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Class/Section	**S23/Slot1**
Ex.No:	**3**
DateofSubmission	5/02/2025
NameoftheExperiment	**StudyofGuidedMedia**

Objective(s):
ToStudyofdifferenttypesofNetworkcablesandpracticallyimplementtheCrossoverwiredandStraight through cable using Crimping Tool.

ComponentsRequired:

- CAT5,CAT6Cable
- RJ45CrimpableConnector
- Crimpingtools
- Splicer

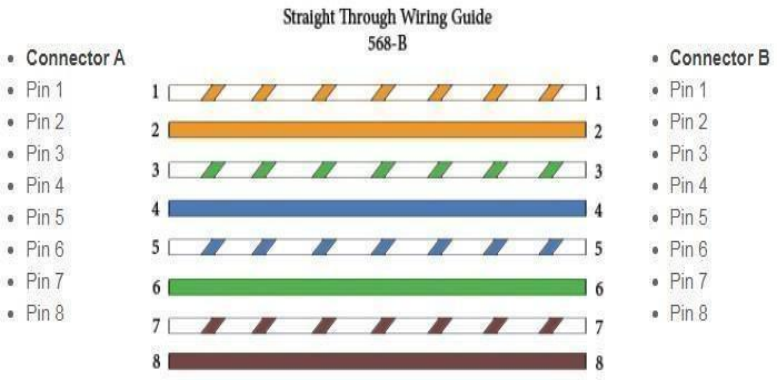
Description:
TheEthernetcablesforconnectivityinmostofficeandhomeenvironmentsrelyontwistedwirepairswithin an overall cable - Cat 5, Cat 6 and Cat 7 all used this format.

Straight-ThroughWiredCables

Straight-Through refers to cables that have the pin assignmentsoneachendofthecable.Inotherwords, Pin 1 connector A goes to Pin 1 on connector B, Pin 2 to Pin 2, etc. Straight-Through wired cables are mostcommonlyusedtoconnectahosttoaclient.Whenwetalkaboutcat5epatchcables,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).

Usestraight-throughcablesforthe following connections:

- SwitchtoarouterEthernetport
- Computertoswitch
- Computertohub



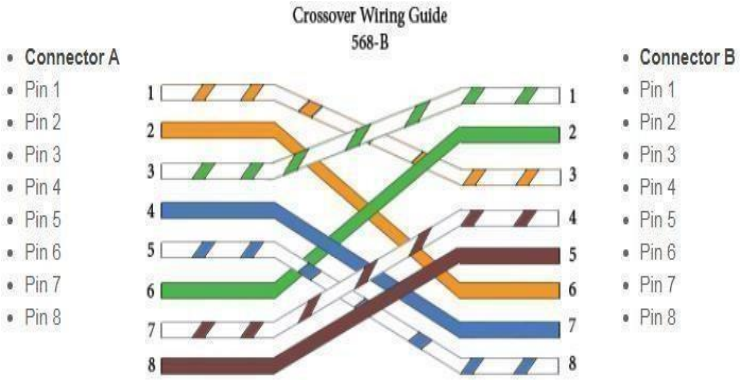
CrossoverWiredCables

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 ofthe cable). Using the 568-B standard as an example below, youwillseethatPin1onconnectorAgoestoPin3 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,mostdeviceshaveauto-sensingtechnologythatdetectsthecableanddeviceandcrossespairs when needed.

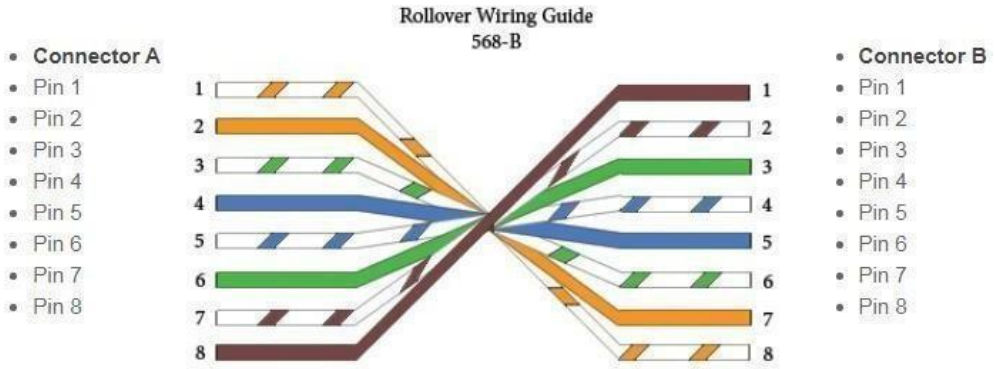
Tosummarize,crossovercablesdirectly connectthefollowingdevicesonaLAN:

- Switchtoswitch
- Switchtohub
- Hubtohub
- Computertocomputer
- ComputertoarouterEthernet port
- RoutertorouterEthernetport connection

