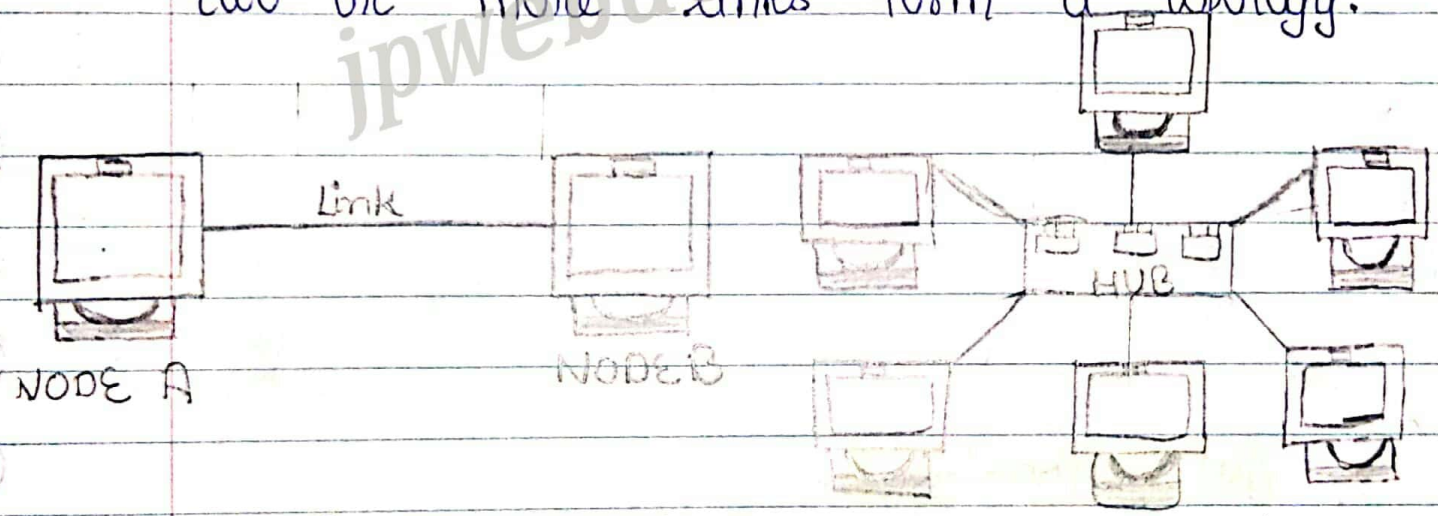
Notes of :- Computer Networks.

Network Topologies :-

- The term Topology refers to the way in which the various nodes or computers of a network are linked together.
- Topology describe the apperance of network.
- Two or more devices connect to a link : two or more links form a topology.



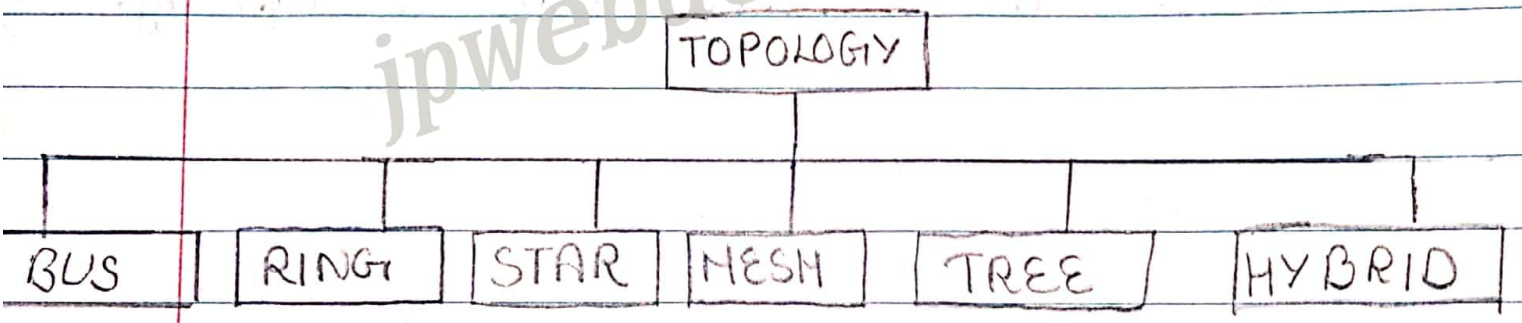
- The followings factors are considered while selecting a topology :-

→ Cost
→ Reliability
→ Scalability
→ Bandwidth capacity.
→ Ease of installation.

