Computer Network

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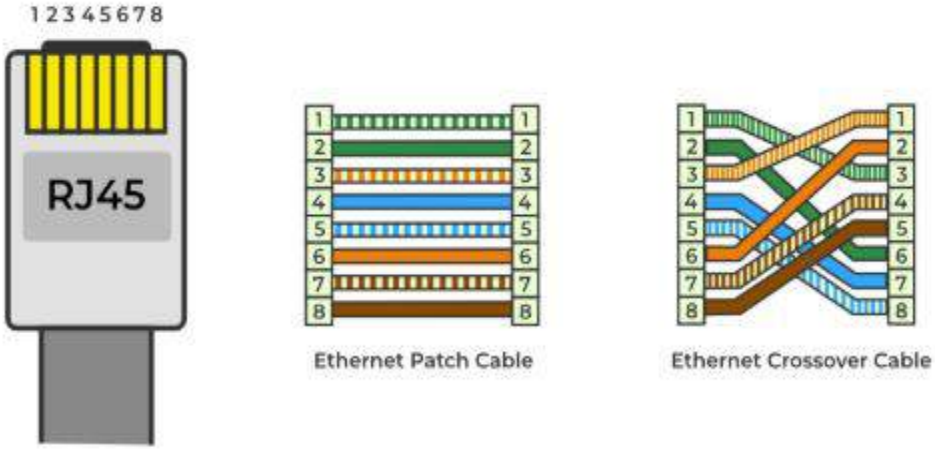
Aim : Study of RJ45 and CAT6 cabling and connection using crimping tool

Theory :

1) **RJ45 (Registered Jack 45) : -**

- The RJ45 Ethernet cable is used to connect HMIs, engineering stations, and printers through a network switch so they can communicate with each other. It allows data transfer, such as downloading graphics or program modifications from the engineering station to other devices.

- This connector RJ45 is available in two standards i.e T568A and T568B . Each of these work as pin IN and pin OUT for ethernet cable to perform data transfer. The only difference between these two cabling is the wiring of green and orange pairs.



2) **CAT6 (Category 6)**

- Cat6 cable is derived from Category 6, it is a twisted pair cable for ethernet that is backward compatible with Cat3, Cat5, and Cat5e cable standards. It is designed for more improved performance as compared to Cat5 and it is also better at handling crosstalk.

- Cat6 cables support data transfer rates of up to 10 Gbps over short distances (55 meters) and have a bandwidth capacity of 250 MHz, which allows faster and more reliable data transmission. Cable consists of four twisted pairs of copper wires with tighter twists and better shielding, which reduces interference and enhances signal.

3) **Crimping tool**

- A crimper is a tool used to press and attach a wire to a connector, like an RJ45 plug or a metal lug, without using heat or solder. It squeezes the wire and connector tightly together to make a strong electrical and mechanical connection.

How To Use :

- ★ To crimp a wire, first remove the outer plastic cover from the end of the wire.
- ★ Then, insert the exposed wire into the connector.
- ★ If you are using a crimping tool with changeable parts (called dies), choose the one that matches the wire size.
- ★ If your tool doesn't have dies, just place the wire into the correct groove.
- ★ After that, press the crimping tool tightly to lock the wire and connector together. Finally, pull the wire gently to make sure it is fixed properly.
- ★ This makes a strong and safe connection without using heat or solder.

Conclusion : Hence, we successfully implemented RJ45 and CAT6 cabling using a crimping tool. This setup enabled the creation of a reliable and structured Ethernet connection suitable for communication between network devices such as HMIs, engineering stations, and printers.