Day 4: Softwares and Internet

To clear the doubts from my previous course. I am picking up the book ‘Tech Simplified by Deepak Singh’.

Softwares and Programs

Programs	Softwares
1. Programs are a set of instructions in order to carry out a task.	1. A combination of multiple programs is a Software. 2. A software is well documented, has operating methods and **a User Interface.** 3. Made for public use.

1. Softwares are of 2 types: **System Software** and **Application Software**
2. **System Softwares:** These are used to run a device such as computer. It runs in the background. The most popular is OS. (Operating System). **An operating system** is an intermediary between hardware of the computer and the user. eg. I type on keyboard and its printed on screen because of OS.
3. **Application Softwares:** We call them **Apps.** Apps have a specific purpose. Eg. Gmail, Skype, Microsoft Excel, Google Chrome etc.
4. **Source code:** The software written in a particular programming language that is human readable is called source code. The human readable source code has to be converted into binary for machines to read. This is done by compiler. The compiled version is used by a user. When we give someone our software, we give them the compiled version.
5. **Open source:** Giving someone code and compiled version both. Eg. MySQL, MongoDB

MySQL? MongoDB?

Internet

1. What? Internet is a **network** of billions of computers connected to each other. It is not the cables, not the data, its not computers, IT’S A NETWORK THAT ALLOWS MANY TO MANY COMMUNICATION of computers.
2. 💻☁️💻 (Computer, internet, Computer)
3. **How is internet connected to devices?** The data is stored in bits on a computer which gets transmitted using optical fibres, cables.
4. For internet to work fine, we need someone to maintain this huge network of cables. Enter ISP. They keep cables in check, help us connect to the right servers. Basically everything we need to have internet on our computers.
5. **Moving Data through Internet?** Data/Message is broken into small packets. These packets are numbered in order, they have the address of where to go. These packets are then converted into binary and sent over cables.

Internet protocols

1. Internet protocols are a set of rules used by computers to communicate with each other.
2. 4 layer model: Application layer, Transport layer, Internet layer and Network layer.
3. **Application layer:** Applications are softwares built for specific purpose eg. Chrome, Skype. There are 2 tasks of this layer. First, it defines rules/protocols to send a particular communication. For eg. postcards are used for sending short messages whereas letters are used for sending long. Similarly, for sending different files, different protocols are used. **Email is sent via SMTP, Files are transferred using FTP and Web browsing is done via HTTP.** Secondly, it makes sure that right application receives that message. Eg. Fb messenger’s message goes to Fb messenger and not whatsapp. Hence, it assigns a **port number.**
4. **Transport layer:** Transport layer establishes the connection between the applications. It receives the data from Application layer. Breaks it down into segments and numbers the segments so they can be assembled at the end. The protocols in the transport layers are TCP (re-sends segments if missed) and UDP (does not re-send if missed eg. in Video calls). **Hence, now our data has Port # + TCP #.**
5. **Internet layer:** It adds the IP address (source + destination)
6. **Network layer:** This layer transmits packets to the internet network. In this layer, data is converted to bits and modulated to electrics signals to be sent through wires.

End to End encryption

1. Public Key and Private key analogy.