* Types of Topologies:-

following are the types of Topologies:-

1. Bus Topology
2. Ring Topology
3. Star Topology
4. Mesh Topology
5. Tree Topology
6. Hybrid Topology.



1. Bus Topology:-

- In Bus Topology, there is a single communication line or cable that is shared by all the nodes in the network.
- All the devices in network are connected to this line.

→ It is easy to install, cheap and use for small network.

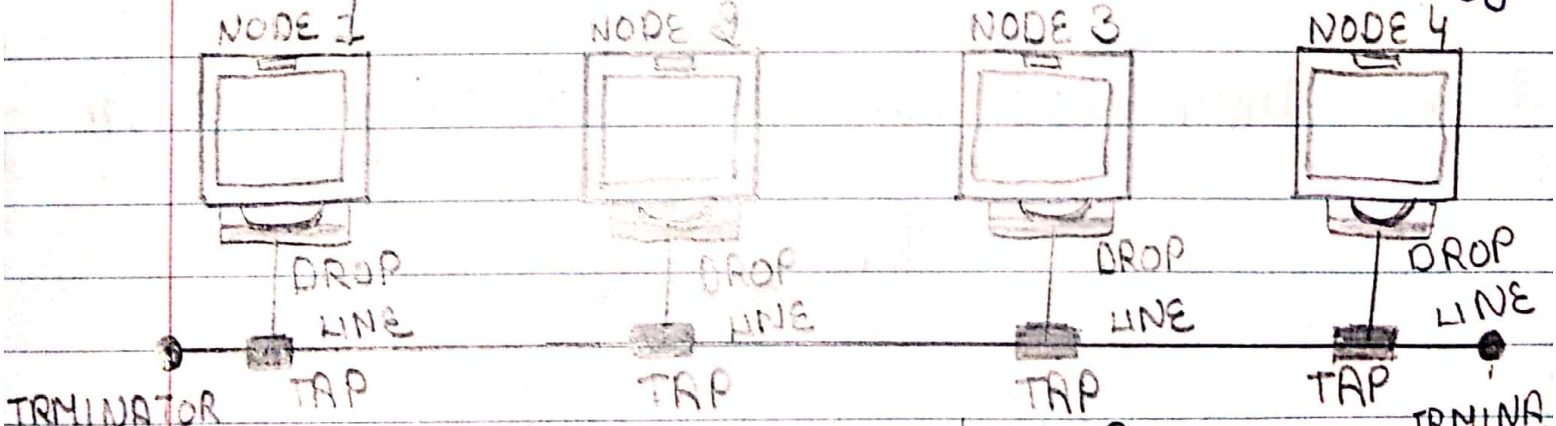
→ The various nodes are connected to the bus cable by drop lines and taps.

→ drop line :- is a connection running between the device and the main line.

→ Tap :- is a connector.

→ It transmits the data from one end to another in a single direction.

→ No bi-directional feature is in bus topology.



Advantages :-

→ easy to install, understand

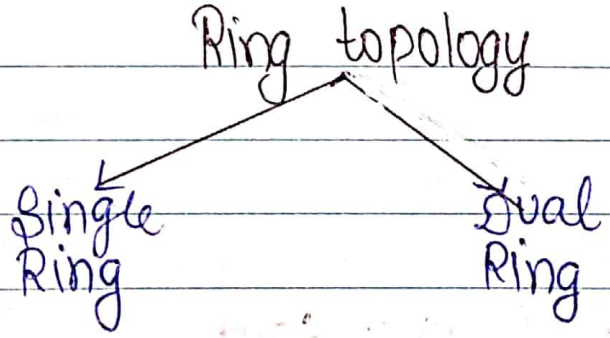
→ cost is less as only one main cable is required.

