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Experiments No: 01

Experiments Name: Study of network cables & implement cross-wired & straight through using crimping tool.

Objectives: The objective of this lab is to study different types of network cables and understand their role in Ethernet networking. It focuses on differentiating straight-through and cross-wired cables based on their wiring configurations and applications. The lab provides hands-on experience in preparing cables by stripping, untwisting, arranging, and aligning wires according to T568A and T568B standards. Using a crimping tool, students will securely attach RJ-45 connectors and test the cables for proper functionality. Additionally, the lab emphasizes best practices in Ethernet cabling to prevent issues like crosstalk and signal interference while also developing troubleshooting skills for identifying and fixing common wiring faults.

Components:

- RJ-45 connector,
- Crimping Tool,
- Twisted pair Cable
- Cable Tester.

Theory

In this experiment, we are studying two types of Ethernet cables: Straight-Through Cable and Crossover (Cross-Wired) Cable. These cables are both used in networking, but they are wired differently and serve different purposes.

1. Straight-Through Cable:

A Straight-Through Cable is used to connect different devices, such as a computer to a switch or a router to a computer. Both ends of the cable are wired the same way, following either the T568A or T568B wiring standard. The main purpose of this cable is to allow communication between different devices over a network.

2. Crossover (Cross-Wired) Cable:

A Crossover Cable is used to connect similar devices, such as computer to computer, switch to switch, or router to router, without needing a hub or switch in between. The wiring on each end is different,

with the Green and Orange pairs of wires swapped. This allows the devices to send and receive data in a way that both can understand.

Cable Construction:

- Ethernet cables are made up of twisted pairs of wires, which help reduce interference and noise from other devices.
- The cable ends are fitted with RJ-45 connectors, which have 8 pins that match the 8 wires inside the cable. These pins need to be properly arranged for the cable to work correctly.

Crimping Process:

- The crimping tool is used to attach the RJ-45 connector to the cable. It presses the pins into the wires, making sure they are securely connected and able to transmit data properly.

Procedure:

1. Cut the Ethernet cable (Cat5e or Cat6) to the required length using a crimping tool.

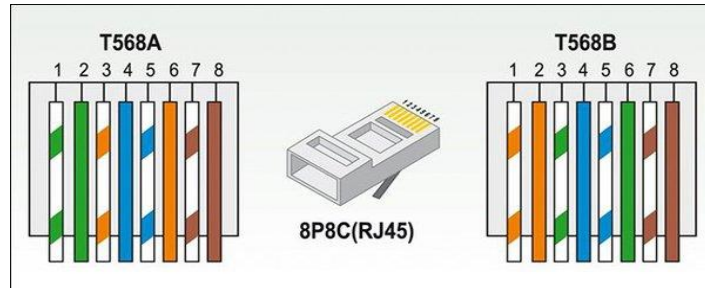


Figure no: 01: Crimping tool.

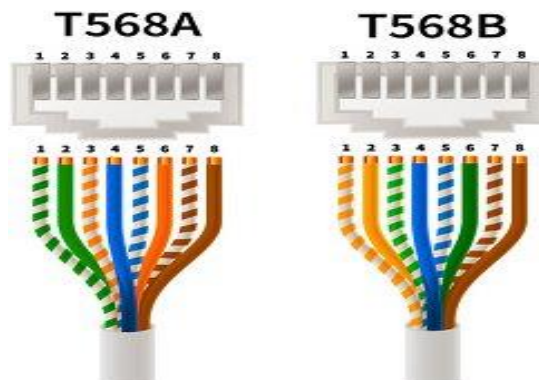
2. Use a crimping tool to remove about 2 inches (5 cm) of the outer plastic jacket from both ends of the cable, being careful not to damage the internal wires.



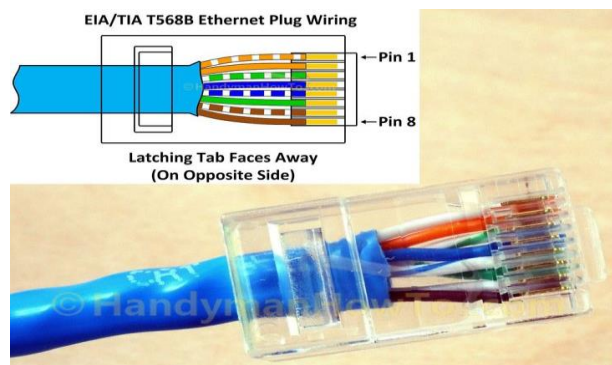
3. Gently untwist the pairs of wires inside the cable, ensuring not to untwist more than 1/2 inch (1.27 cm) of the wire.
4. For a Straight-Through Cable, arrange the wires on both ends in the same order using either the T568A or T568B wiring standard.



