.255.0

---

b. Ping 192.168.1.11 (Other PC's IP Address)

Was the ping successful?

Yes, 4 packets sent and received

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8. Click PCB (PC1) → Desktop → Command Prompt →

a. Ipconfig

What is the IP address of the computer?

192.168.1.11

---

What is the subnet mask of the computer?

255.255.255.0

---

b. Ping 192.168.1.10 (Other PC's IP Address)

Was the ping successful?

Yes, 4 packets sent and received

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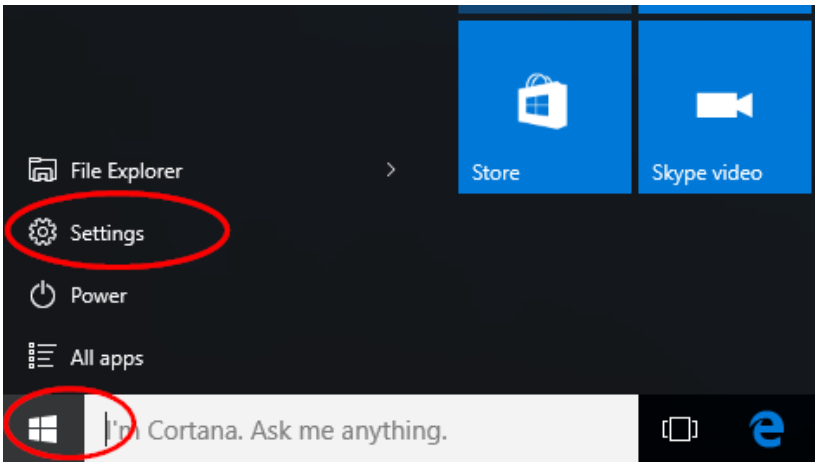
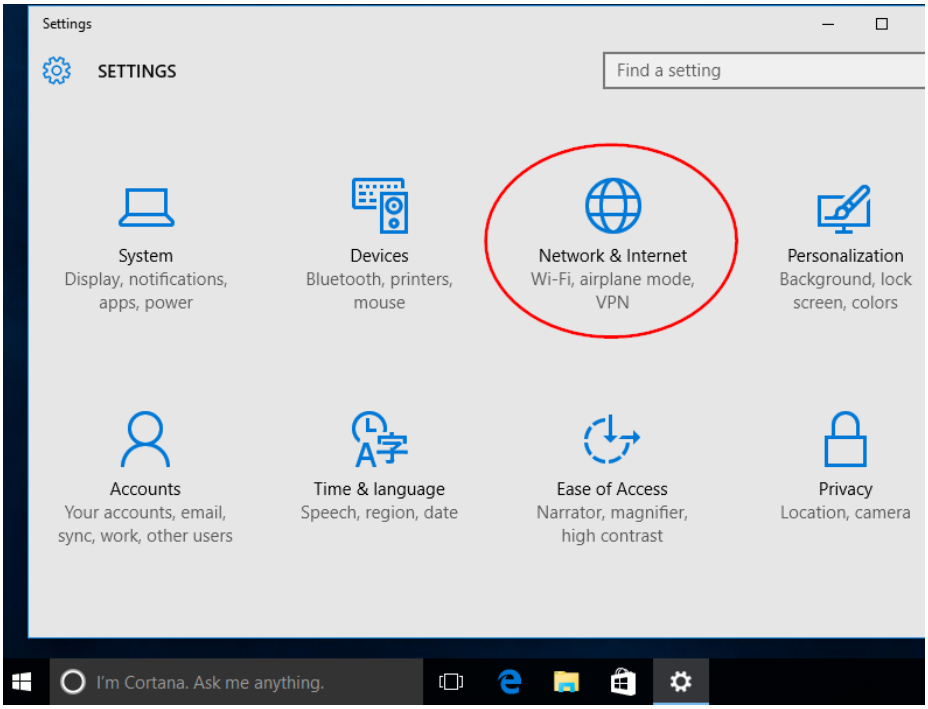
**Task 2: Document your PC/ Laptop's Network Addressing details and use Traceroute to determine the possible route.**