Disadvantages :-

If the common cable fails, then whole system will crash

2. Ring Topology :-

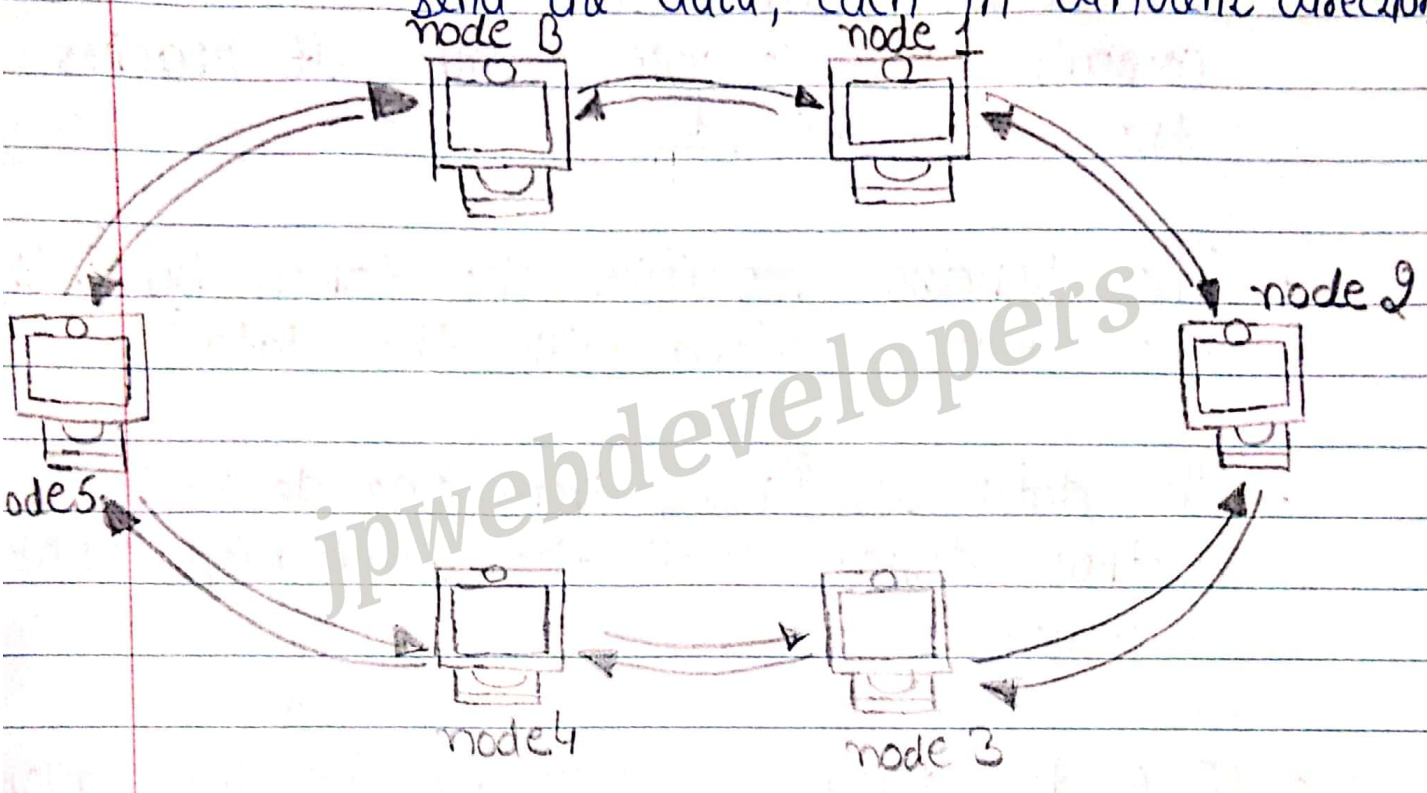
- It is called ring topology, because it forms a ring.
- In this, various nodes are connected in the form of ring, in which data flows in a circle, one station to another station.
- In this topology each node is strongly connected with its adjacent node.
- It has no beginning or end that needs to be terminated.
- There are two kinds of ring topologies :-



1. Single Ring :- In this, a single cable is shared by all the devices and data travel

in one direction.

