PART A

(PART A: TO BE REFFERED BY STUDENTS)

Experiment No.2

A.1 Aim:

Demonstration of crimping and fault finding of cross-wired cable and straight through cable along with the tools, cables and connectors used.

A.2 Prerequisite:

Crimping Tool, CAT 6 cable

A.3 Outcome:

After successful completion of this experiment students will be able to

Identify various protocols, cables and devices in networking.

A.4 Theory:

Twisted Pair

Twisted pair eventually emerged during the 1990s as the leading cabling standard for Ethernet, starting with 10 Mbps (10BASE-T, also known as Category 3 or Cat3), later followed by improved versions for 100 Mbps (100BASE-TX, Cat5, and Cat5e) and successively higher speeds up to 10 Gbps (10GBASE-T). Ethernet twisted pair cables contain up to eight (8) wires wound together in pairs to minimize electromagnetic interference.

Category 6 cable, commonly referred to as Cat 6, is a standardized twisted pair cable for Ethernet and other network physical layers that is backward compatible with the Category 5/5e and Category 3 cable standards.

Compared with Cat 5 and Cat 5e, Cat 6 features more stringent specifications for crosstalk and system noise. The cable standard also specifies performance of up to 250 MHz compared to 100 MHz for Cat 5 and Cat 5e.

Whereas Category 6 cable has a reduced maximum length of 55 meters when used for 10GBASE-T, Category 6A cable (or Augmented Category 6) is characterized to 500 MHz and has improved alien crosstalk characteristics, allowing 10GBASE-T to be run for the same 100 meter maximum distance as previous Ethernet variants.

When used for 10/100/1000 BASE-T, the maximum allowed length of a Cat 6 cable is up to 100 meters (328 ft). This consists of 90 meters (295 ft) of solid "horizontal" cabling between

the patch panel and the wall jack, plus 5 meters (16 ft) of stranded patch cable between each jack and the attached device. For 10GBASE-T, an unshielded Cat 6 cable should not exceed 55 meters.

- Unshielded Twisted Pair (UTP) Cable.
- Shielded Twisted Pair (STP) Cable.

Coaxial Cable.

Invented in the 1880s, "coax" was best known as the kind of cable that connected television sets to home antennas. Coaxial cable is also a standard for 10 Mbps Ethernet cables. When 10 Mbps Ethernet was most popular, during the 1980s and early 1990s, networks typically utilized one of two kinds of coax cable - thinnet(10BASE2 standard) or thicknet (10BASE5). These cables consist of an inner copper wire of varying thickness surrounded by insulation and another shielding. Their stiffness caused network administrators difficulty in installing and maintaining thinnet and thicknet.

Fiber Optic Cable.

Instead of insulated metal wires transmitting electrical signals, fiber optic network cables work using strands of glass and pulses of light. These network cables are bendable despite being made of glass. They have proven especially useful in wide area network (WAN) installations where long distance underground or outdoor cable runs are required and also in office buildings where a high volume of communication traffic is common.

Two primary types of fiber optic cable industry standards are defined – single-mode(100BaseBX standard) and multimode (100BaseSX standard). Long-distance telecommunications networks more commonly use single-mode for its relatively higher bandwidth capacity, while local networks typically use multimode instead due to its lower cost.

PART B

(PART B : TO BE COMPLETED BY STUDENTS)

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Class : T.E A	Batch : A1
Date of Experiment:	Date of Submission:
Grade :	

B.1 Document created by the student:

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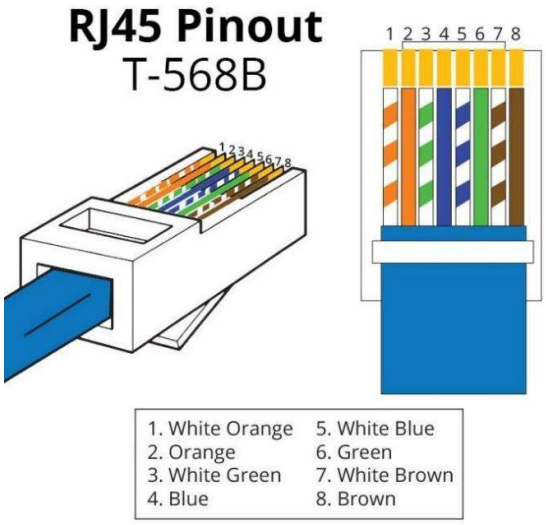
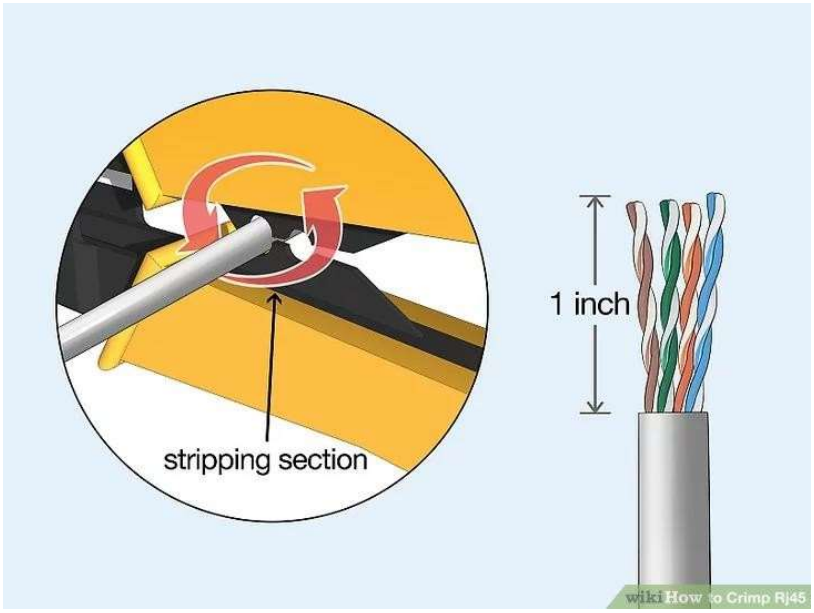
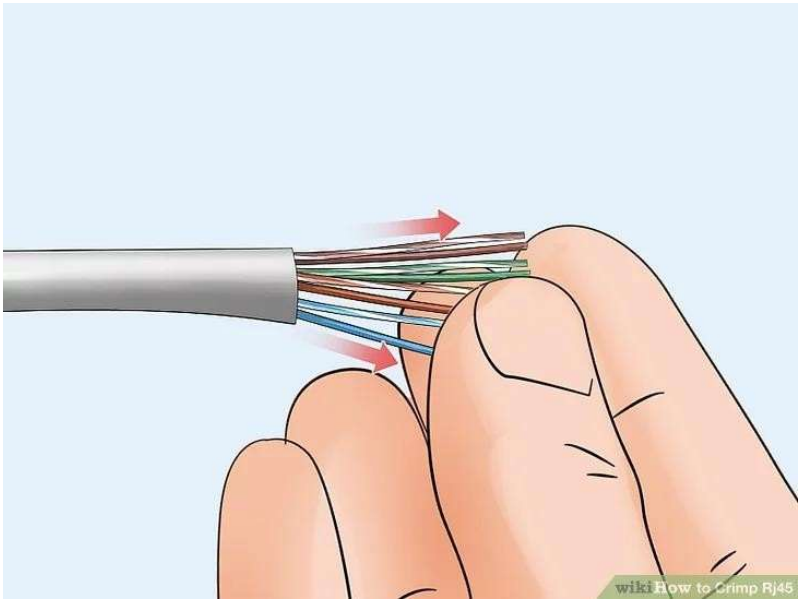
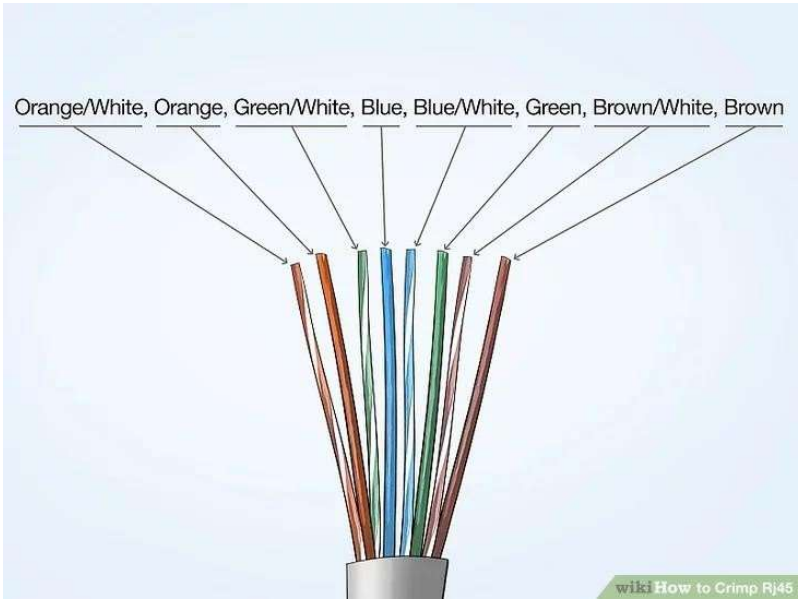