5. For a Crossover Cable, arrange one end in the T568A standard and the other end in the T568B standard, swapping the Green and Orange wire pairs.



6. Hold the RJ-45 connector with the clip facing down and insert the wires in the correct order, ensuring they reach the end of the connector.



7. Place the RJ-45 connector into the crimping tool and press firmly to secure the connection.
8. Repeat the process for the other end, following the correct wiring standard.
9. Use a cable tester to check if the cable is functioning properly.
10. If the test fails, recheck the wiring order and crimp the connectors again.
11. Once the cable passes the test, it is ready for use in networking.



Conclusion

In this experiment, we successfully created Straight-Through and Crossover Ethernet cables by following the proper wiring standards and using a crimping tool. We learned how to strip the cable, arrange the internal wires according to T568A and T568B standards, and securely attach RJ-45 connectors. After crimping, we tested the cables using a cable tester to ensure proper signal transmission. This experiment provided practical knowledge of network cable construction, which is essential for establishing reliable network connections in real-world applications.

Experiments No: 02

Experiments Name: Implementation of device to device connection and file transfer using LAN cable.

Objectives: A Local Area Network (LAN) cable enables direct communication between two devices, allowing them to share files, folders, and resources. A Crossover Cable is used for this purpose, as it swaps the transmitting (TX) and receiving (RX) wires, allowing two computers to communicate without a router or switch. The devices must be configured with appropriate IP addresses in the same subnet for proper communication. The file-sharing feature of the operating system is used to transfer files between the connected devices.

Components:

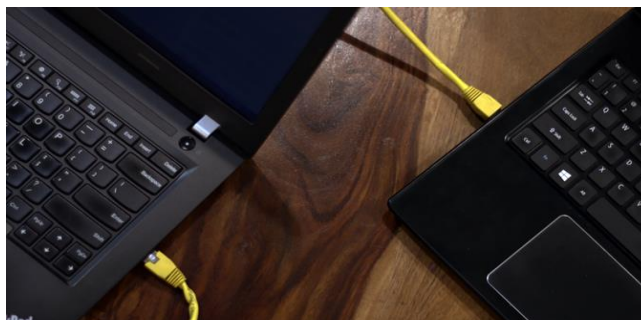
- Two devices (computers, laptops, etc.)
- Ethernet cable

Theory

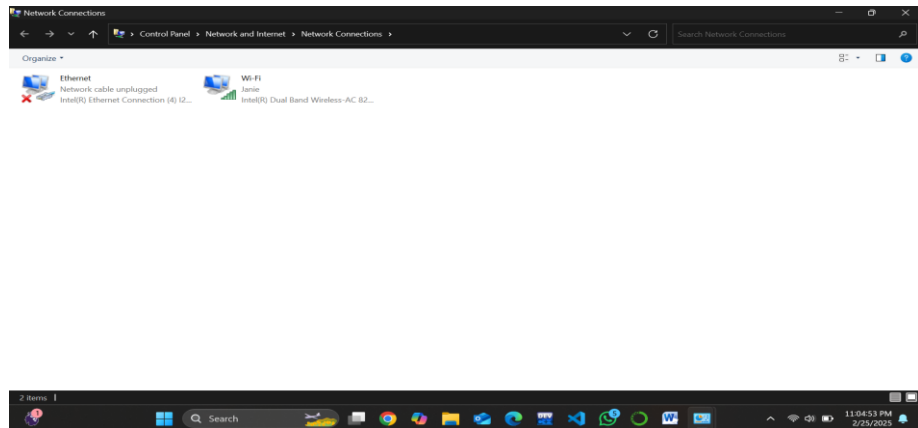
A LAN cable, specifically an Ethernet cable (Cat5e, Cat6, or higher), is used to create a physical connection between two computers. The devices communicate using the TCP/IP networking protocol, where one computer can act as a file-sharing server while the other accesses shared resources. Each device is assigned a unique IP address within the same subnet to enable direct communication.

Procedure:

