Register No:	**9220040772**
Name	**V VISHWARADHYA**
Class/Section	**S 24 / Slot 2**
Ex.No:	**3**
Date of Submission	
Name of the Experiment	**Study of Guided Media**
Google Drive link of the packet tracer file (give view permission):	**https://drive.google.com/drive/folders/17hT4le0tyNBIT1GmVw3AG0hFGtBs3kMB?usp=drive_link**

Objective(s):

To Study of different types of Network cables and practically implement the Crossover wired and Straight through cable using Crimping Tool.

Components Required:

- CAT5, CAT6 Cable
- RJ45 Crimpable Connector
- Crimping tools
- Splicer

Description:

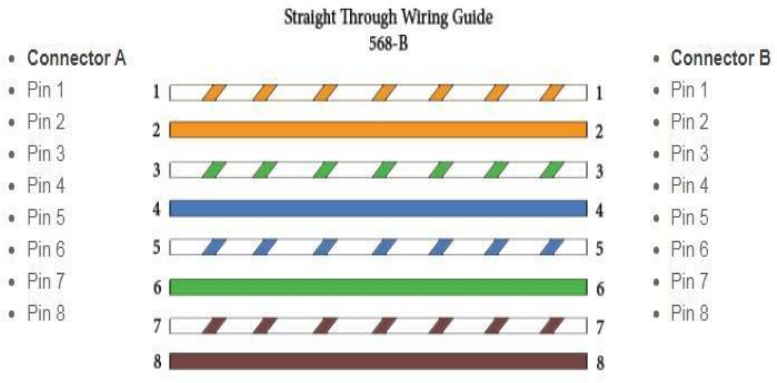
The Ethernet cables for connectivity in most office and home environments rely on twisted wire pairs within an overall cable - Cat 5, Cat 6 and Cat 7 all used this format.

Straight-Through Wired Cables

Straight-Through refers to cables that have the pin assignments on each end of the cable. In other words, Pin 1 connector A goes to Pin 1 on connector B, Pin 2 to Pin 2, etc. Straight-Through wired cables are most commonly used to connect a host to a client. When we talk about cat5e patch cables, the Straight-Through wired cat5e patch cable is used to connect computers, printers, and other network client devices to the router switch or hub (the host device in this instance).

Use straight-through cables for the following connections:

- ➢ Switch to a router Ethernet port
- ➢ Computer to switch
- ➢ Computer to hub



Crossover Wired Cables

Crossover wired cables (commonly called crossover cables) are very much like Straight-Through cables with the exception that TX and RX lines are crossed (they are at opposite positions on either end of the cable). Using the 568-B standard as an example below, you will see that Pin 1 on connector A goes to Pin 3 on connector B. Pin 2 on connector A goes to Pin 6 on connector B, etc. Crossover cables are most

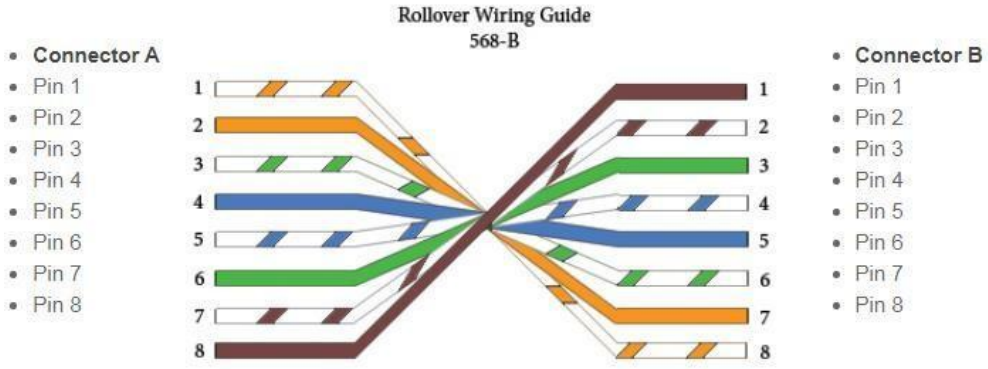
commonly used to connect two hosts directly. Examples would be connecting a computer directly to another computer, connecting a switch directly to another switch, or connecting a router to a router. Note: While in the past, when connecting two host devices directly, a crossover cable was required. Nowadays, most devices have auto-sensing technology that detects the cable and device and crosses pairs when needed.

To summarize, crossover cables directly connect the following devices on a LAN:

- Switch to switch
- Switch to hub
- Hub to hub
- Computer to computer
- Computer to a router Ethernet port
- Router to router Ethernet port connection