2. Dual ring :- This topology uses two rings to send the data, each in different direction.



* Token Passing in Ring Network :-

- The most common access method of the ring topology is Token Passing.
- Token Passing :- It is a network access method in which token is Passed from one node to another node.
- Token is a short message that is Passed

around the ring.

▷ Working of Token Passing:- A token is moved around the network, and it is passed from computer to computer until it reaches the destination.

- The sender modifies the token by Putting the address along with the data.
- The data is Passed from one device to another device until the destination address matched.
- Once the token received by the destination device, it sends the feedback to sender that the message is received.

* Advantages of ring topology:-

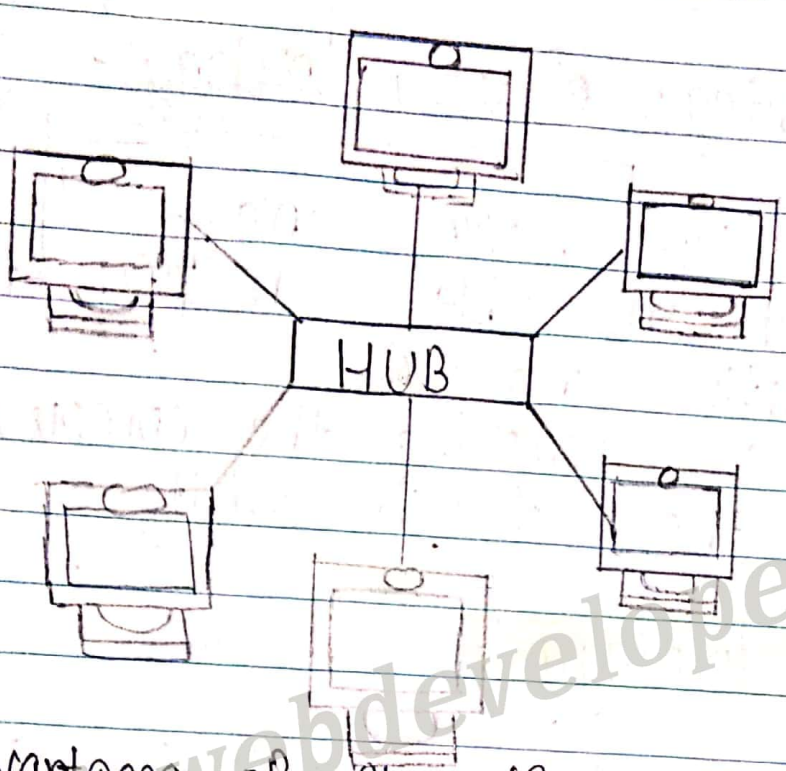
→ Cheap to install and expand.
→ Faster error checking and acknowledgment
→ Data travel at greater speed
→ There are no collisions.

* Disadvantages of ring topology:-

→ It requires more cable.
→ A break in cable can risk the breaking the entire network.
→ Adding or removing the computers can disturb the network activity.

3 Star Topology :-

- This topology has a central controller called Hub.
- In Star topology, all the nodes are connected with a central device called HUB.
- In this, there is no direct link between these computers and the computers can communicate via HUB.
- It means that if one computer A wants to send data to another computer B, Computer A sends the data to the controller and this controller then sends the data to computer B.



* Advantages of Star Topology :-

→ It is easier to add new node or modify.
→ Only those nodes are affected, that has failed. other nodes still work.
→ Addition, deletion and moving of devices are easy.

