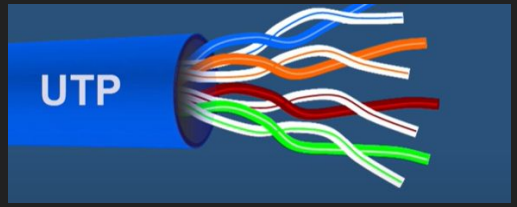
Network Cables

Types



UTP-Unshielded Twisted Pair

-has 4 pairs of wires twisted around each other

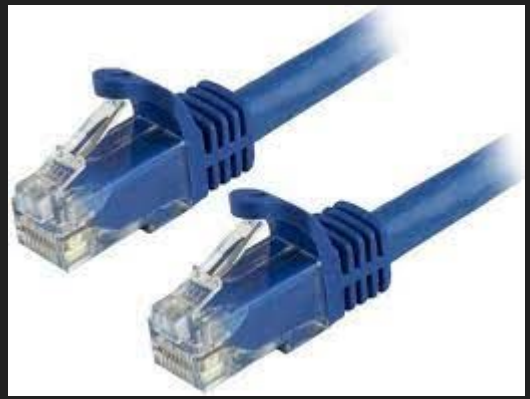
-twisting prevents electromagnetic interference or crosstalk

-STP-Shielded Twisted Pair twisted pair-has foil shield around the wires to protect even more from interference

-used commercially

Building a Cable

-require UTP cable and RJ-45 connector



Steps

-remove protective sheathing from around the twisted paired wires using a wire stripper

Twisted Pair Wire Arrangement

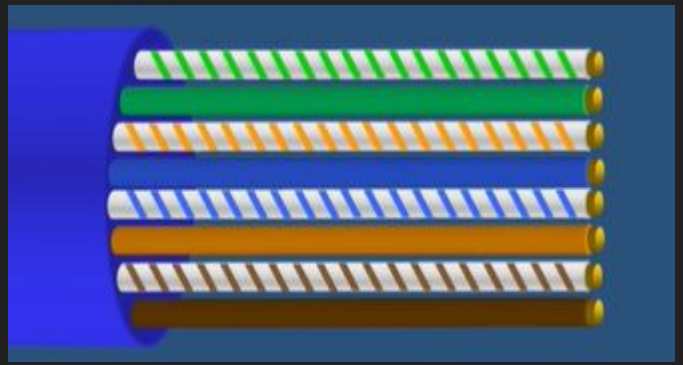
Once the outer sheathing is removed you will have to untwist the wires and sort them in a specific order.

The order is determined by the use of the cable.

LAN cables→T568B

Wiring Standards

568A



White - Green
Green
White - Orange
Blue
White - Blue
Orange
White - Brown
Brown

568B

White - Orange
Orange
White - Green
Blue
White - Blue
Green
White - Brown
Brown

Choose either. It doesn't matter. Just make sure both ends follow the same standard. This makes a straight through or patch cable. Most common cable type and is used to connect devices to hubs, switches and routers.

Crossover Cables

Not common. Wired using both standards where each end of the cable is different i.e. one end is 568A and the other is 568B.

Used to connect like devices i.e. two computers directly to each other, two hubs etc.

Cable Categories

Ethernet Cable Comparison Chart			
Category	**Shielded**	**Max. Transmission**	**Max. Bandwidth**
Cat 3	No	10 Mbps at 100m	16 MHz
Cat 5	No	10/100 Mbps at 100m	100 MHz
Cat 5e	No	1 Gbps at 100m	100 MHz
Cat 6	Yes & No	1 Gbps at 100m	250 MHz
Cat 6a	Yes	10 Gbps at 100m	500 MHz
Cat 7	Yes	10 Gbps at 100m	600 MHz
Cat 7a	Yes	10 Gbps at 100m	1000 MHz
Cat 8	Yes	25 Gbps/40 Gbps	2000 MHz at 30m

Build Steps

Step 1

Get your supplies

Ethernet cable (Cat5e, Cat6, etc.)
RJ-45 connectors
Cable/wire stripper and crimper

Step 2

Determine the type of cable you want?

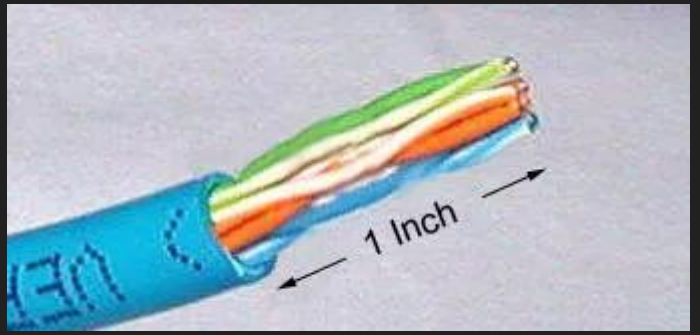
Straight Through/Patch Cable (568A-568A) or (568B-568B)

Or

Crossover Cable (568A-568B)

Step 3

Cut the cable to the length you need.

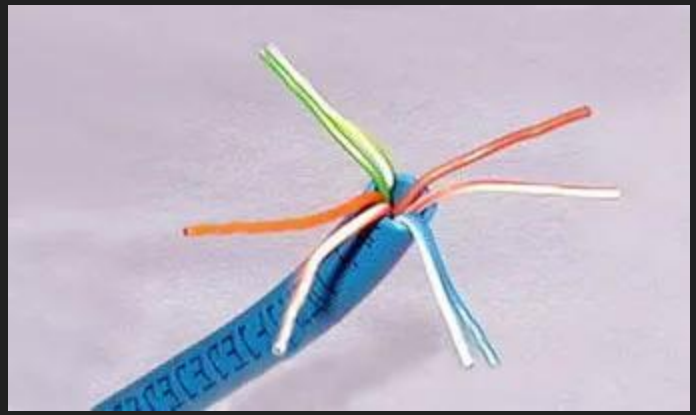


Strip each end of the cable by about 1 inch.