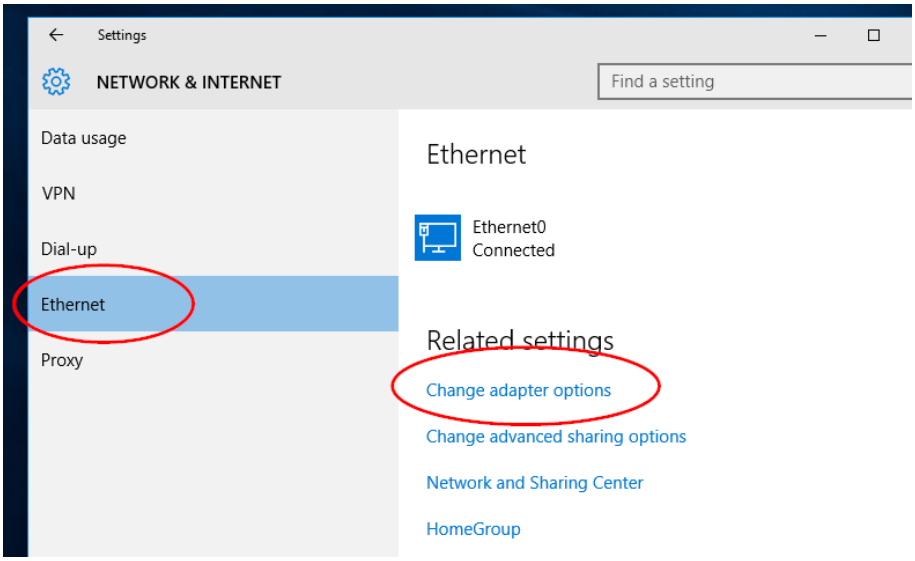
Step 1: In your PC/ Laptop, click **Start**, then click **Settings**.



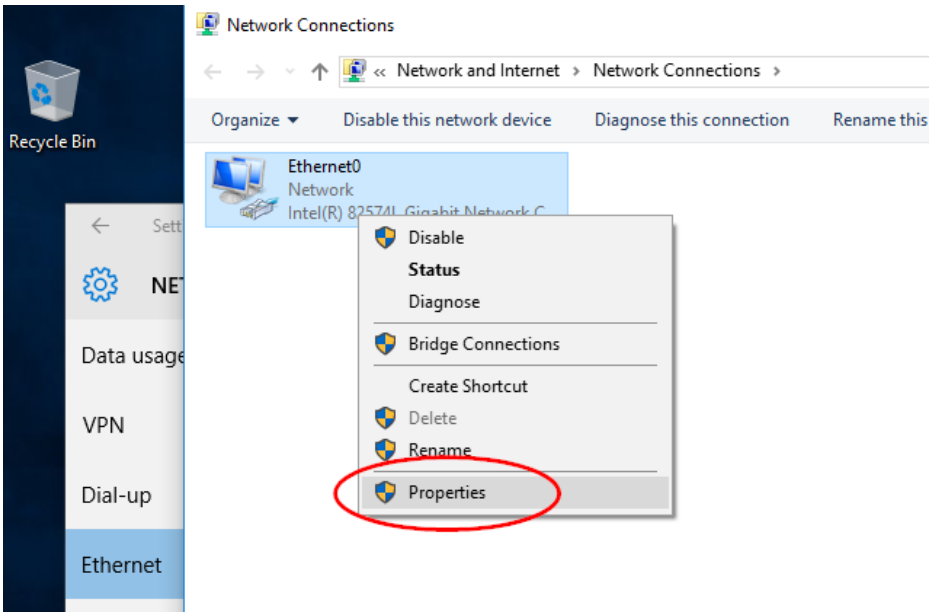

Step 2: In the Settings window click **Network & Internet**.