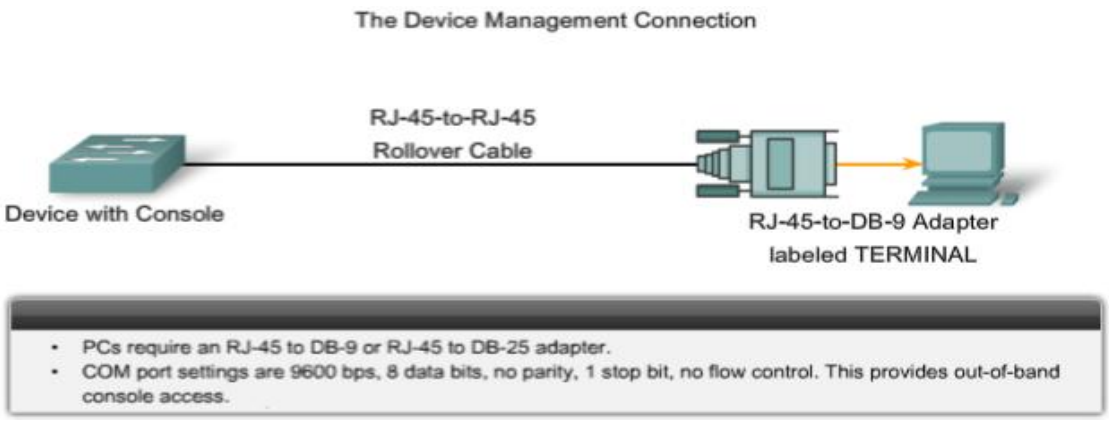
Rollover Wired Cables

Rollover wired cables, most commonly called rollover cables, have opposite Pin assignments on each end of the cable or, in other words, it is "rolled over." Pin 1 of connector A would be connected to Pin 8 of connector B. Pin 2 of connector A would be connected to Pin 7 of connector B and so on. Rollover cables, sometimes referred to as Yost cables are most commonly used to connect to a device's console port to make programming changes to the device. Unlike crossover and straight-wired cables, rollover cables are not intended to carry data but instead create an interface with the device.



Console Cables (RJ-45 to DB-9 Female). This cable is also known as Management Cable

The connection to the console is made by plugging the DB-9 connector into an available EIA/TIA 232 serial port on the computer. It is important to remember that if there is more than one serial port, note which port number is being used for the console connection. Once the serial connection to the computer is made, connect the RJ-45 end of the cable directly into the console interface on the router.



Video Reference:
Refer the following videos:

Categories of Cables: https://www.youtube.com/watch?v=_NX99ad2FUA

Crimpling : https://www.youtube.com/watch?v=8qTS2BiRZzU

Answer the following VIVA Questions:

1. Transmission media are directly controlled by _____Physical_____Layer.

2. What are the three major classes of Guided Media?
   The three major classes of Guided Media are:
   1. Twisted Pair Cable
   2. Coaxial Cable
   3. Fiber Optic Cable

3. Why Cladding is used in Fiber Optics?
   Cladding is an essential component of fiber optic cables and serves the following purposes:
   1. Total Internal Reflection
   2. Signal Containment
   3. Mechanical Protection
   4. Minimized Crosstalk
   5. Improved Signal Quality

4. List the Categories of UTP cables.
   1. Cat 1 (Category 1): Basic twisted pair cabling.
   2. Cat 2 (Category 2): Slightly better performance than Cat 1.
   3. Cat 3 (Category 3): designed for data communication.
   4. Cat 4 (Category 4): Improved performance over Cat 3.
   5. Cat 5 (Category 5): High-speed cable with greater signal integrity.
   6. Cat 5e (Category 5 Enhanced): Improved version of Cat 5 with reduced crosstalk.
   7. Cat 6 (Category 6): Better insulation and reduced interference.
   8. Cat 6a (Augmented Category 6): Enhanced Cat 6 with even better performance.
   9. Cat 7 (Category 7): Shielded twisted pair cable with improved performance.
   10. Cat 8 (Category 8): Designed for high-speed applications.

5. Mention the cause of attenuation and how will you measure it.
   Attenuation refers to the gradual loss of signal strength as it travels through a transmission medium. The primary causes of attenuation are:
   Distance, Material Properties, Interference, Signal Dispersion, Frequency Dependency etc.

   Attenuation is typically measured in **decibels (dB)** over a specific distance. The formula used is:

   Attenuation (dB) = 10. log (Input Power / Output Power) base 10

6. What are the advantages of Fiber Optics?
   1. High Bandwidth
   2. Low Signal Loss
   3. Immunity to Electromagnetic Interference (EMI)
   4. Long-Distance Transmission
   5. Secure Communication
   6. Lightweight and Thin
   7. Resistant to Harsh Environmental Conditions
   8. Supports High Data Rates
   9. No Spark Hazard

7. What is meant by LOS?
   LOS stands for **Line of Sight**. It is a concept in communication systems, particularly in wireless and optical transmission, where a direct, unobstructed path between the transmitter and receiver is necessary for effective signal transmission.

8. Mention the modes of propagation in unguided medium.
   In **unguided mediums**, signals are transmitted without a physical conductor, typically through the air, vacuum, or water. The modes of propagation for these signals depend on their frequency and application. Here are the primary modes of propagation:
   1. Ground Wave Propagation
   2. Sky Wave Propagation
   3. Line of Sight (LOS) or Space Wave Propagation
   4. Tropospheric Scatter Propagation
   5. Satellite or Space Communication

9. List out the connectors used in guided medium.
   1. Twisted Pair Cable Connectors
   2. Coaxial Cable Connectors
   3. Fiber Optic Cable Connectors
   4. Serial and Parallel Connectors
   5. Modular and Specialized Connectors

10. Where you will use Straight through cable and Cross over cable?
    A straight-through cable has the same wiring sequence on both ends, typically using the **T568A or T568B standard**.

    Uses:

    1. Computer to Switch/Hub

    2. Computer to Router

A crossover cable swaps the transmit (Tx) and receive (Rx) pins, allowing two devices of the same type to communicate directly.

Uses:

1. **Computer to Computer** (without a switch or hub)

2. **Switch to Switch** (older models).

3. Hub to Hub

4. Router to Router

Rubrics for Experiment Assessment:

Description	Marks Weightage	Marks Scored
Build Straight through, Cross over, Roll over UTP cable	4	
Test the connectivity using small network	4	
Timely Completion	2	
Total Marks		

RESULT:

Thus the different types of network cables and the implementation of the crossover wired and straight-through cable using Crimping Tool was completed successfully.