Connecting to a Network

1) Create step-by-step instructions for Building a Peer-to-Peer Network with an Ethernet Cross-Over
    Cable – Instructions including:
    A: Cabling the network – diagram
    - First find two computers, a Ethernet cross-over cable.
    - If there is already an Ethernet cable plug into your computer's network card's, then unplug
      those cable's and plug in the Cross-over cable.
    - Once you've plug in the cables open up control panel and network's find the network icon
      and right click.

   a) Changing the IP Addressing in the TCP/IP setting
    - In the properties windows box find the TCP/IP section and then find the advance button and
      click it.
    - In the advance window box find the section that says "set an IP address manually" and in the
      section below enter the proper IP address such as "192.168.1.1" or so forth.
    - Then click in the section right below the IP address section and you should get a Subnet
      mask number automatically.
    - Then repeat on the second machine except when set the second IP address set it as
      192.168.1.2".
    - To check if your network is running, open up command prompt and type: "ping 192.168.1.2"
      and it should come back with:

2) What is a Hub?
A: A Hub is just a device the repeats traffic on a network without filtering.

3) How does a hub work? Diagram and Description
A: A hub works by broad casting all the information out to all the connected devices on the
network.

4) What is a Collision?

A: Collision is when packets from two or more systems collide on the network because there's no filtering on the Hub.

5) What is Collision Domain? Diagram and Description

A: A network collision is a scenario when one device sends a packet on a network while forcing another device on the network to wait until the other packet it sent then forcing the second device to resend its packet.
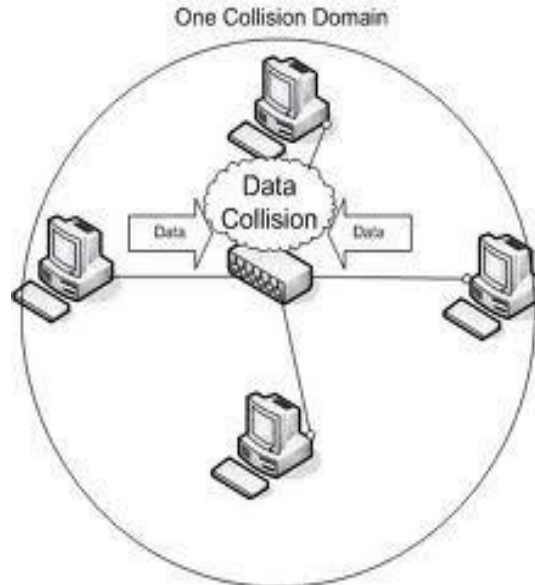
6) 4) What is shared bandwidth? What is the advantage and/or disadvantage?

A: Bandwidth is the measure of available or consumed data communication resources expressed in bits/second or multiples of it. Shared bandwidth is just that *shared* on network between multiple systems. One advantage of having shared bandwidth is that you only need one connection, one source of bandwidth and a switch or a router to filter your data that is used by more than one system. A disadvantage is that if your bandwidth is small you're shared network speed with be slower than your total bandwidth speed. On the business side shared bandwidth is provided by popular DSL and Cable broadband companies and works on the same concept. The ISP has a total bandwidth amount and that amount is divide between the customers of the ISP.

7) What is a Switch?

A: A switch is a multi-port networking device that can think in terms of what data on the network goes where.

8) How does a switch work? Diagram and Description

A: A switch basically directs network traffic and reduces network collisions.
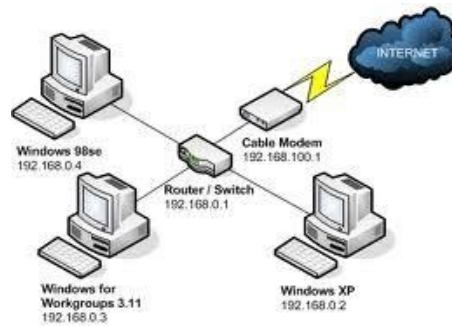
9) How does a switch handle collisions differently than a hub?

A: A switch operates at the data link layer of the OSI model to create a separate collision domain
for each switch port. An example with 4 computers (e.g., A, B, C, and D) on 4 switch ports, A
and B can transfer data back and forth, while C and D also do so simultaneously, and the two
conversations will not interfere with one another. Basically this means the switch just creates a
bridge between two devices on the network.

10) What is dedicated bandwidth? What is the advantage and/or disadvantage?
A: Dedicated bandwidth is just the opposite of shared bandwidth. It is   dedicated to one system
and the bandwidth amount is always available for that system. That's a good advantage if you're
a business and need that bandwidth all the time, but a disadvantage is that you may over pay for
when the service is not needed and your business is down.