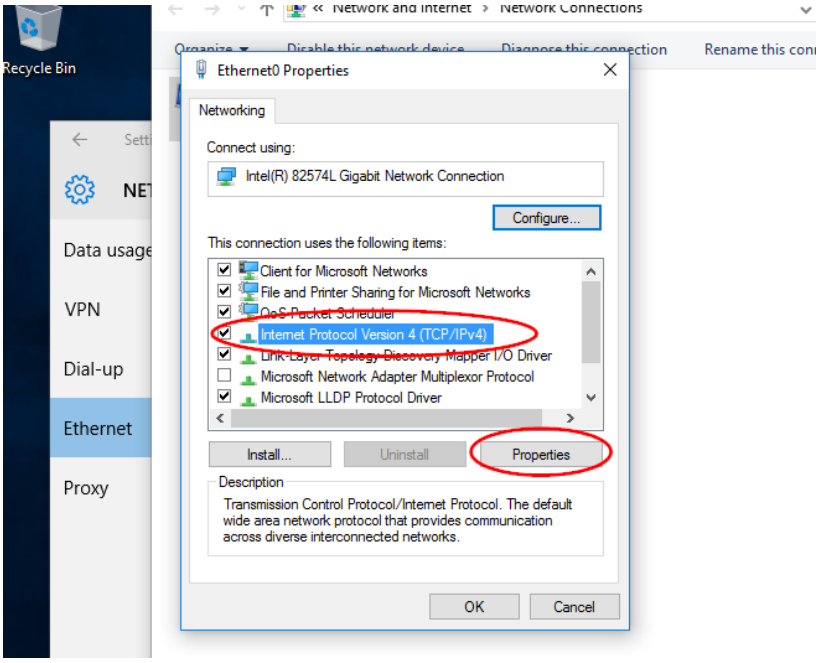

Step 3: In the left pane select **Ethernet**, then click **Change adapter options**.




Step 4: The Network Connections window displays the available network interfaces on the PC. Right-click the **Ethernet0** interface and select **Properties**.



Step 5: Select the **Internet Protocol Version 4 (TCP/IPv4)** option and then click **Properties**.




**Note**: You can also double-click **Internet Protocol Version 4 (TCP/IPv4**) to display the Properties window.

**Check the Settings**:

**Is your IP Address Automatically configured or Manually Configured**?

It is automatically configured (Obtains an IP address automatically)

