Task 1 (General questions)

1.1. Please compare the topologies star, bus, and meshed. What are the main advantages and drawbacks of those options?

- These Topologies are network shapes, meaning the way the devices in the network communicate with each other.
- **Star:** its a star shaped Network, where every device has its own connection to the main device. It is easy to set up as we just create a cable from the new device to the new device, and if a device was to fail, the network would not collapse. However, if the main device disconnects or malfunctions, then the entire network collapses
- **Tree:** this network is shaped like a tree and it connects to every device via one main cable. It is really cheap to set up, but only one device at a time can communicate, and protocols are needed so that many devices dont try to communicate at the same time which could initiate a deadlock
- **Meshed:** this is like a spider web, in which every node (device) is connected with each other, meaning devices dont need to go through a main node to communicate with each other. If a cable was to break, the data could still find its way to the device as there are many roads to the device. However it would cost alot and we would need many cables.

1.2. What are the main differences between a circuit-switching and a packet-switching network? Please explain by using an appropriate example.

- **Circuit Switching:** this is used for Line Phones, where a dedicated line is created for data to be transmitted, a setback is that even if there is no data being sent, the line stays idle, and is only available to use once its left free. It is a stable way of sending data but as mentioned it has its setbacks and is used for old telephones.
- **Packet Switching:** This is used for Internet, for example sending emails, trying to communicate with a server etc. In this Form of data transport, we divide the data into packets, which we then send one by one, where the data finds the optimal path to reach the server or the device that we want to communicate with. During this packet transfer, we add certain information to the packets/data, so that the receiver can decode it and understand our intentions.

1.3. As you already know, communication on the internet is organized in layers. Please create an example sketch with four layers that considers the following situation:

- 1. Boss (Application Layer) : wants to send an email to a coworker (Protocol is then SMTP)
- 2. Lawyer (Presentation Layer): Lawyer reads the data and encrypts it using TLS Protocol
- 3. Administrative Employee (Transport Layer): packages (potentially divides) the data and ensures delivery with TCP Protocol (If a packet gets lost, TCP **resends it**)
- 4. Postal Office (Physical Layer): The data is then transported with the given address and information to the receiver using IP protocol

The Receiver then receives it the same way, Administrative Employee checks for data loss, Lawyer checks for the rules to decrypt the message and the boss is then able to read the data.

Task 2

- Website Niche -> Exotic Fruits from all over the world.
    - Categories: Continents
        - Subcategories: Country of origin