Aim : Study of RJ45 and CAT6 Cabling and connection using crimping tool.

Equipment : RJ45 Socket, Cat 5 Cable, Crimping Tool.

Theory :

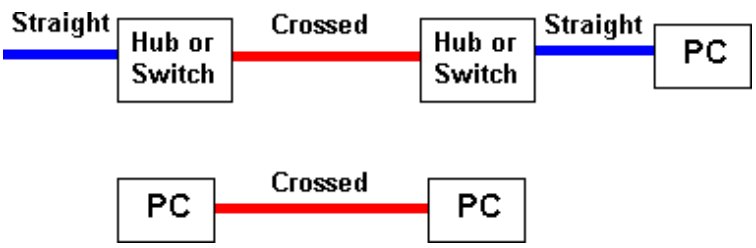
CAT 5 Cable:

CAT5 (also, CAT 5) is an Ethernet network cable standard defined by the Electronic Industries Association and Telecommunications Industry Association (commonly known as EIA/TIA). CAT5 is the fifth generation of twisted pair Ethernet technology and the most popular of all twisted pair cables in use today.

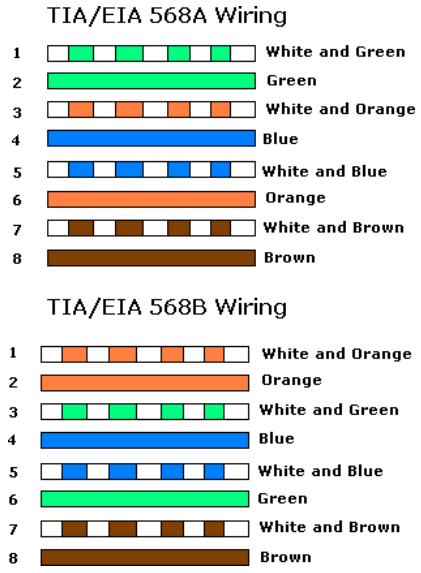
CAT5 cable contains four pairs of copper wire. It supports Fast Ethernet speeds (up to 100 Mbps). As with all other types of twisted pair EIA/TIA cabling, CAT5 cable runs are limited to a maximum recommended run length of 100m (328 feet).

CAT 5 cabling consists of four twisted pairs of copper wire terminated by RJ45 connectors. Cat-5 cabling supports frequencies up to 100 MHz and speeds up to 1000 Mbps. Computers hooked up to LAN s are connected using Cat-5 cables, so if you're on a LAN, most likely the cable running out of the back of your PC is Category 5. Cat-5 is based on the EIA/TIA 568 Commercial Building Telecommunications Wiring Standard developed by the Electronics Industries Association as requested by the Computer Communications Industry Association in 1985.

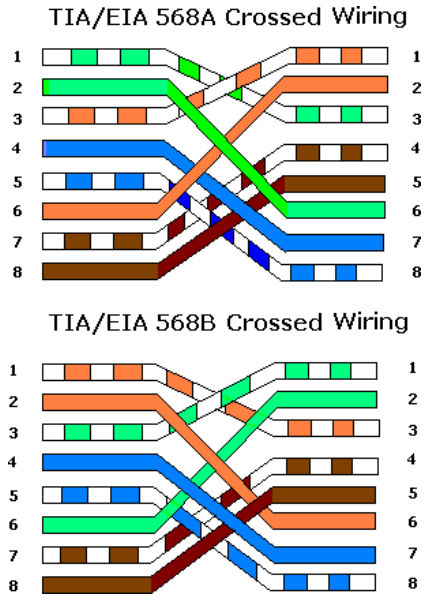
CAT 5 Cables can be either Straight-Through Cables or Crossed Cables. The following diagram shows the Normal use of Crossed and Straight cables.



Straight Cable: Straight wiring method is used to connect PCs or other equipment to a HUB or Switch. The following shows the colour-coded placement of wires in Straight Wiring.



Crossed Cable: Crossed cables are used to connect PCs to one other PC or to connect a HUB to a HUB. Crossed cables are sometimes called Crossover, Patch or Jumper cables. Colour coding in crossed wiring is show below.



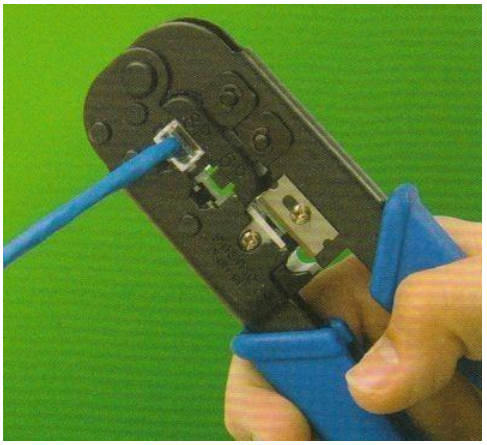
RJ-45 Connectors:

RJ45 is a standard type of connector for network cables. RJ45 connectors are most commonly seen with Ethernet cables and networks. RJ45 connectors feature eight pins to which the wire strands of a cable interface electrically. Standard RJ-45 pinouts define the

arrangement of the individual wires needed when attaching connectors to a cable. Although used for a variety of purposes, the RJ-45 connector is probably most commonly used for 10Base-T and 100Base-TX Ethernet connections. Note that it is very important that a single pair be used for pins 3 and 6. If one conductor from one pair is used for pin 3 and a conductor from another pair is used for pin 6, performance will degrade.

Crimping:

Crimping is a method of ensuring that the wires stay secure in the RJ 45 socket after making a working ethernet cable. The cables can be made by referring to the straight wired or cross wired charts, as needed.



Procedure:

i. Strip off about 2 inches of the ethernet cable sheath.
ii. Untwist the pairs - don't untwist them beyond what you have exposed, the more untwisted cable you have the worse the problems you can run into.
iii. Align the colored wires according to the wiring diagrams above.
iv. Trim all the wires to the same length, about 1/2" to 3/4" left exposed from the sheath.
v. Insert the wires into the RJ45 plug -
vi. make sure each wire is fully inserted to the front of the RJ45 plug and in the correct order. The sheath of the ethernet cable should extend into the plug by about 1/2" and will be held in place by the crimp.
vii. Crimp the RJ45 plug with the crimper tool.
viii. Verify the wires ended up the right order and that the wires extend to the front of the RJ45 plug and make good contact with the metal contacts in the RJ45 plug
ix. Cut the ethernet cable to length - make sure it is more than long enough for your needs.
x. Repeat the above steps for the second RJ45 plug.

Conclusion : Thus we have studied Networking Tools and Crimping of network cable in Straight-through & Crossover modes.