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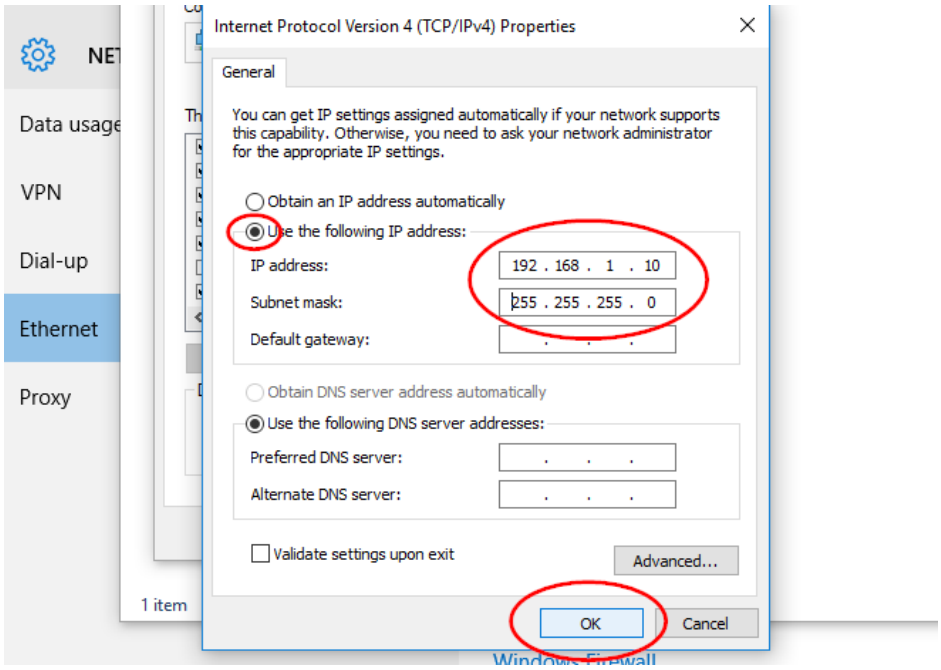
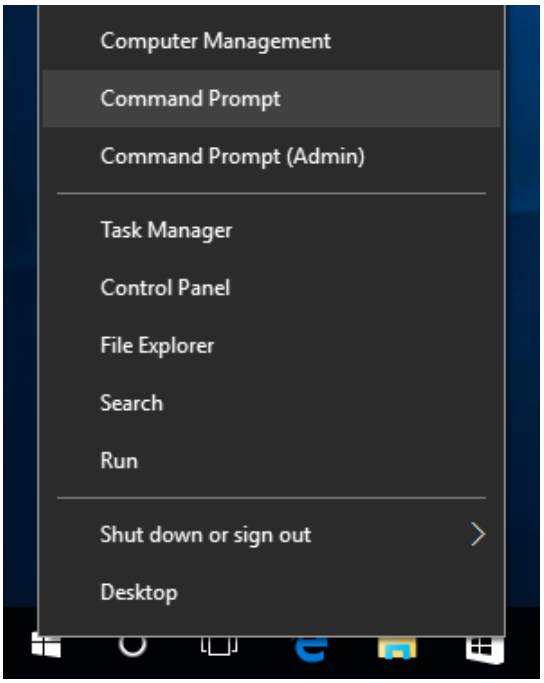
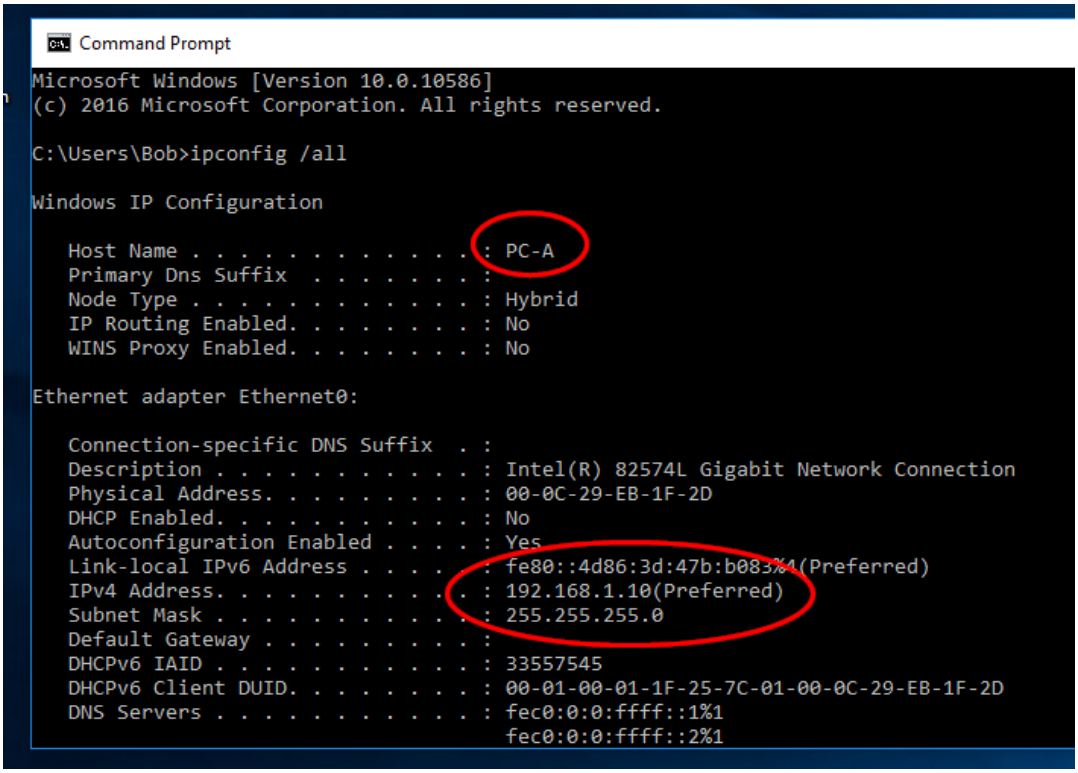