* Disadvantages of Star Topology :-

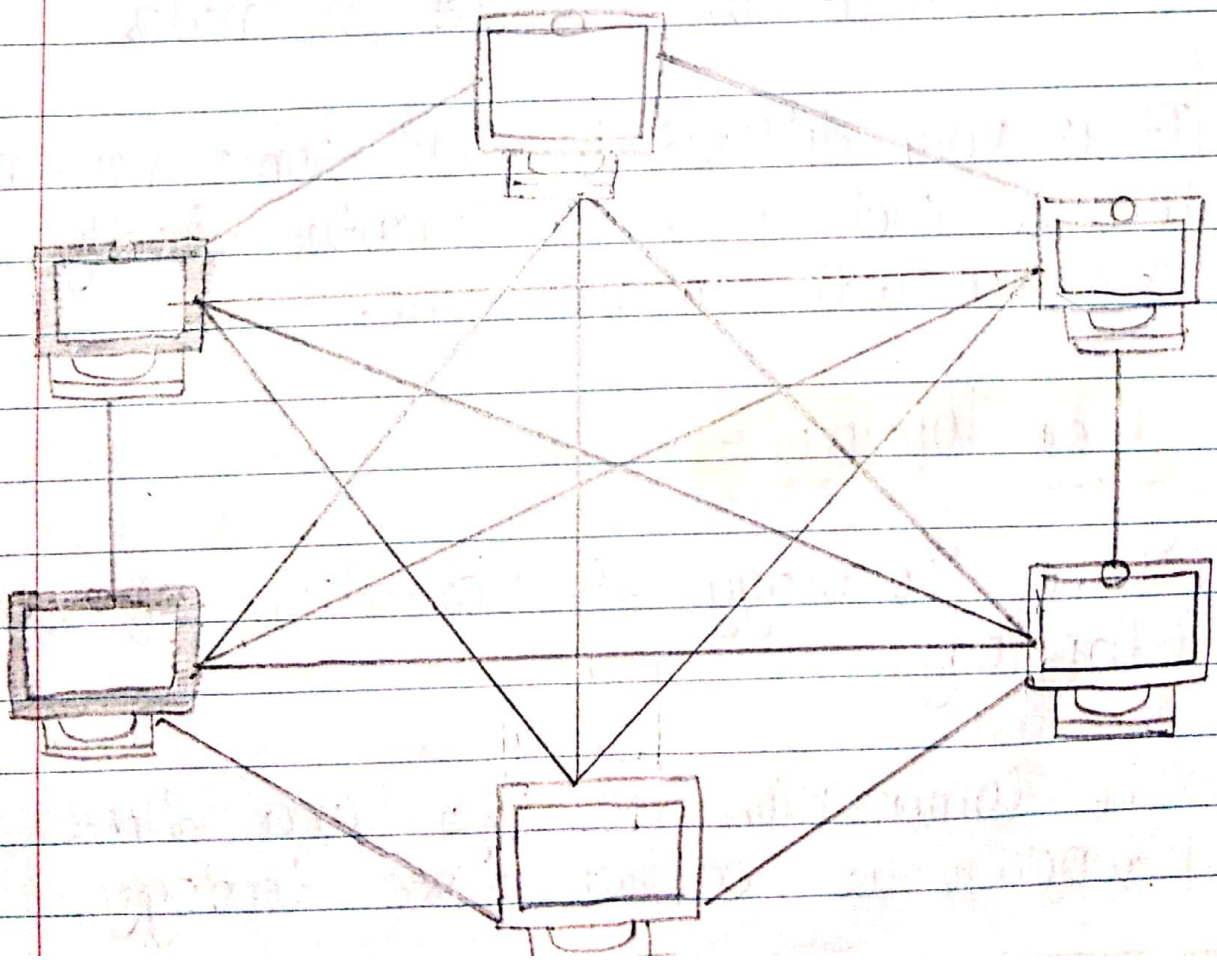
→ If the HUB fails, entire system collapses.
→ Performance depends on the HUB's capacity.
→ Cabling cost is more as each node is connected individually to the HUB.

4 ## Mesh Topology :-

In this topology, each and every computer is directly connected with each other, so we can directly send the data to the destination.

In this way, there are exist multiple path between two nodes of the network.

In case of failure of one path, the other can be used.



* Advantages of mesh topology :-

→ It is good topology to send Private data.

→ Dedicated links ensure data Privacy and security.

→ Links ensure faster transmission without any delay.