Do this carefully as it is very easy to nick/cut/damage the thin internal twisted pair cables.

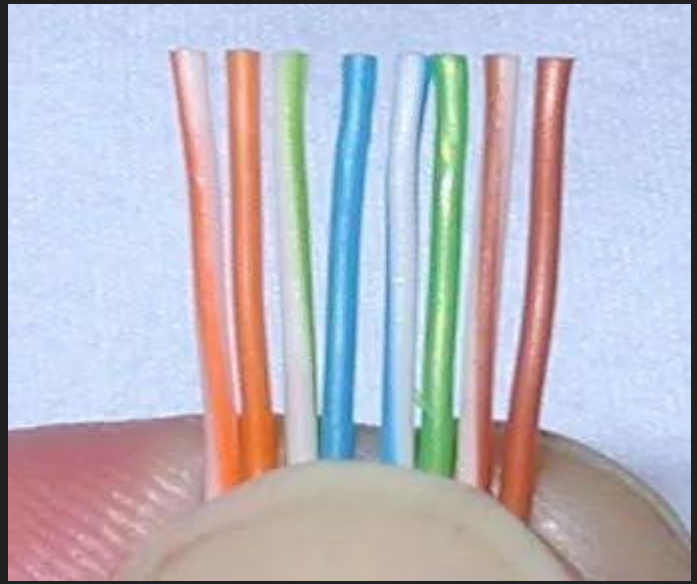
Step 4

Unwind and pair the twisted pair cables



Step 5

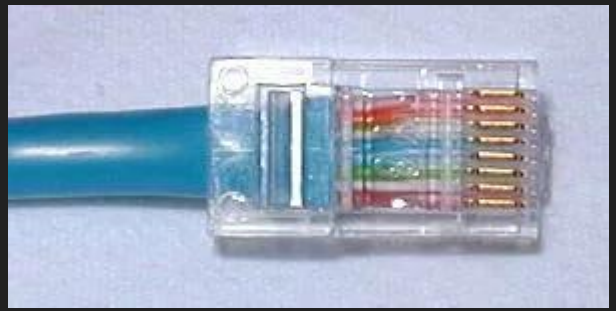
Straighten out and order the cables according to the selected standards.



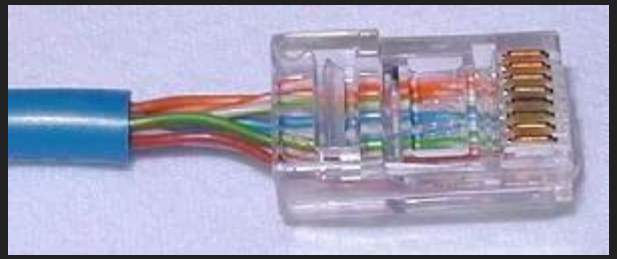
Step 6

Use the wire stripper/crimper or another cutting tool to cut the wires down to half an inch.

Push the wires carefully into a connector, making sure they reach the end.



Mistakes



Step 7

Crimp the connector onto the cable

Step 8

Test with a Ethernet Cable Tester

Questions and Exercises

1. Find and list at least 3 youtube videos that show you how to build an ethernet cable.Watch all 3 to get different hints and suggestions.

How to Make an Ethernet Cable - YouTube
How to Crimp RJ45 to Cat5e or Cat6 cable - YouTube
DIY Ethernet Cable Making - Step by Step Guide - YouTube

2. I want to connect my Xbox to a hub. What cable type do I use?

Patch cable.

3. What are the two wiring standards used in making ethernet cables?

T568A and T568B

4. Which is more rare to build: a crossover or patch cable?

Crossover cable

5. What is the slowest category of ethernet cable?

Cat5

6. What is the name of the connector used on each end of an ethernet cable?

RJ-45 connector

7. List a link to a site that sells 1000 feet of cat 6 ethernet cable. How much does it cost?

Link to Cat6 cable product with price

8. List a link to a site that sells a 10 pack of RJ-45 connectors. How much do they cost?

Link to RJ-45 connector pack with price

9. Someone gives you a TP-LINK ER605 wired router. Would it make sense to spend money building cat7 or cat 8 cables to connect to it? Why or why not?

No, Cat7 or Cat8 cables would be overkill for a basic wired router

10. Build two patch cables, each about 4ft. Test with the Ethernet cable tester. Show your teacher when you are done. Note: you will only be given 6 RJ-45 connectors so limit your mistakes!

Two 4ft patch cables tested with an Ethernet cable tester.

Test your Cable

Ask your teacher for the cable tester. Plug each end of your cable's RJ-45 connectors into the cable tester. Make sure the GND button is OFF and then press the POWER button. All 4 LEDs should blink GREEN. If they don't all blink GREEN but the 1 and 2 LED and the 3 and 6 LED do turn green, your cable may still be useable. To perform the second test plug your cable into your router and into your computer's ethernet port. Open a browser, enter the default IP address of your router (see the router's documentation for this). Hit enter and if you see the router's administration page show up then you know your cable is good to go!

Complete the handout : https://docs.google.com/document/d/1W0hqr0VFxCHcLQQ5v9CFezAKGyf0vT2y5hVrMc8uSpc/edit?usp=sharing