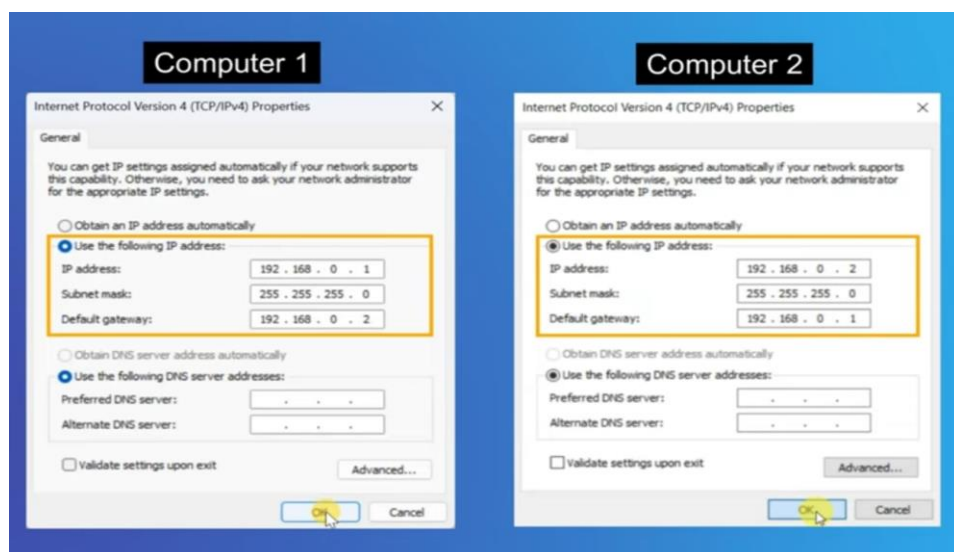
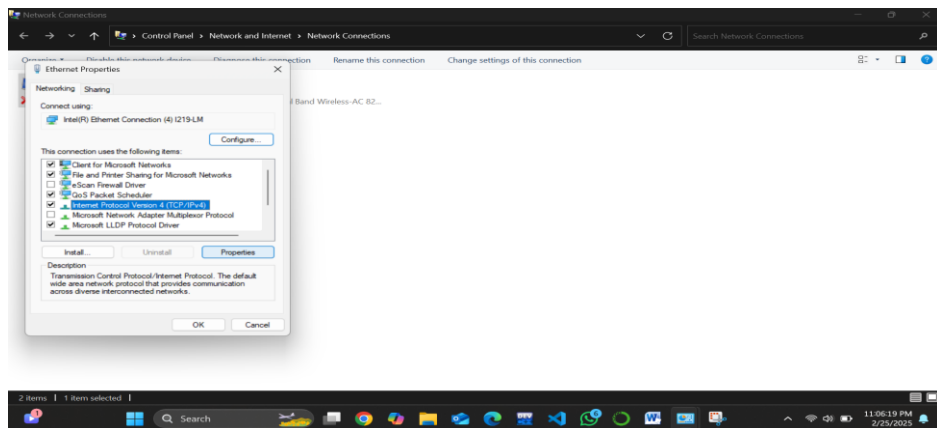
1. Gather two computers and a LAN cable, preferably Cat5e or Cat6 for better speed.
2. Connect one end of the LAN cable to the first computer's Ethernet port and the other end to the second computer's Ethernet port.



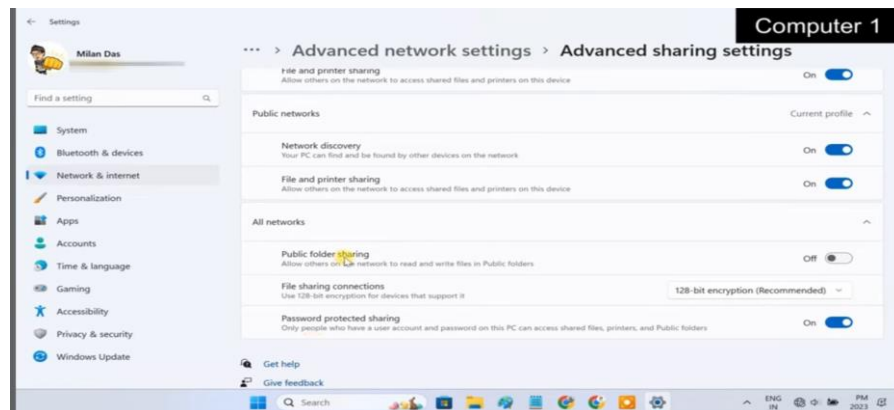
- Open the Network and Sharing Center on both computers, go to Change adapter settings, right-click on the Ethernet connection, and select Properties.