Steps to crimp Rj45 using a Crimping Tool:



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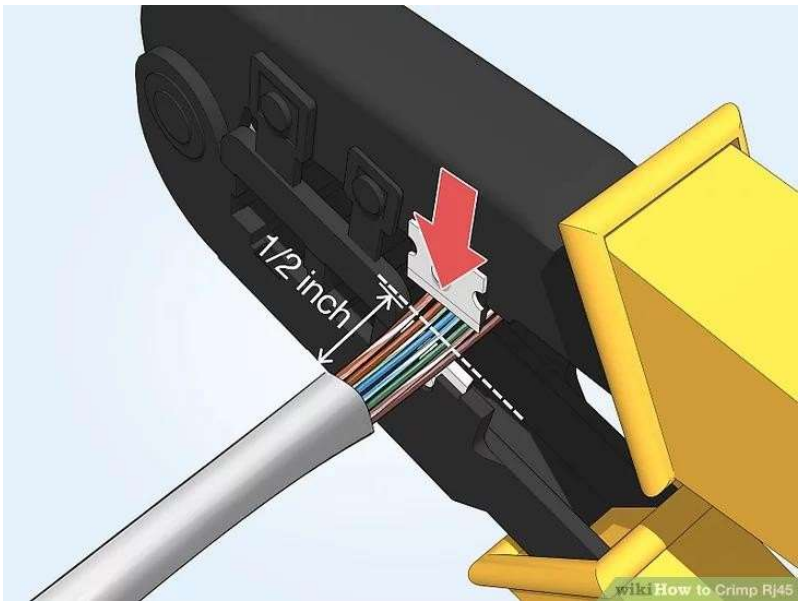
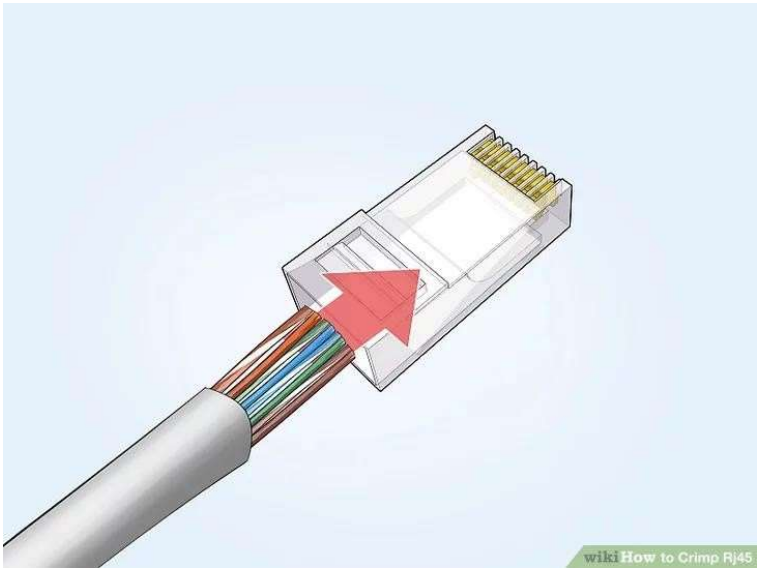
wikiHow to Crimp Rj45


