Department of Computer Science and Engineering

Islamic University of Technology (IUT)

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Laboratory Report

CSE 4412: Data Communication and Networking Lab

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Section	**:1A**
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Title: Introduction to different transmission media and crimping of RJ45 Connector to UTP cable

Objective:

1. Introduction to different guided media such as UTP, Coaxial Cable, Optical fiber.
2. Internal arrangement of UTP cables.
3. Different Wiring pattern Standard such as T568A or T568B.
4. Different types of cabling for UTP such as straight through, crossover and rollover, and their usage.
5. Procedure to crimp RJ45 connector to UTP cable.
6. Procedure to check the connection.

Devices Used in the experiment:

1.Ethernet Cable – Category 5e or CAT5e or CAT6
2.RJ45 Crimping tool
3.RJ45 Crimpable Connectors
4.Cable Tester

Theory:

UTP stands for Unshielded Twisted Pair cable. UTP cables are copper cables that consist of unshielded twisted pairs surrounded by an outer jacket which implies they have no metallic shield. This makes the cable unprotected against electrical interference but it also makes the cable small in diameter. The twist helps to improve the cables' immunity to electrical noise.

There are four coloured wires in the UTP. They are - are green, orange, blue and brown.Each coloured wire is twisted with a white coloured wire.

There are different categories of UTP cable, such as- Cat1, Cat2, Cat3, Cat4, Cat5, Cat5e, Cat6, Cat6a and Cat7.There are also different types of UTP cables such as 10Base-T,10GBase-T etc.

There are two major wiring standards used in the networking industry. They are TIA/EIA 568A standard & TIA/EIA 568B standard. In TIA/EIA 568A the wires at pin 1 and 2 are green and green white and the wires at pin 3 and 6 are orange and orange white. In TIA/EIA 568B the pairs exchange their position. In TIA/EIA 568A the green pairs are used for transmitting data, orange ones are used for receiving data signals and vice-versa in TIA/EIA 568B. Other two pairs are kept as back-up pairs in both the standards. They are used if any wire among the green and orange pair is broken.

In straight-through cable each end has the same pin out. If one end has T568A configuration, the other end will also have T568A configuration. A straight cable is used to connect a computer to a switch, hub, router etc.

In crossover cable, if one end is T568A configuration then the other end will be T568B configuration. In this cable connection, Pin 1 is crossed with Pin 3, and Pin 2 is crossed with Pin 6. A cross cable is used to connect a computer to computer using only a UTP cable. And also to connect a network device to a network device such as to connect a router to router, switch to switch etc.

Working Procedure:

At first I stripped the cable jacket for about 1.5 inches using an RJ45 crimping tool's double blade down from the end.

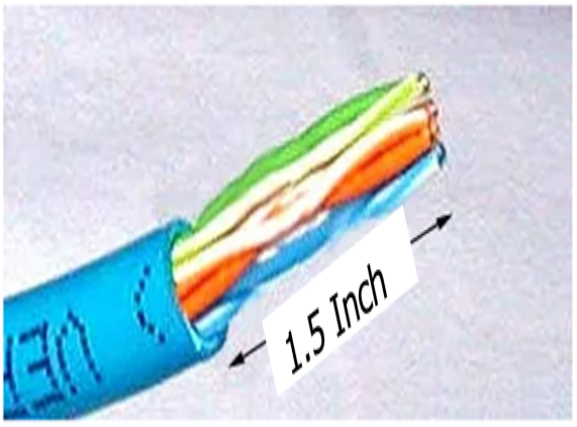
Then spreaded the four pairs of twisted wire apart. After that I untwisted the wire pairs and aligned them in the T568A and T568B orientation. As we were given a pair of UTP, we aligned one UTP in T568A configuration and another in T568B configuration to do cross over cable.

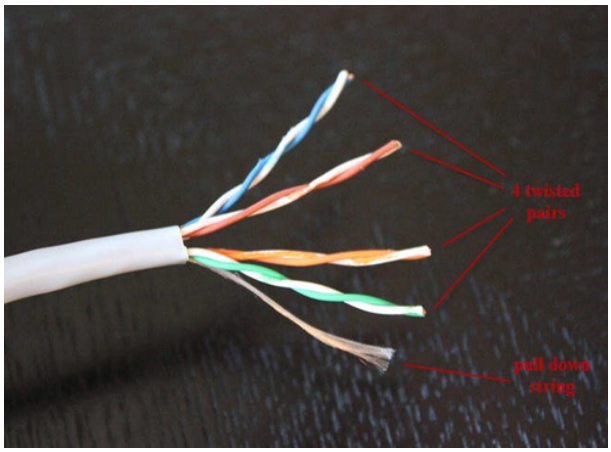
After that I cut the wires as straight as possible for about 0.5 inch above the end of the jacket using the crimping tool's single blade.

