Computing Reference Notes for Grade 5

Note: These notes are provided as an additional study aid for the subject. Main assessment will be based on the booklet, PPT slides, Worksheets etc shared with the students.

Unit: 3 Networks and Digital Communication

Networks: A **computer network** is a group of two or more computers that are connected together so they can **share information, files, and resources** like the internet or a printer.

Connecting with networks:

Computer can connect to networks with wires or without wires

Switch: a switch allows you to connect wired devices.

Routers: A router is a device that connects computers and other devices to the internet

Wi-Fi Access Points: Wi-Fi access points allow devices to connect to a network wirelessly. An advantage of wireless access points is that many devices can connect to a single access point without a physical connection, like a wire. A wired switch needs one cable for each device. One wireless access point allows hundreds of devices to connect. A Wi-Fi access point is used to transmit data to any device nearby. This means that it sends signals to devices, and it receives signals from devices. Signals are special waves that allow the Wi-Fi access point to communicate with devices nearby.

Wi-Fi sends signals over a short distance. The further away you are from the Wi-Fi router, the weaker the signal. Wi-Fi access points are often attached to walls and ceilings, and sometimes they have an aerial on them. An aerial is something that allows signals to be sent and received.

Cellular Networks

A cellular network is a different type of wireless network. Cellular networks cover large areas. They use very strong signals that smartphones can detect over many kilometres.

Cellular networks use tall towers to send signals over large distances. Having tall towers means that signals are less likely to be blocked by hills or buildings. Mobile phones use cellular networks. This allows them to connect almost anywhere, from the top of a mountain to the middle of a city.

IP address

An IP address is a unique number that identifies a device on a network.

Think about the number of devices around the world that connect to the internet. There are millions and millions. The internet uses a system to identify the location of each device connected to the internet. The system is called internet protocol (IP) address. An IP address is a set of numbers. The numbers tell the computer the destination to go to and get data from or send data to. These IP addresses are usually automatically created by a program on a computer.

Transmitting Data

Before data is sent over the internet, it is split up into **packets.** Packets are small chunks of data. Smaller packets are easier and faster for the internet to send and manage as compared to one huge block of data. Packets are usually all of the same size. Packets can take different paths to get to their destination. If one path is blocked or busy, the packets can go a different way, making delivery faster. Each packet includes IP address that it comes from and the IP address it is going to. This means that if packets are lost along the way the computer knows which IP address to ask to send those packets again.

When packets arrive at the destination, they maybe in the wrong order. This is because each packet may travel to the IP address by a different route. Some routes will be quicker than others and so they will arrive at different times. Please type the packets of data contain information about the order in which they should be reassembled or put back together again. The computer at the destination uses this information to put the packets into the correct order. When all the packets have arrived and are assembled in the right order, the computer can use the data.

Advantages and Disadvantages of Packets

Using packets has the following advantages

1. If a packet is lost, a computer only needs to resend a small bit of data again

2. Packets do not take up as much bandwidth, so they can be sent along a greater variety of connections.

3. Smaller packets are less likely to get delayed along a network.

4. As well as the data being sent, each packet contains extra pieces of **information**. This information is needed by the device which receives the data packets.

The extra pieces of information include:

1. The IP address that packet was sent from

2. The IP address the packet is being sent to

3. The number of the packet that is being sent.

There are some disadvantages of using packets.

1. The extra information that each packet needs means you use more data in total to send something.

2. You need all of the packets to arrive before you can read the data that was sent.

Sometimes packets are lost and do not reach their destination. This means that the data is incomplete and cannot be put back in the right order.

What happens if packets are lost?

- If a packet gets lost, the receiver computer sends a message to the sender computer asking it to send another copy of the packet.
- The sender computer sends another copy of the lost packet.
- When the packet arrives at the receiver computer, the data is complete and the receiver computer puts it in order.
- The data can then be used.

Accessing Websites

A website is stored on a web server. A **web server** stores all of the pages for a website, and the IP addresses of the websites. Web servers are connected to the Internet.

To access a web server using the Internet.

- You type a web address into your web browser. Another name for a web address is **Uniform Resource Locator (URL)** For example, www.cambridge.org
- Your web browser connects to the web server using the Internet.
- Because computers only understand numbers, the URL is converted into an IP address.
- The web browser gives the web server the IP addresses for the website you want. This address tells the web browser where the website is stored on the web server.
- The web server checks that the webpage is there and then sends the data back to the web browser that asked for it.

Computers use **IP addresses** for websites because they only understand numbers. Humans use **URLs** because it is much easier to remember than a lot of numbers.