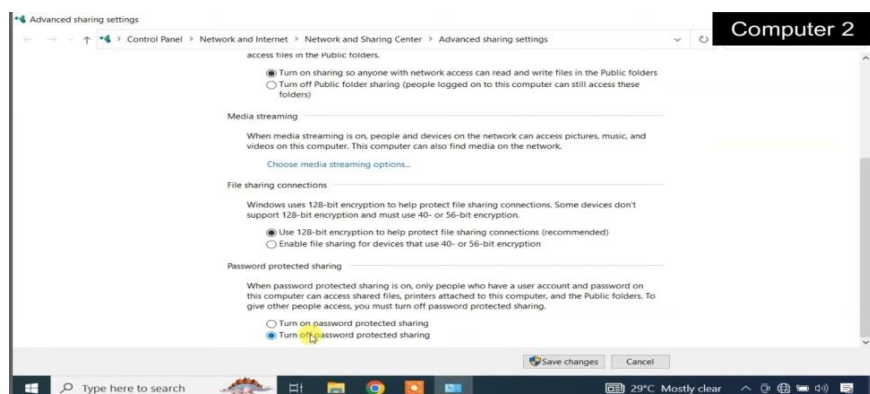
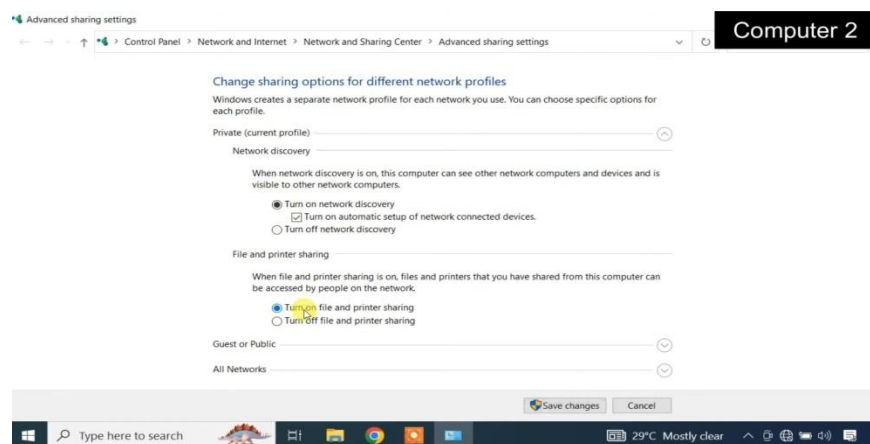
- Select Internet Protocol Version 4 (TCP/IPv4), click Properties, and manually set the IP addresses for both computers. Set one computer's IP to 192.168.1.1 with a subnet mask of 255.255.255.0, and the other computer's IP to 192.168.1.2 with the same subnet mask.



5. In the Network and Sharing Center, open Change advanced sharing settings and enable Network discovery and File and printer sharing on both computers.

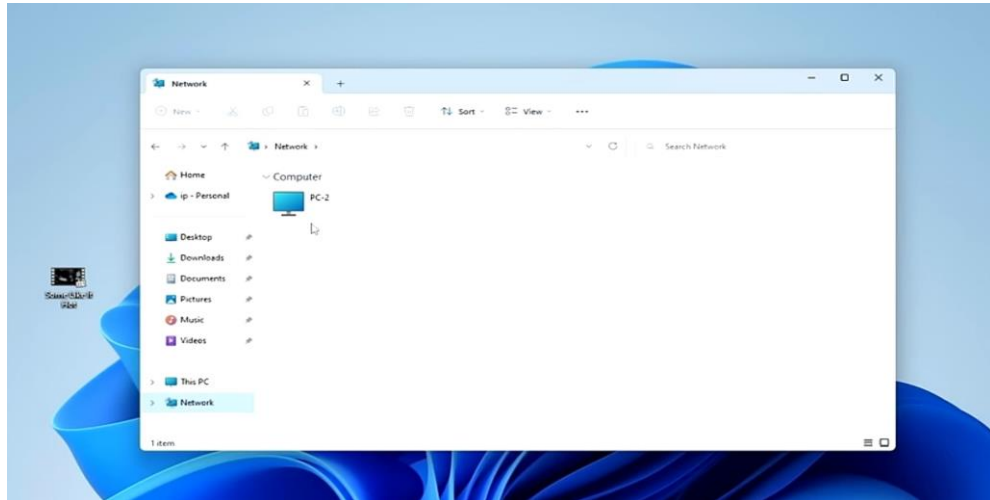


6. On one computer, create a folder, right-click it, go to Properties, navigate to the Sharing tab, click Advanced Sharing, check Share this folder, and adjust permissions as needed.



7. Note the network path of the shared folder, which will be something like \\192.168.1.1\SharedFolder.
8. On the second computer, open File Explorer, type \\192.168.1.1 in the address bar, press Enter, and access the shared folder.

9. Open Command Prompt on one computer, type ping 192.168.1.2, and press Enter to check if the connection is successful. Repeat on the other computer with ping 192.168.1.1.



10. Transfer files by dragging and dropping them into the shared folder from either computer.

Conclusion:

Conclusion

Device-to-device file transfer using a LAN cable is a reliable, fast, and secure method for sharing data between two computers without requiring an internet connection. By establishing a direct Ethernet connection and configuring basic network settings, users can efficiently transfer files at high speeds while ensuring data privacy. Although the setup requires manual configuration, it eliminates dependency on external networks and provides a cost-effective solution for data exchange. This method remains an excellent choice for users who need a simple yet effective way to share large files between computers.