11) What is the switching table? Diagram and Description
A: A switching table contains a list of all the MAC addresses of systems on a particular network.

12) What information does a switch use to determine where the frame should go?
A: The MAC address of the actual destination host.

13) 11. What is a router?
A: A router is a device on a network that connects one local network to other local networks.

14) How does a router work? Diagram and Description

A: A router is like a switch in that is directs traffic on a network. But a router works at the distribution layer of a network. The router reads the network portion of an destination IP address and then finds the correct connected network.
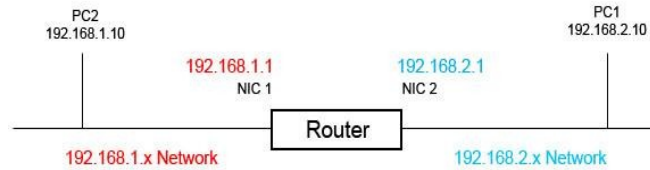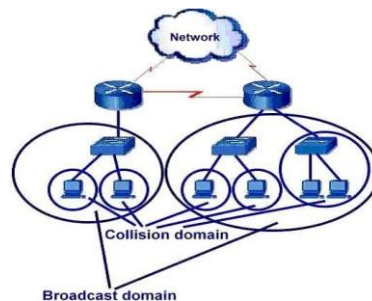

15) What are the 2 major functions of a router?

A: Decode and encode data, then forward that data to the correct destination IP address.

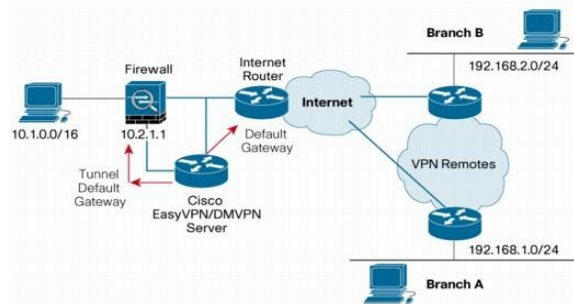16) What is a broadcast domain? Diagram and Description

A: A *broadcast domain* is a logical division of a computer network, in which all nodes can reach each other by broadcast at the data link layer.

(Diagram below)

17) What is the default gateway? Diagram and Description

A: A method a host uses to send data to destination IP on a remote network.

18) Explain a routing table and how and why it is used. Diagram and Description.

A: The routing table is at the heart of router operation. It typically stores the addresses of the local subnetworks, any static routes configured by the network administrator, and the routes dynamically learned by the router using a routing protocol. In its simplest form, a routing table contains a list of all known subnetwork addresses (i.e., NETIDs or routing prefixes). Associated with each subnetwork address is a port identifier and the network address of an adjacent router.

19) What is ARP?
   A: ARP stands for Address Resolution Protocol and is protocol used to discover the MAC address of any host on the same Network.

20) What information should be included when gathering information for a Network Plan?
A: A network plan includes the number and type of hosts to be connected to the network, the software that you plan on using and the Internet connection requirements. The plan also must have security and privacy concerns as well as network reliability and uptime. One must also consider the connection requirements weather one needs wired or wireless connection or a combination of both.