Sample for Manual Configuration. If “Obtain an IP address automatically” is selected, then your PC/ Laptop is DHCP/ Automatic configured. Record the status above.

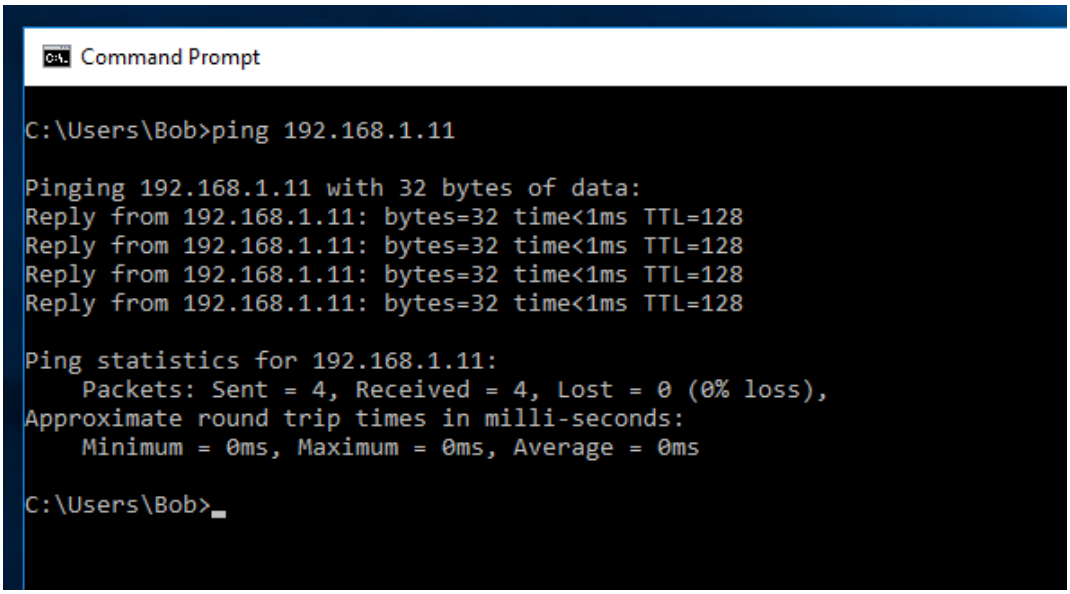
Step 6: From your PC/ Laptop, use the Command Prompt to verify the PC settings and connectivity. Right-click **Start**, select **Command Prompt**.




Step 7: The cmd.exe window is where you can enter commands directly to the PC and view the results of those commands. Verify your PC settings by using the **ipconfig /all** command. This command displays the PC hostname and the IPv4 address information.



Step 8: Type **ping www.google.com** and press Enter.



