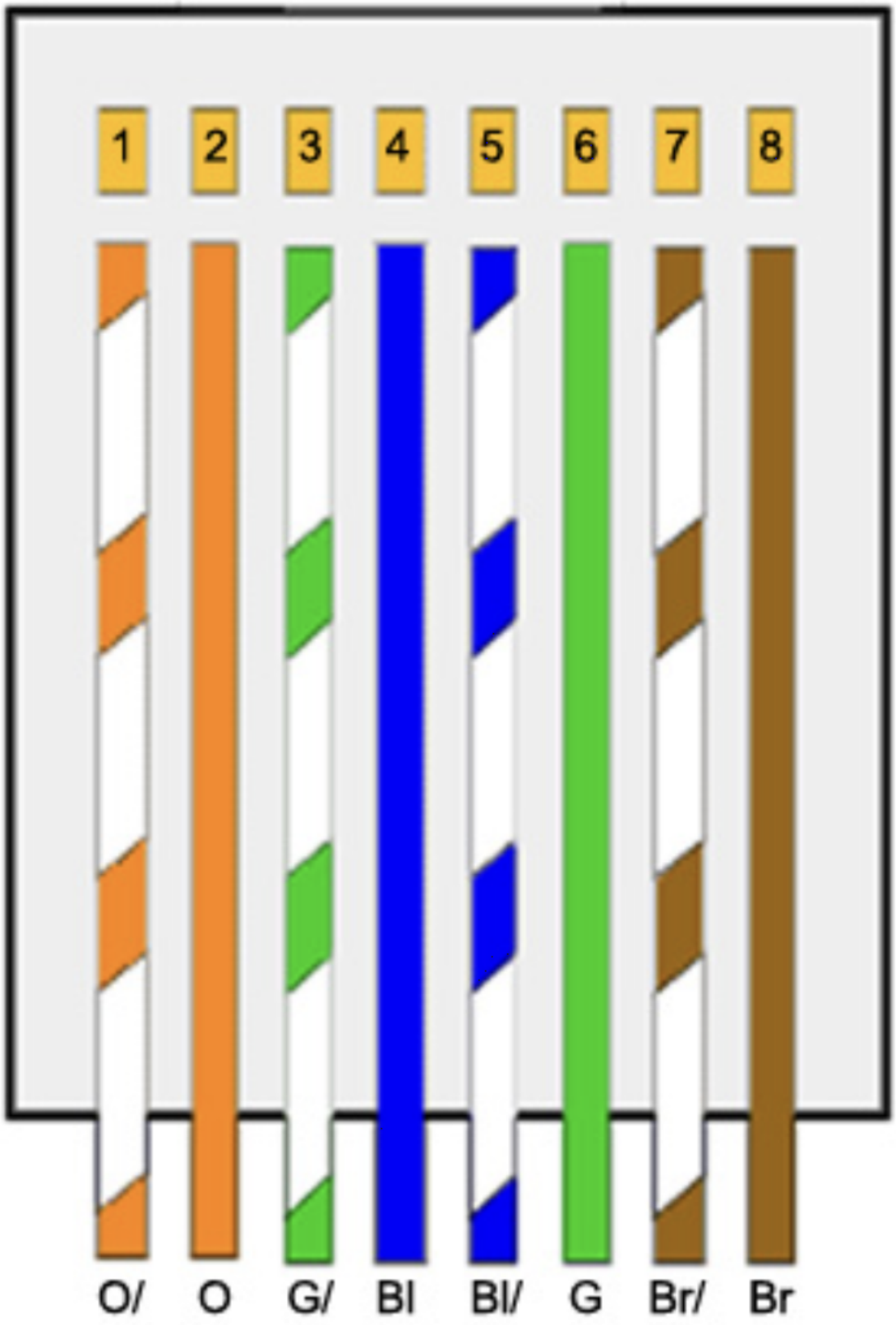
Ethernet cables

- If you want to learn about driving, you first have to understand what a road is.
- In this case, network "roads" are cables, but can also be fiber optics or wireless networks
- We need to understand how to create one of these "roads" from scratch
- We will be using either category 5 "cat5" or category 6 "cat6" cables
- cat5 has a max speed of 1 gb/s, especially if it is labeled "cat5e", or "cat5 extended, cat5e"
- cat6 has a max speed of 10 gb/s
- The RJ-45 cable ends for these are not interchangeable, as one wire is a bit thinner than the other (cat5 is 24AWG while cat6 is 23AWG, a bit thicker)
- The ends are called RJ45 and have 8 slots, with the flat side facing you, and the hole at the bottom, see below.
- When viewed with the flat side towards you, these are the colors:



568B

Screenshot 2026-01-30 at 12.50.35 PM.png

- This is NOT random
- The first two orange pairs (1 and 2) are for data transmit
- The green pairs (3 and 6) are for data receive
- The blue pair is for power over ethernet (POE) plus (+)
- The brown pair is for POE negative (-)
- This color is different from 8 conductor (4 pair) telephone cables which may look exactly alike
- Reason? Phone cables start with 4-5 as line one, then 3-6 as line two, 2-7 as line three and 1-8 as line four
- Each of these has up to 90 volts on each pair (when a telephone rings) so we separate our color code for computers
- Reason? Plugging a computer into a phone outlet will not burn out the network card on the computer this way

Creating an ethernet cable:
We will be using pass-through connectors for our cables, along with cat5e cable
Parts:

- RJ-45 cat5e pass-through cable connectors (make sure these are the correct size for cat5e)
- at least 1 meter long length of cat5e cable (cat6 uses different RJ-45 ends)
- cable strippers (optional if you use the Klein tool below)
- Klein combo cable crimper tool (yellow)

1. strip one end of the cable about 3cm from the end
2. cut off the tension thread (this prevents stretching when pulling cable)
3. arrange the wires according to the ATT 568B pattern with orange-white on the left side
4. cut the arranged wires flat using the Klein tool or wire clippers about 2 cm from the cable sheath
5. holding the RJ-45 cable end with the flat side facing you, and the open bit facing down, thread the wires into the connector
6. check the order to make sure it matches the image above
7. crimp with the crimping tool
8. repeat with the other end of the cable
9. test with the continuity tester
10. if available, test with the speed tester

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