23/7/24

# PRACTICAL - 2

AIM

Study of different types of network cables.

Different type of cables used in networking are:

1) Unshielded Twisted Pair (UTP) cable
2) Shielded Twisted Pair (STP) Cable
3) Coaxial cable
4) Fibre Optic Cable

| Cable Type | Category | Maximum Data Transmission | Advantages / Disadvantages | Application / Use |
|---|---|---|---|---|
| UTP | Category 3 | 10 bps | Advantages:<br>→ Cheaper in cost<br>→ Easy to install as they have a smaller overall diameter<br>Disadvantages:<br>→ More prone to (EMI) Electromagnetic Interference and nose | 10 Base-T ethernet<br>Fast Ethernet, Gigabit Ethernet<br>Fast Ethernet, Gigabit Ethernet. |
| STP | category 6, 6a | 10Gbps | Advantages:<br>→ Shielded<br>→ Faster than UTP<br>→ Less susceptible to noise & interference | Gigabit Ethernet, 10G Ethernet (55m)<br>widely used in data centers |
| SSTP | category 7 | 10Gbps | Disadvantages:<br>→ Expensive<br>→ Greater installation effort | Gigabit Ethernet<br>10G ethernet (100m) |

| | | | | |
|---|---|---|---|---|
| Coaxial cable | RG-6<br>RG-59<br>RG-11 | 10-100 Mbps | → High bandwidth<br>→ Immune to interference,<br>→ Low loss bandwidth<br>Disadvantages:<br>→ Limited distance<br>→ Cost<br>→ Size is bulky. | Speed of signal is 500m.<br>Television network<br>High speed internet connections. |
| Fibre optics cable | single mode<br>Multi mode | 100Gbps | Advantages<br>→ High speed<br>→ High bandwidth<br>→ High security<br>→ Long distance<br>Disadvantages<br>→ Expensive<br>→ Requires skilled installers. | Maximum distance of fibre optics cable is around 100 meters |

Image of UTP :

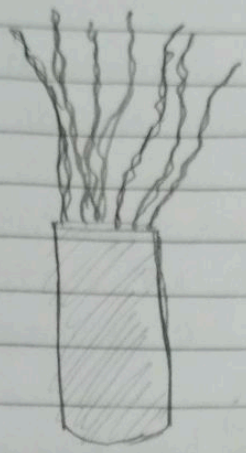


Image of STP :

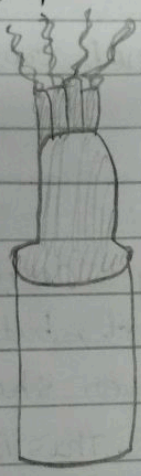


Image of coaxial cable :

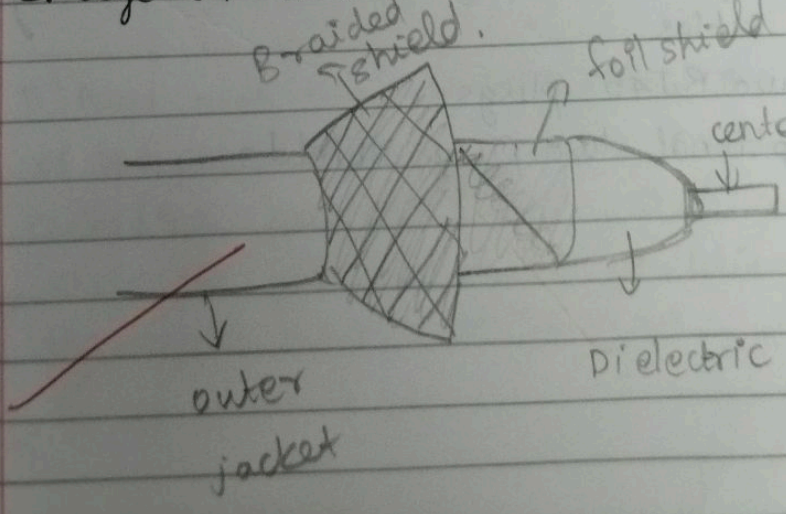
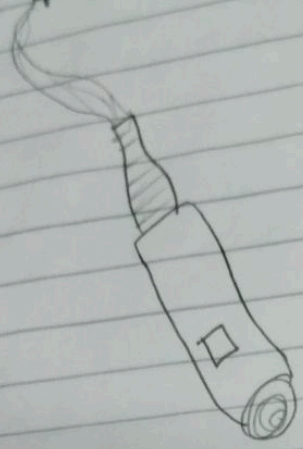


Image of fibre optics cable:



b) Make your own Ethernet cross-over cable/ Straight cabel:

Tools & parts needed:

- Ethernet cabling: CAT5E is certified for ~~for~~ gigabit support, but CAT5 cabling works as well, just over shorter distances.
- A crimping tool. This is an all-in-one networking tool shaped to push down the pins in the plug and strip and cut the shielding off the cables.
- Two RJ45 plugs
- Optional two plug shields

Steps to be followed :

1) To start construction of the device, begin by threading shields onto the cable.

2) Next, strip approximately 1.5cm of cable shielding from both ends. The crimping tool has a round area to complete this task.

3) After, you will need to untangle the wires, there should be four "twisted pairs". Referencing back to the sheet, arrange them from top to bottom. One end should be in arrangement A and the other in B.

4) Once the order is correct, bunch them together in a line, and if there are any to create an even level. The difficult aspect is placing these in to the RJ45 plug without messing up the order. To do so, hold the plug with the clip side facing away from you and have the gold pins facing toward you, as shown.

5) Next, push the cable right in. The notch at the end of the plug needs to be just over the cable shielding, and if it's isn't, that means that you stripped off too much shielding. Simply snip the cables back a little more.

b) After the wires are securely sitting inside the plug, insert into the crimping tool and push down.

7) Lastly, repeat for the other end using diagram B (to make a crossover cables) / using diagram A (to make a straight through cable).

Study observation :

1) What is the difference between cross cable and straight cable?

| Straight cables | cross table. |
|---|---|
| used to connect different types of device. | used to connect similar devices directly. |
| wiring is same on both ends | wiring is crossed over btw ends. |
| eg : pc to router | eg : pc to pc. |

2) Which type of cable is used to connect two PC ? (straight / cross cable).

Cross cable.

3) Which type of cable is used to connect a router / switch to your PC?

straight cable.

4) Find out the category of twisted pair cable used in your lab to connect the pc to network socket?

Cat 5e, Cat 6 cables.

5) Write down your understanding, challenges faced & output received while making a twisted pair cross / straight cable.

understanding : cable structure, pinouts

challenges : wiring, testing

output : working cable

Result :

The types of network cables and making cross-wired cable & straight through cable using clamping / crimping tool.

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