21) When planning a network installation, what are some things to consider?
A: Two major things to consider in planning a network installation are the physical and logical topology of the network to be installed. The physical environment where the network will be installed is the major consideration before the network is installed, as well as the physical configuration and logical configuration.
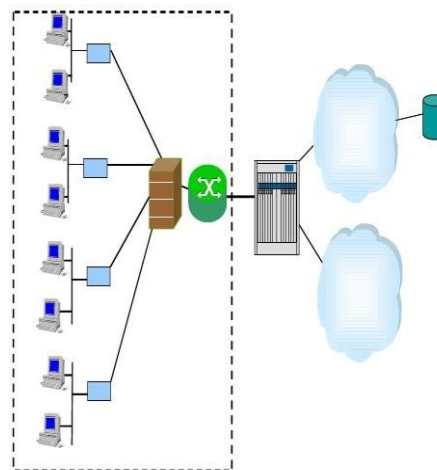
22) What is a physical topology map? What is a logical topology map?
A: A physical topology map is a map of the physical locations of nodes on the network, while a logical map just shows the connections of each node and to each other node.
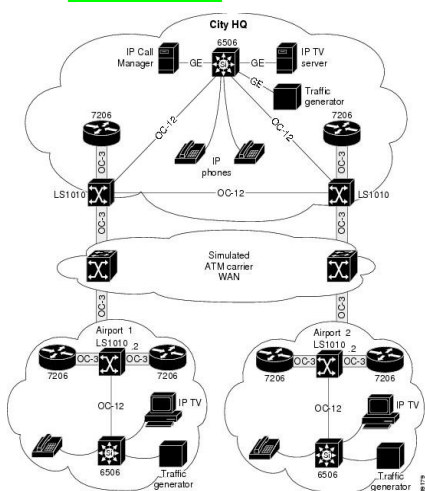
a)   Physical map   Logical map
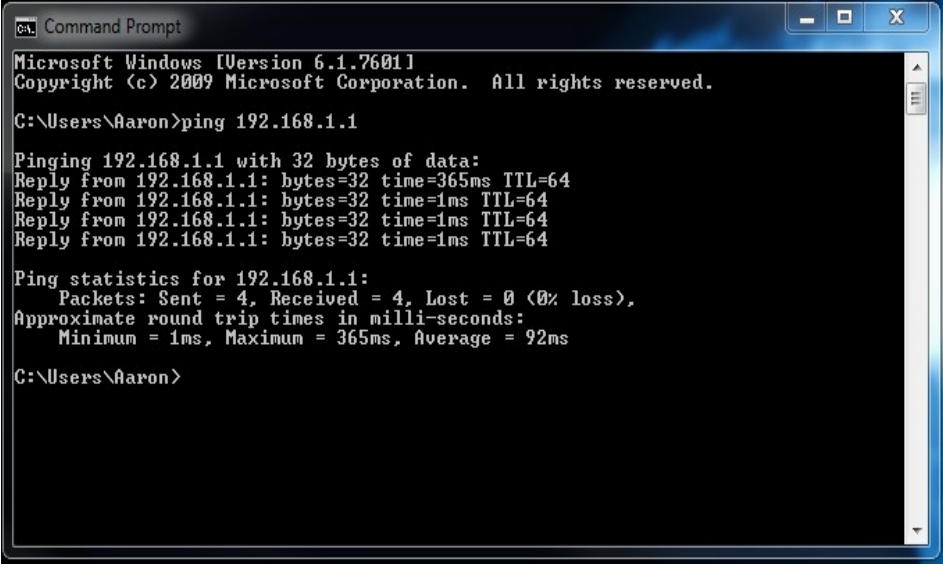
23) What is a prototype and why is it important?
A: A prototype is the first build. In networking that means one will lay out the network equipment to physically see how things will be and how the network will look. It's important so in case something doesn't go right or something doesn't fit you can fix it without having to start over.

24) Describe a multi-function networking device.
A: Multi-function devices are used in smaller networking environments such as home or small businesses. They incorporate the functions of a router, a switch and wireless access point into one single device often referred to as a integrated router.

25) Testing your network – Diagram and/or Describe each Ping
A: Typing *Ping* followed by the IP address of your destination host in command-line will or should bring back you a message like the one below.

```
Command Prompt                                                    _ □ X

Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation.  All rights reserved.

C:\Users\Aaron>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:
Reply from 192.168.1.1: bytes=32 time=365ms TTL=64
Reply from 192.168.1.1: bytes=32 time=1ms TTL=64
Reply from 192.168.1.1: bytes=32 time=1ms TTL=64
Reply from 192.168.1.1: bytes=32 time=1ms TTL=64

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 365ms, Average = 92ms

C:\Users\Aaron>
```
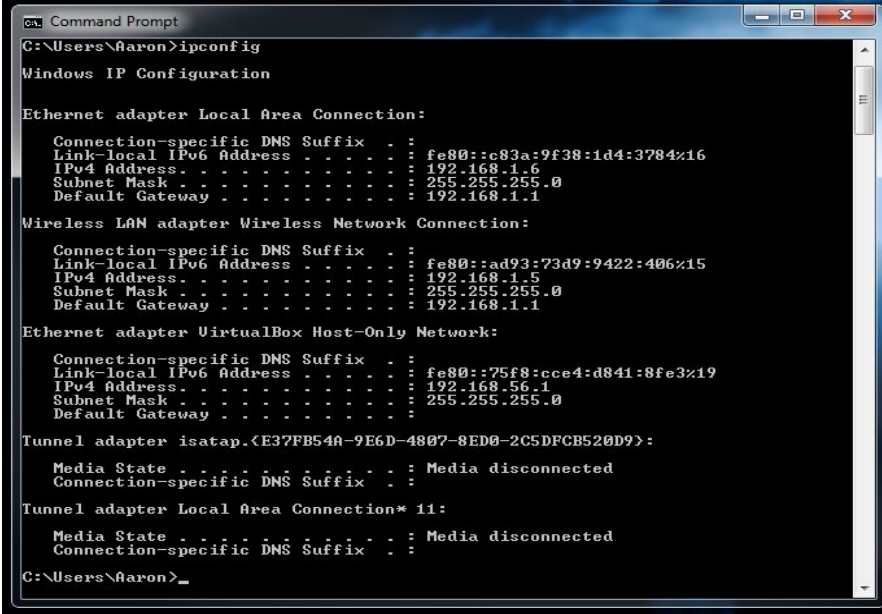
26) Ipconfig(windows), ifconfig(Unix)
A: ipconfig will give you all information about your IP configuration such as Information about your Ethernet connection, your IP address as well as the default gateway address.