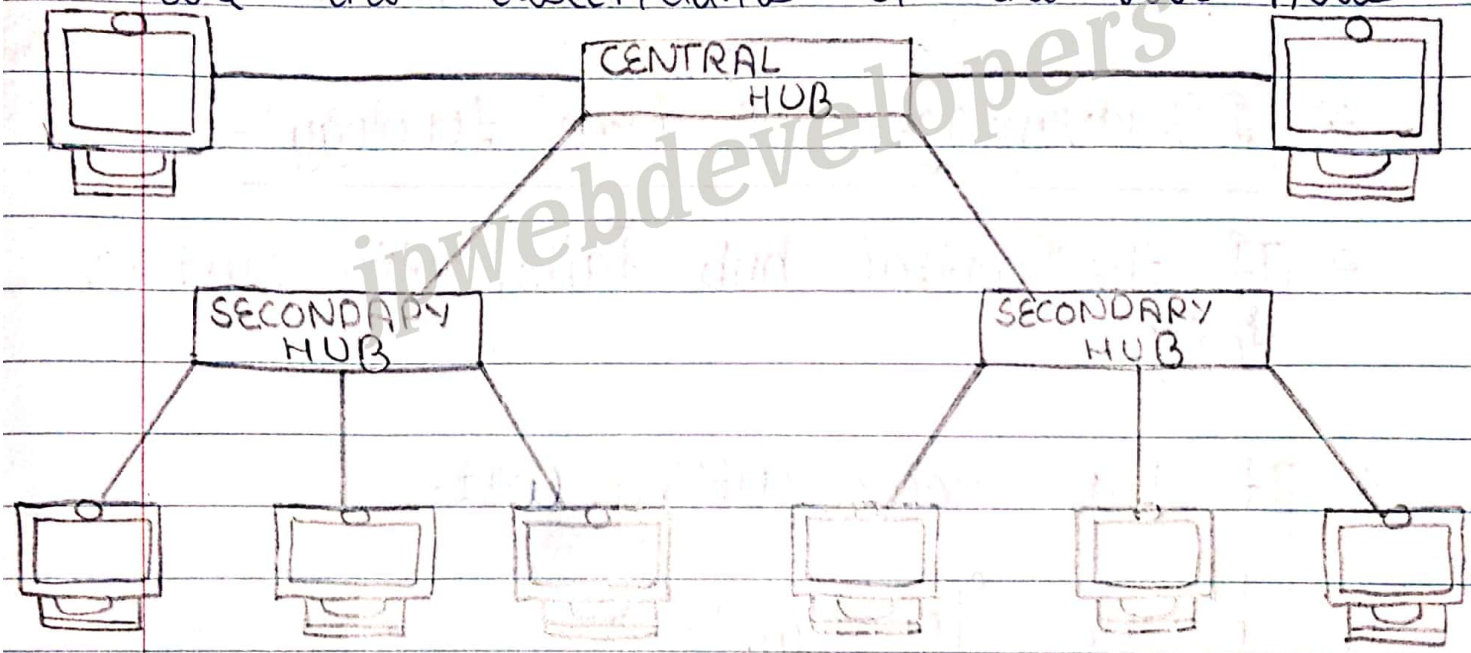
* Disadvantages of mesh topology :-

- It has high cabling cost as n(n-1)2 links are required to connect n nodes.
- It is very difficult to add some new node because each an every computer directly connected with another one.

Tree Topology :-

- Tree Topology is variation of star topology.
- The combination of BUS and STAR topology is called tree topology.

- Tree networks have hierarchical flow of data i.e. the data travels level by level.
- It is also known as hierarchical topology.
- The top most node in tree topology is known as a root node, and all other nodes are the descendants of the root node.



→ In diagram, the various secondary HUBS are connected to central HUB. and majority of devices are connected to secondary HUB.

→ Data can flow from top to bottom. (from central hub to secondary) and from (bottom to top).

* Advantages of tree topology :-

→ It allows more devices to be attached to a single central HUB.

→ Expansion of nodes is possible and easy.

→ Easy managed and maintained.

