

LAN Setup Assignment - Theory Notes

Assignment: LAN Setup - Wired and Wireless

Part A: Wired LAN Setup Using Switch

1. Introduction to LAN

A Local Area Network (LAN) is a network that connects computers and other devices within a limited geographical area, such as a home, office, school, or laboratory. A LAN enables sharing of resources like files, printers, and internet access.

LANs can be set up in two main ways:

- Wired LAN - using physical cables
- Wireless LAN - using radio signals and wireless devices

2. Wired LAN Using Switch

A Switch is a networking device used to connect multiple devices in a wired LAN. It forwards data only to the device it is intended for, which makes it more efficient than a hub.

3. Components Required

- Cat5e/Cat6 cables (twisted pair)
- RJ-45 connectors
- Crimping tool
- LAN cable tester
- Network switch
- Computers or laptops
- IP addresses

LAN Setup Assignment - Theory Notes

4. Steps to Set Up Wired LAN

a) Cable Preparation

- Use Cat5e or Cat6 cable.
- Strip the outer insulation to expose the 8 inner wires.
- Arrange the wires in the T568B or T568A color order.
- Insert the wires into the RJ-45 connector and crimp it with a crimping tool.
- Repeat the process on the other end of the cable.

b) Cable Testing

- Use a LAN cable tester to verify the cable connection.
- The tester checks if the wiring is correct and ensures no breaks or shorts exist.

c) Connecting Devices

- Connect one end of the LAN cable to the computer and the other to the switch.
- Connect all computers similarly to the switch using individual cables.

d) IP Address Configuration

- Assign a unique IP address to each computer in the same network range.

Example:

- PC1: 192.168.1.2
- PC2: 192.168.1.3
- Subnet Mask: 255.255.255.0

Steps to set IP (Windows):

1. Go to Control Panel -> Network and Sharing Center.

LAN Setup Assignment - Theory Notes

2. Click on Change Adapter Settings.
3. Right-click on Local Area Connection -> Properties.
4. Select Internet Protocol Version 4 (TCP/IPv4) -> Properties.
5. Enter the IP address and Subnet Mask.

e) Testing the Network with PING

- Open Command Prompt on one PC.
- Type ping <IP Address of other PC>.
- Example: ping 192.168.1.3
- If the reply is received, the network is successfully set up.

Part B: Wireless LAN Setup Using Access Point

1. Introduction to WLAN

A Wireless LAN (WLAN) connects devices through wireless communication, eliminating the need for cables.

WLANs are commonly used in homes, offices, and public spaces.

The main device in a WLAN is an Access Point (AP), which connects wireless devices to the wired network or internet.

2. Components Required

- Wireless Access Point (Wi-Fi Router)
- Computers, Laptops, or Smartphones with Wi-Fi
- Switch (optional for internet backhaul)
- Power supply for AP

3. Steps to Set Up Wireless LAN

LAN Setup Assignment - Theory Notes

a) Access Point Setup

- Power on the access point and connect it to the switch (or directly to a modem if internet access is needed).
- Configure the AP settings using its IP address (usually 192.168.0.1 or 192.168.1.1) in a web browser.
- Set SSID (network name), password, and security type (usually WPA2/WPA3).

b) Connect Devices Wirelessly

- Enable Wi-Fi on each device.
- Select the correct SSID and enter the password.
- The device connects wirelessly to the network.

c) IP Configuration

- Devices can get IP addresses automatically (DHCP) from the access point.
- Alternatively, assign static IPs in the same subnet.

Example:

- PC1: 192.168.0.10
- PC2: 192.168.0.11
- Subnet Mask: 255.255.255.0
- Default Gateway: 192.168.0.1 (Access Point)

d) Testing Wireless Connectivity

- Use the PING command to test connectivity between two wireless devices or between a wired and a wireless device.
- Example: ping 192.168.0.11
- Successful replies indicate working wireless LAN.

LAN Setup Assignment - Theory Notes

4. Conclusion

Setting up a LAN is an essential skill in networking. It involves:

- Using hardware like switches, access points, cables.
- Configuring IP addresses.
- Testing connections using tools like LAN cable testers and the PING utility.

A wired LAN provides better speed and reliability, while a wireless LAN offers flexibility and mobility.

Understanding both setups helps in building and troubleshooting modern computer networks effectively.