**Questions 1 - Solutions**

1)

a) We can connect computers in the same environment using cables and switches.

b) We can connect computers in the same environment using the access point.

c) We can connect devices in the same environment using a home-router. Remember that the home-router has both a switch and access point feature. In other words, we can make this connection with both wireless technology and cable. This is up to us.

2)

There are a number of Ethernet cable categories that can be seen advertised. Cat 5, Cat 6, Cat 7 are all widely available, with Cat 5 being the oldest standard and Cat 7 the newest network cable category and with the highest performance. The different category cables have different levels of performance and as a result, it is important to select a cable that will meet the requirements for the system. The big decision when buying Ethernet cables is making the choice of the best cable. Performance benefit over cost.

For domestic use, Cat5 and Cat 5e cables are currently adequate for most applications. However, technology is constantly improving and these cables are starting to be inadequate.

If you want to be sure of getting the best speeds, then Cat 6 and Cat 6a cables are a good bet. They often don’t cost too much more than Cat 5, and for future-proofing then they are a wise option.

3)

Cat 5 (Outdated) -> up to 100 Mbps

Cat 5e -> up to 1.000 Mbit/s

Cat 6   -> up to 1.000 Mbit/s

Cat 6a -> up to 10.000 Mbit/s

Cat 7   -> up to 10.000 Mbit/s

Cat 7a -> up to 10.000 Mbit/s

Fiber Optic -> up to 10.000 Mbit/s

\*\*\*Important\*\*\* => Cat7 cables are susceptible to interference and crosstalk compared to fiber, especially the longer the cable run. That's why POPs of ISPs prefer fiber optic cable when connecting. I mean speed is not the only factor.

4)

Cat 5e -> up to 1.000 Mbit/s,     100MHz

Cat 6 ->   up to 1.000 Mbit/s,     250MHz

Cat 6a -> up to 10.000 Mbit/s,   500MHz

Cat 7 ->   up to 10.000 Mbit/s,   1000MHz

\*The frequency indicates how often the signal can pass through the cable.  A Cat7 cable will therefore be able to transfer data faster than a Cat6a cable or A Cat6 cable will be able to transfer data faster than a Cat5e cable.

5)

A local area network (LAN) is a network that interconnects electronic devices within a limited area such as a residence, school, laboratory, university campus, or office building. These electronic devices can be any kind of electronic device you can think of.  For example, game consoles, televisions, mobile phones, desktop computers, laptops, air conditioners and etc. Some of these devices are connected to the LAN via wireless technology, while some are connected via cable.

6)

Sometimes a boss may not know what LAN stands for and only know that it is very secure. I mean he just knows the LAN. Doesn't know the Local Area Network. Hence, you must tell your boss the following.

"LAN is very secure, that's true, but to create a LAN, the distance must be limited. If you want offices in different regions of the world to create a company-owned network, we must set up a WAN."

7)

If we want to create a LAN, the device we need to use is the switch. But as you know, home-routers have a switch feature. For this reason, we can create a LAN by using a home-router, too.

On the other hand, as you know, there are access point devices. I want to give extra information here. Assume that there are 5 computers in the office and all of these computers are communicating with wireless technology over the access point. We call such networks Wireless Local Area Network (WLAN) instead of Local Area Network (LAN). Please note that if all devices on the network are connecting via wireless, this is WLAN. On the other hand, if even a single computer in the environment is connected to the network by cable, we call it a LAN.

So let's say we have 5 devices connected to each other via wireless technology in our house. 2 mobile phones, 1 television, and 2 laptops. This connection takes place via home-router. Our home network is now a WLAN. But suppose you connect another computer with a cable to the home router. Our home network has now become a LAN.

8)

As you know, the general purpose of WAN is to connect LANs in different locations and the device that connects different LANs is the router. So if we want to create a WAN, we need to have a router in both offices and we set up the WAN through these routers. These routers can be the routers that we connect to the internet. We do not need different routers to set up a WAN.

9)

If one computer can send a packet to another computer, it means that 2 computers can communicate. Especially system administrators and network experts use this information a lot in troubleshooting processes. Please check the 'ping' command. It is a valid command for both Linux, Windows, and Mac OS.

10)

1) The switch receives a packet from one of its ports and gives this packet to its hardware.

2) The switch looks inside this packet with the help of its hardware and learns the destination address of the packet.

3) The switch forwards the packet to the appropriate port connected to the destination device and sends it to its destination.

\*\*In summary, the switch is a smart device. It receives the packet, checks the packet's destination, and sends the packet to its destination. That's it.

11)

We plug the computers into the ports of the switch and as a result, we create a LAN. For this reason, it is quite logical to call these ports LAN ports.

12)

There is no order or rule to follow. All ports have the same function. However, it is recommended to make the connections to the ports sequentially in order to be neat and not to create cable mess.