Result and Conclusion of RJ45 Cable Connection Experiment:

Result: The RJ45 cable was successfully terminated with proper connections following the T568A or T568B wiring standard. Continuity tests confirmed all pins were correctly connected, enabling effective data transmission between network devices.

Conclusion: Proper termination of RJ45 cables ensures stable network connectivity and minimizes signal loss or interference. Following standard wiring guidelines is critical for compatibility and optimal performance.

UTP vs. STP: Detailed Comparison

Aspect	UTP (Unshielded Twisted Pair)	STP (Shielded Twisted Pair)
Construction	No shielding; relies on twisted pairs to reduce interference.	Contains an additional shielding layer (foil or braid) around each pair or the entire cable.
Interference	Less resistant to electromagnetic interference (EMI) and crosstalk.	Highly resistant to EMI and crosstalk, ideal for noisy environments.
Cost	Cheaper due to simpler construction.	More expensive because of the added shielding.
Flexibility	Lighter and easier to handle, making installation simple.	Bulkier and less flexible, requiring careful handling.
Durability	Vulnerable to signal degradation in high-interference areas.	More durable in environments with electrical noise.
Performance	Sufficient for standard home or office networks.	Suitable for high-speed and secure industrial or data center applications.
Typical Usage	Homes, small businesses, and low-interference areas.	Factories, data centers, and high-interference zones.

Summary:

- **UTP** is cost-effective and easier to use, ideal for general networks.
- **STP** offers enhanced performance in environments with high EMI or critical data transmission needs.

Types of Ethernet Cables:

By Category:

- **Cat 5e**: 1 Gbps, 100 MHz.
- **Cat 6**: 10 Gbps (55m), 250 MHz.
- **Cat 6a**: 10 Gbps (100m), 500 MHz.
- **Cat 7**: 10 Gbps, 600 MHz.
- **Cat 8**: 25-40 Gbps, 2000 MHz.

By Construction:

- **STP**: Shielded for high interference areas.
- **UTP**: Common and cost-effective.
- **Crossover**: Direct device connections.
- **Patch**: Short device-to-network links.
- **Flat**: Flexible for tight spaces.

Key Features of Ethernet Cables:

1. **Speed**: Supports 10 Mbps to 40 Gbps.
2. **Bandwidth**: Higher categories provide greater bandwidth.
3. **Shielding**: STP (shielded) for interference protection; UTP (unshielded) for general use.
4. **Length**: Up to 100 meters without a booster.
5. **Connector**: RJ45 is standard.
6. **Durability**: Options for indoor, plenum, and outdoor use.

What Is Straight Through Cable?

A straight through cable is a type of twisted pair cable that is used in local area networks to connect a computer to a network hub such as a router. This type of cable is also sometimes called a patch cable and is an alternative to wireless connections where one or more computers access a router through a wireless signal. On a straight through cable, the wired pins match. Straight through cable use one wiring standard: both ends use T568A wiring standard or both ends use T568B wiring standard. The following figure shows a straight through cable of which both ends are wired as the T568B standard.