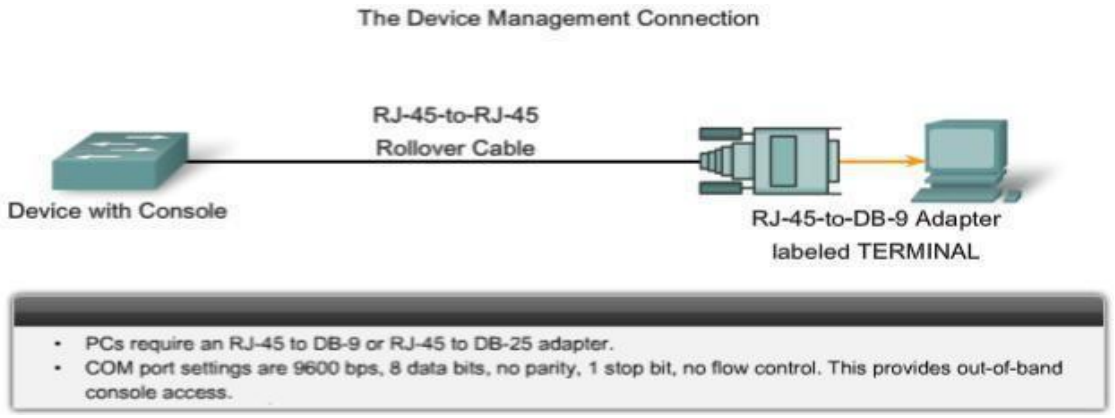


Rollover Wired Cables

Rollover wired cables, most commonly called rollover cables, have opposite Pin assignments on each endofthecableor,inotherwords,itis"rolledover."Pin1ofconnectorAwouldbeconnectedtoPin8of connector B.Pin2ofconnectorAwouldbeconnectedtoPin7ofconnectorBandsoon.Rollovercables, 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-45toDB-9Female).ThiscableisalsoknownasManagementCable 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 usedfor 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.



VideoReference:
Referthefollowingvideos:

Categories of Cables:

https://www.youtube.com/watch?v=_NX99ad2FUACrimpling :

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

Answer the following VIVA Questions:

1. Transmissionmediaaredirectlycontrolledby_____Physical_____Layer.

2. WhatarethethreemajorclassesofGuidedMedia?
   The three major classes of Guided Media are:
   1. Twisted PairCable
   2. CoaxialCable
   3. FiberOpticCable

3. WhyCladdingisusedinFiberOptics?
   Claddingisanessentialcomponentoffiberopticcablesandservesthefollowingpurposes:
   1. TotalInternal Reflection
   2. SignalContainment
   3. MechanicalProtection
   4. MinimizedCrosstalk
   5. ImprovedSignalQuality

4. ListtheCategoriesofUTPcables.
   1. Cat1(Category1):Basictwistedpaircabling.
   2. Cat2(Category2):SlightlybetterperformancethanCat1.
   3. Cat3(Category3):designedfordatacommunication.
   4. Cat4(Category4):ImprovedperformanceoverCat3.
   5. Cat5(Category5):High-speedcablewithgreatersignalintegrity.
   6. Cat5e(Category5Enhanced):ImprovedversionofCat5withreducedcrosstalk.
   7. Cat6(Category6):Betterinsulationandreducedinterference.
   8. Cat6a(AugmentedCategory6):EnhancedCat6withevenbetterperformance.
   9. Cat7(Category7):Shieldedtwistedpaircablewithimprovedperformance.
   10. Cat8(Category8):Designedforhigh-speedapplications.

5. Mentionthecauseofattenuationandhowwillyoumeasure it.
   Attenuationreferstothegraduallossofsignalstrengthasittravelsthroughatransmission medium. The primary causes of attenuation are:
   Distance, Material Properties, Interference, Signal Dispersion, Frequency Dependency etc.

   Attenuationistypicallymeasuredin**decibels(dB)**overaspecificdistance.Theformulausedis:

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

6. WhataretheadvantagesofFiberOptics?
   1. HighBandwidth
   2. LowSignalLoss
   3. ImmunitytoElectromagneticInterference(EMI)
   4. Long-DistanceTransmission
   5. SecureCommunication
   6. LightweightandThin
   7. ResistanttoHarshEnvironmentalConditions
   8. SupportsHighDataRates
   9. NoSparkHazard

7. Whatismeantby LOS?
   LOS stands for **Line of Sight**. It is a concept in communication systems, particularly in wireless andopticaltransmission,whereadirect,unobstructedpathbetweenthetransmitterandreceiver is necessary for effective signal transmission.

8. Mentionthemodesofpropagationinunguidedmedium.
   In**unguidedmediums**,signalsaretransmittedwithoutaphysicalconductor,typicallythrough theair,vacuum,orwater.Themodesofpropagationforthesesignalsdependontheirfrequency and application. Here are the primary modes of propagation:
   1. GroundWavePropagation
   2. SkyWavePropagation
   3. LineofSight(LOS)orSpaceWavePropagation
   4. TroposphericScatterPropagation
   5. SatelliteorSpaceCommunication

9. Listouttheconnectorsusedinguidedmedium.
   1. TwistedPairCableConnectors
   2. CoaxialCableConnectors
   3. FiberOpticCableConnectors
   4. SerialandParallelConnectors
   5. ModularandSpecializedConnectors

10. WhereyouwilluseStraightthroughcableandCrossovercable?
    Astraight-throughcablehasthesamewiringsequenceonbothends,typicallyusingthe**T568A or T568B standard**.

    Uses:

    1. ComputertoSwitch/Hub

    2. ComputertoRouter

Acrossovercableswapsthetransmit(Tx)andreceive(Rx)pins,allowingtwodevicesofthesametypeto communicate directly.

Uses:

1. **ComputertoComputer**(withoutaswitchorhub)

2. **SwitchtoSwitch**(oldermodels).

3. HubtoHub

4. RoutertoRouter

RubricsforExperimentAssessment:

Description	MarksWeightage	MarksScored
BuildStraight through, Crossover, Roll over UTPcable	4	
Testtheconnectivityusingsmallnetwork	4	
TimelyCompletion	2	
Total Marks		

RESULT:

Thusthedifferenttypesofnetworkcablesandtheimplementationofthecrossoverwiredandstraight- through cable using Crimping Tool was completed successfully.