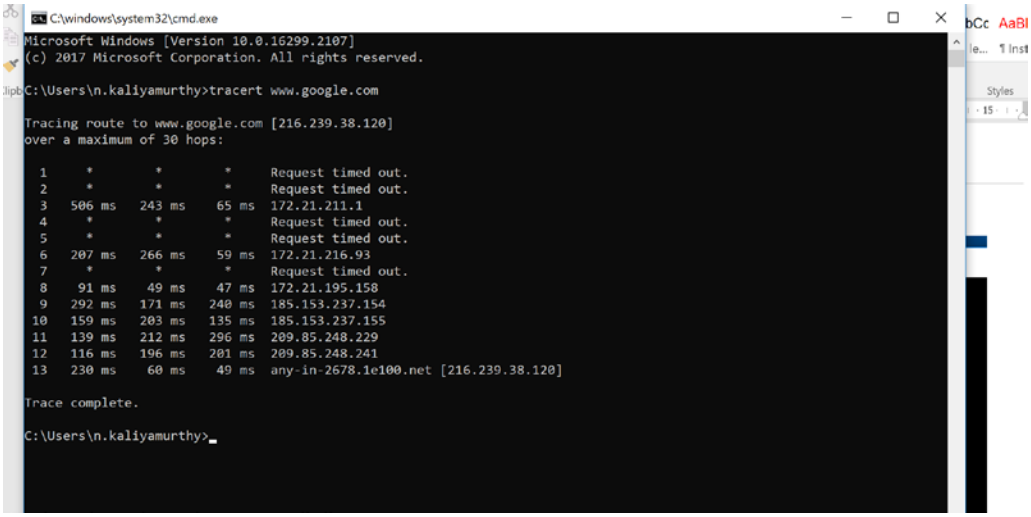
```
Command Prompt

C:\Users\Bob>ping 192.168.1.11

Pinging 192.168.1.11 with 32 bytes of data:
Reply from 192.168.1.11: bytes=32 time<1ms TTL=128
Reply from 192.168.1.11: bytes=32 time<1ms TTL=128
Reply from 192.168.1.11: bytes=32 time<1ms TTL=128
Reply from 192.168.1.11: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.11:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\Bob>_
```

Were the ping results successful? Yes, 4 packets sent and received

If not, there is good chance that **Windows Firewall** is blocking ICMP echo requests (ping). Click **Start** > **Settings** > **Network & Internet** > **Ethernet** > **Windows Firewall** to turn it off.

**Note**: If you did not get a reply from PC-B, try to ping PC-B again. If you still do not get a reply from PC-B, try to ping PC-A from PC-B. If you are unable to get a reply from the remote PC, ask your instructor to help you troubleshoot the problem.

Step 9: Type **tracert www.google.com** and press Enter.



```
C:\windows\system32\cmd.exe
Microsoft Windows [Version 10.0.16299.2107]
(c) 2017 Microsoft Corporation. All rights reserved.

C:\Users\n.kaliyamurthy>tracert www.google.com

Tracing route to www.google.com [216.239.38.120]
over a maximum of 30 hops:

  1     *        *        *     Request timed out.
  2     *        *        *     Request timed out.
  3   506 ms   243 ms    65 ms  172.21.211.1
  4     *        *        *     Request timed out.
  5     *        *        *     Request timed out.
  6   207 ms   266 ms    59 ms  172.21.216.93
  7     *        *        *     Request timed out.
  8    91 ms    49 ms    47 ms  172.21.195.158
  9   292 ms   171 ms   240 ms  185.153.237.154
 10   159 ms   203 ms   135 ms  185.153.237.155
 11   139 ms   212 ms   296 ms  209.85.248.229
 12   116 ms   196 ms   201 ms  209.85.248.241
 13   230 ms    60 ms    49 ms  any-in-2678.1e100.net [216.239.38.120]

Trace complete.

C:\Users\n.kaliyamurthy>_
```

Record your reflection

The ping sent to www.google.com has confirmed that my PC is able to establish a connection and communicate with www.google.com. www.google.com is also able to communicate with my PC as I sent and received all 4 packets and lost none of them.

Traceroute is used to find out the route taken by a packet, from its starting point and to its end destination. From tracing the route to www.google.com I have identified that 11 hops had to be made until a connection with the end destination was established.