Practical 4 : To implement straight through and cross over cable using cat 5 cable and RJ-45 connector.

Software & Hardwere Requirements:
Crimping Tool, Cable Tester , Category 5 cable (or Unshielded Twisted Pair (UTP) path cable) and RJ-45 connectors.

Knowledge requirements: basic of knowledge network devices.

Question:

Q-1. What is Crimping Tool and how it is use?

Answer : A crimping tool is a device used to conjoin two pieces of metal by deforming one or both of them in a way that causes them to hold each other. The result of the tool's work is called a crimp. A good example of crimping is the process of affixing a connector to the end of a cable. For instance, network cables and phone cables are created using a crimping tool (shown below) to join the RJ-45 and RJ-11 connectors to the both ends of either phone or Cat 5 cable.

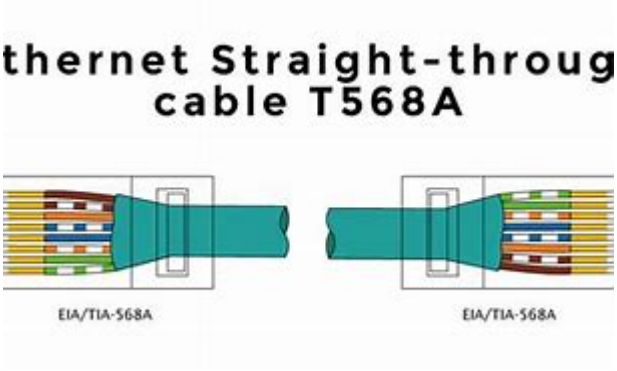
To use this crimping tool, each wire is first placed into the connector. Once all the wires are in the jack, the connector with wires are placed into the crimping tool, and the handles are squeezed together. Crimping punctures the plastic connector and holds each of the wires, allowing for data to be transmitted through the connector.

Theory:

Straight Through cable:

Straight-through cable is a type of twisted pair copper wire cable for local area network (LAN) use for which the RJ-45 connectors at each end have the same pinout (i.e., arrangement of conductors). It is identical to crossover cable, except that in the latter the wires on the cable are crossed over so that the receive signal pins on the connector on one end are connected to the transmit signal pins on the connector on the other end.

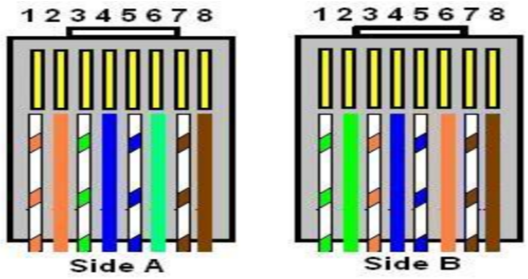
Straight-through cable is used to connect computers and other end-user devices (e.g., printers) to networking devices such as hubs and switches. It can also be used to directly connect like devices (e.g., two hubs or two switches) if the cable is plugged into an uplink port on one (but not both) of the devices. Crossover cable is used to connect two like devices without the use of an uplink port.



Cross over cable:

A crossover cable is a type of twisted pair copper wire cable for LANs (local area network) in which the wires on the cable are crossed over so that the receive signal pins on the RJ-45 connector on one end are connected to the transmit signal pins on the RJ-45 connector on the other end.

An alternative to using a crossover cable is to use a hub or switch that has an uplink port. An uplink port is a jack (i.e., a socket) for an RJ-45 connector that reverses the transmit and receive circuits. Some uplink ports have a switch that allows the user to select the mode of operation.



RJ45 Connector Crimping:

After cutting the cable to proper length, the first step is to unsheathe the cable. Using the stripper on your crimping tool, strip the cable back 1" (inch) from the end. Insert the cable into the stripper portion of the crimping tool and squeeze it tight. While squeezed, rotate the crimp tool around the cable a full 360°. Pull away and the sheathing will come off.

After stripping the wire, the next step is to untwist the smaller wires and arrange them into the proper wiring scheme for the RJ-45 connector. The recommended scheme for the wiring is 568B. The scheme
is as follows:

Pin 1 – Orange/White
Pin 2 – Orange
Pin 3 – Green/White
Pin 4 – Blue
Pin 5 – Blue/White
Pin 6 – Green
Pin 7 – Brown/White
Pin 8 – Brown

Once the wire is arranged to the 568B scheme, it needs to be cut down to fit in the connector. This is easily done with the cutting tool on the 3-in-1 crimping tool. Bring the wires tighter together and cut them down, in an even line, to ½" (inch) from the cut of the sheathing.

With the wires cut to proper length for the RJ-45 connector, the wires are ready to be inserted into the connector. With the RJ-45 connector facing up (securing clip on the underside), This side up insert the wires into the connector. Each wire will fit into each of the eight grooves in the connector. The wires should be inserted until the sheathing is inside the connector, just beyond the crimp portion of the connector. See the image below for proper insertion.

Finally, the RJ-45 connector needs to be crimped onto the wire. When this happens, the eight pins (at the end of the connector) are pushed down into the wires below. Insert the connector into the crimping portion of the crimping tool until the connector cannot go in any further. Squeeze the crimping tool very tightly and release. Squeeze the crimping tool a second time to make sure that all of the pins are pushed down on the connector. When crimping is complete, remove the wire (now with the connector crimped) from the tool and check the pins to make sure that they are all down. Before Crimping If the pins are all crimped down, give the connector a slight tug to make sure that it is securely attached to the wire. Connect the RJ-45 to the camera and then repeat these steps for the cable end at the switch.

Conclusion : We can concluded that the straight-through and crossover cable are designed with different arrangements, serving for different applications. The straight-through cable is usually used for connecting two different kinds of devices, while the crossover cable is highly recommended in the applications where same kind of devices need to be connected. If you want to distinguish the two kinds of cables, you can just check the color orders for the wires inside the RJ45 keystone jacks at both ends of the cables. If the color orders of the wires are the same on both ends, it means the network

patch cable is a straight-through cable. If not, it must be a crossover cable or there may be a wiring error in the cable.

CONCLUSION:

We study and implement straight through and cross over cable using cat 5 cable and RJ-45 connector.

And we perform this practically also…