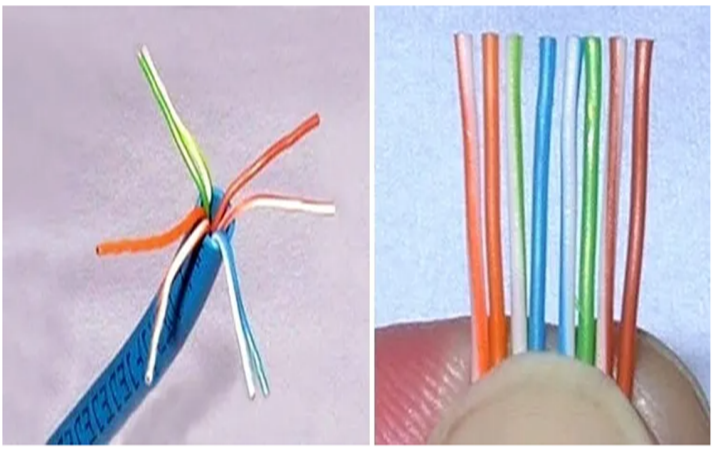
Then I inserted the wires into the modular connector and pushed the connector inside the crimping tool and squeezed the crimper carefully.

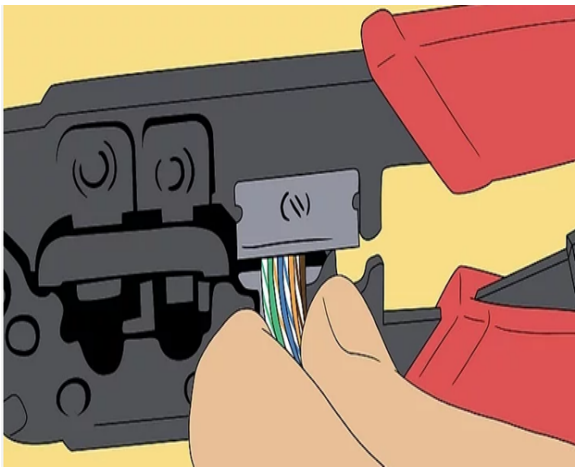
After that we used a cable tester to test each pin.

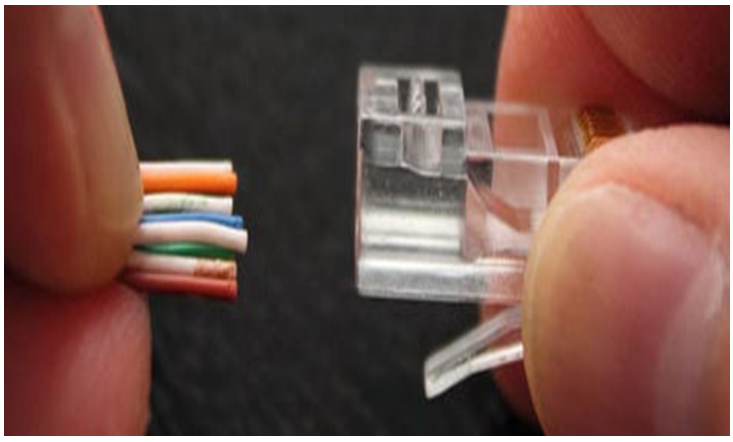
Diagram of the experiment:

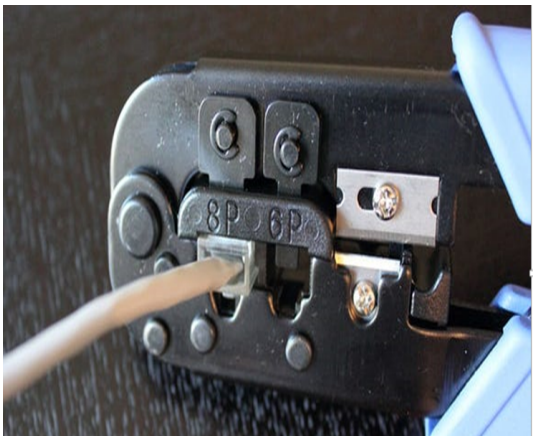











8P 6P


TEST
AUTO
OFF
ON/TONE
NETWORK CABLE TESTER
WITH TONE GENERATOR
TRANSMITTER
TRENDnet
TRENDware, USA
NOT FOR LIVE CIRCUITS

Observation:

After I inserted the pairs of wires in the tester, I observed green signals blinking on the tester which implies the procedure was successful.

Challenges:

As it was my first time building a UTP cable connection, I faced quite some difficulties doing the experiment. Firstly, I face a bit of difficulty using the crimping tool. I could not uncover the outer jacket in my first trial and I had to try multiple times to do so. Secondly, I found it a bit difficult to untwist and straighten the wires according to a specific configuration. And lastly, I could not push the connector into the crimper in the correct manner in the first attempt. I needed to squeeze the crimping tool harder to ensure the successful connection.