27) IPconfig /all (windows) ifconfig eth0 or wlan0 (linux)

A: ipconfig /all will give you a more in-depth look into your ip configuration. Like whether or not you have a DHCP enabled, your DHCP address as well as if you are using a DNS or default gateway.

```
Command Prompt                                                              _ □ X

C:\Users\Aaron>ipconfig /all

Windows IP Configuration

    Host Name . . . . . . . . . . . . : Aarons-PC
    Primary Dns Suffix  . . . . . . . :
    Node Type . . . . . . . . . . . . : Hybrid
    IP Routing Enabled. . . . . . . . : No
    WINS Proxy Enabled. . . . . . . . : No

Ethernet adapter Local Area Connection:

    Connection-specific DNS Suffix  . :
    Description . . . . . . . . . . . : Realtek PCIe GBE Family Controller
    Physical Address. . . . . . . . . : 1C-6F-65-AB-63-8D
    DHCP Enabled. . . . . . . . . . . : Yes
    Autoconfiguration Enabled . . . . : Yes
    Link-local IPv6 Address . . . . . : fe80::c83a:9f38:1d4:3784%16(Preferred)
    IPv4 Address. . . . . . . . . . . : 192.168.1.6(Preferred)
    Subnet Mask . . . . . . . . . . . : 255.255.255.0
    Lease Obtained. . . . . . . . . . : Monday, November 14, 2011 12:45:19 AM
    Lease Expires . . . . . . . . . . : Tuesday, November 15, 2011 12:45:19 AM
    Default Gateway . . . . . . . . . : 192.168.1.1
    DHCP Server . . . . . . . . . . . : 192.168.1.1
    DHCPv6 IAID . . . . . . . . . . . : 454848357
    DHCPv6 Client DUID. . . . . . . . : 00-01-00-01-15-84-3E-62-00-21-91-F8-B5-A8

    DNS Servers . . . . . . . . . . . : 192.168.1.1
    NetBIOS over Tcpip. . . . . . . . : Enabled

Wireless LAN adapter Wireless Network Connection:

    Connection-specific DNS Suffix  . :
    Description . . . . . . . . . . . : D-Link DWA-552 XtremeN Desktop Adapter
    Physical Address. . . . . . . . . : 00-21-91-F8-B5-A8
    DHCP Enabled. . . . . . . . . . . : Yes
    Autoconfiguration Enabled . . . . : Yes
    Link-local IPv6 Address . . . . . : fe80::ad93:73d9:9422:406%15(Preferred)
    IPv4 Address. . . . . . . . . . . : 192.168.1.5(Preferred)
    Subnet Mask . . . . . . . . . . . : 255.255.255.0
    Lease Obtained. . . . . . . . . . : Monday, November 14, 2011 12:45:22 AM
    Lease Expires . . . . . . . . . . : Tuesday, November 15, 2011 12:45:22 AM
    Default Gateway . . . . . . . . . : 192.168.1.1
    DHCP Server . . . . . . . . . . . : 192.168.1.1
    DHCPv6 IAID . . . . . . . . . . . : 251666833
    DHCPv6 Client DUID. . . . . . . . : 00-01-00-01-15-84-3E-62-00-21-91-F8-B5-A8

    DNS Servers . . . . . . . . . . . : 192.168.1.1
    NetBIOS over Tcpip. . . . . . . . : Enabled

Ethernet adapter VirtualBox Host-Only Network:

    Connection-specific DNS Suffix  . :
    Description . . . . . . . . . . . : VirtualBox Host-Only Ethernet Adapter
    Physical Address. . . . . . . . . : 08-00-27-00-10-53
    DHCP Enabled. . . . . . . . . . . : No
    Autoconfiguration Enabled . . . . : Yes
    Link-local IPv6 Address . . . . . : fe80::75f8:cce4:d841:8fe3%19(Preferred)
    IPv4 Address. . . . . . . . . . . : 192.168.56.1(Preferred)
    Subnet Mask . . . . . . . . . . . : 255.255.255.0
    Default Gateway . . . . . . . . . :
    DHCPv6 IAID . . . . . . . . . . . : 453509159
    DHCPv6 Client DUID. . . . . . . . : 00-01-00-01-15-84-3E-62-00-21-91-F8-B5-A8

    DNS Servers . . . . . . . . . . . : fec0:0:0:ffff::1%1
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