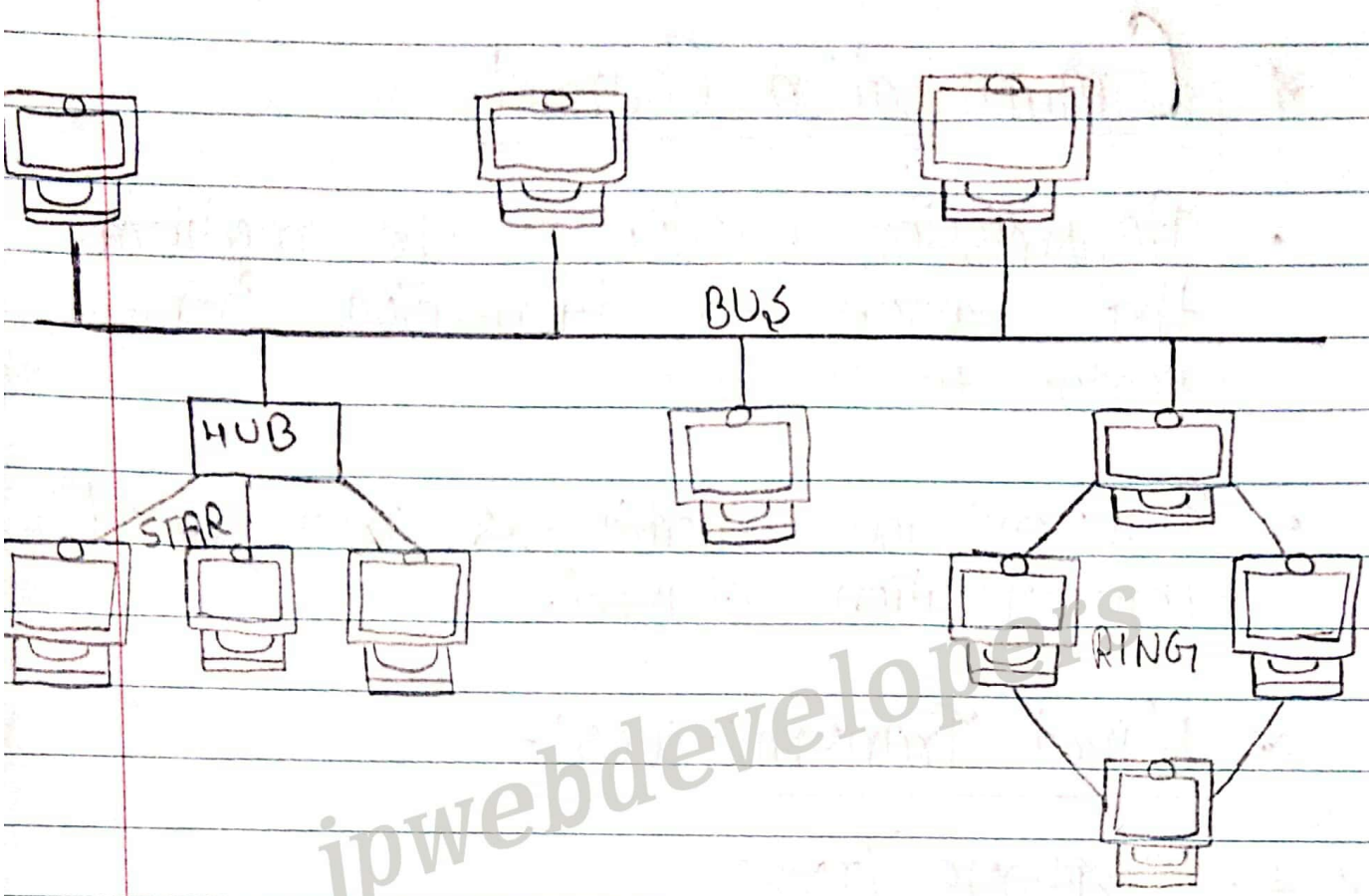
* Disadvantages of tree topology :-

→ If the central hub fails, entire system fails.

→ It has higher cabling cost.

6 Hybrid Topology :-

- Combination of various different topology is called Hybrid Topology.
- A Hybrid topology is a connection between different links and nodes to transfer the data.



* Advantages of Hybrid Topology :-

→ Easiest method for error detecting.
→ It is highly effective and flexible network Topology.
→ It is scable so you can increase your network size.

* Disadvantages of Hybrid Topology :-

→ The design of Hybrid Topology is complex.
→ It is the costly Process.