1/2 inch
wikiHow to Crimp Rj45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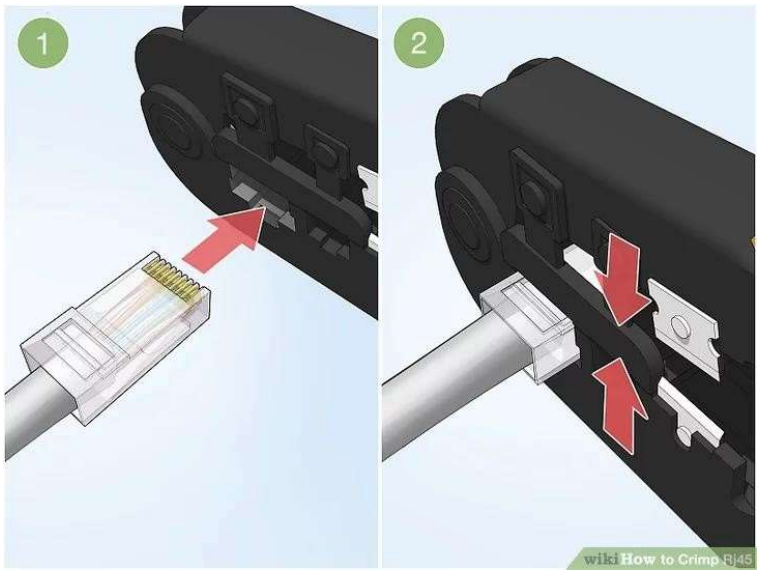
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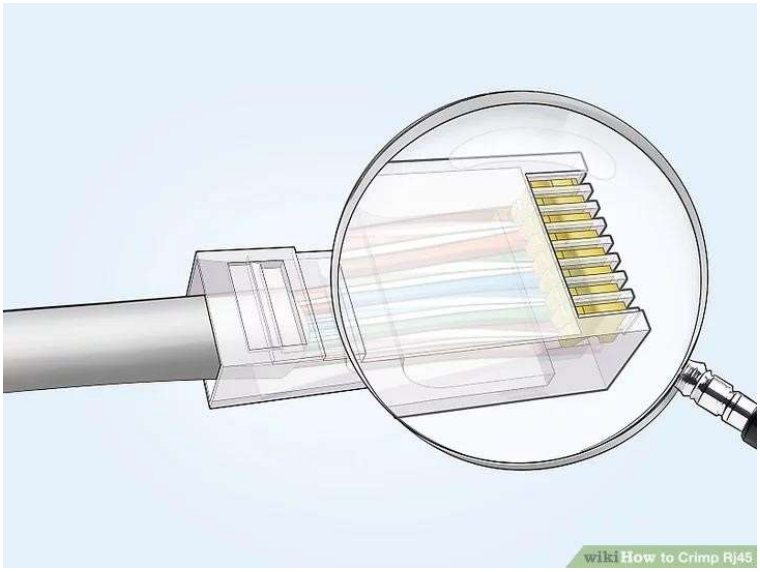
wikiHow to Crimp Rj45



B.3 Observations and learning:

During the crimping and fault-finding experiment for cross-wired and straight-through cables, it was observed that the process of creating reliable network connections depends heavily on the proper use of tools and materials, such as the crimping tool and CAT 6 cables. The distinction between straight-through and cross-wired cables was clearly demonstrated, with straight-through cables being used to connect different types of devices (e.g., computers to switches), while cross-wired cables are used for similar devices (e.g., computer to computer). Additionally, the experiment highlighted the differences between various types of network cables, such as twisted pair (UTP/STP), coaxial, and fiber optic cables, with an emphasis on their respective uses, advantages, and limitations in networking. For instance, the CAT 6 cable, known for its higher bandwidth and reduced crosstalk, was specifically noted for its effectiveness in modern Ethernet applications.

B.4 Conclusion:

The successful completion of the experiment provided a comprehensive understanding of the fundamental techniques required for crimping and troubleshooting network cables. Students were able to identify and distinguish between various networking cables and protocols, gaining hands-on experience in creating and testing network connections. The experiment reinforced the importance of using the correct cable type for specific networking tasks and underscored the role of proper cable management in minimizing electromagnetic interference and ensuring optimal network performance. The knowledge gained from this experiment is essential for anyone involved in network setup and maintenance, as it lays the groundwork for more advanced networking concepts and practices.

B.5 Question of Curiosity

(To be answered by student based on the practical performed and learning/observations)

Q1: What is the difference between straight through cable and crossover cable?

Ans. Straight Through Cable: In a straight through cable, the wire color order on one end of the cable is identical to the order on the other end. This means that each pin on one connector is connected to the corresponding pin on the other connector. Straight through cables are used for connecting different types of devices, like a computer to a switch or a router.

Crossover Cable: In a crossover cable, the transmit and receive pins are swapped. Specifically, pins 1 and 3, and pins 2 and 6 are crossed. This type of cable is used to connect similar types of devices directly to each other, such as connecting two computers or two switches without an intermediate device.

Q2: Where straight through and crossover cables are used?

Ans. Straight Through Cable:

- Connecting a computer to a network switch or router.
- Connecting a computer to a network printer.
- Connecting a modem to a router.

Crossover Cable:

- Connecting two computers directly to each other.
- Connecting two switches or hubs directly.
- Connecting two routers directly in certain scenarios.

Q3: What is Bandwidth of CAT 6 cable?

Ans. CAT 6 Cable Bandwidth: A CAT 6 (Category 6) cable supports a bandwidth of up to 250 MHz. This type of cable is designed to handle Ethernet speeds of up to 10 Gbps (Gigabits per second) over distances up to 55 meters, and 1 Gbps over distances up to 100 meters.