🚀 LECTURE 9 – DHCP, ROMMON, CONFIGURATION REGISTER

🟦 1. DHCP (Dynamic Host Configuration Protocol)

✓ What is DHCP?

DHCP is a protocol used to automatically assign network settings to devices, such as:

- IP address
- Subnet mask
- Default gateway
- DNS server
- Lease duration

Instead of configuring each PC manually, DHCP makes the entire process automatic.

✓ Why is DHCP used?

- Reduces manual work
- Prevents mistakes (wrong IP, duplicate IP)
- Automatically reassigns IPs
- Used in almost every Wi-Fi network

✓ Real-Life Example

When you connect your laptop or mobile to **Wi-Fi**, it automatically receives:

- IP address
- Gateway (router IP)
- DNS (Google DNS or ISP DNS)

This is done by DHCP running inside your router.

🟦 2. DHCP Working Process – DORA

DHCP uses a **4-step process** called **DORA**:

Step	Name	Sent by	Type	Purpose
1	**Discover**	Client	Broadcast	"Is any DHCP server available?"
2	**Offer**	Server	Unicast/Broadcast	"Here is an IP for you."
3	**Request**	Client	Broadcast	"I accept this IP address."
4	**Acknowledge (ACK)**	Server	Unicast/Broadcast	"IP is now assigned to you."

🟧 DORA Process in Detail

1. DHCP Discover

- Sent by: **Client**
- Type: **Broadcast (255.255.255.255)**
- Purpose:
  Client asks → "Any DHCP server here?"

2. DHCP Offer

- Sent by: **DHCP Server**
- Includes:
  - IP address
  - Subnet mask
  - Default gateway
  - DNS server
  - Lease time
- Purpose:
  Server says → "I can give you this IP."

3. DHCP Request

- Sent by: **Client**
- Purpose:
  Client responds → "I want the IP from Server X."

4. DHCP ACK (Acknowledge)

- Sent by: **DHCP Server**
- Purpose:
  Server confirms → "This IP is now yours."

🟦 3. DHCP Configuration on Cisco Router (Packet Tracer Lab)

Network Devices Needed

- 1 Router
- 1 Switch
- 6 PCs

🟧 Step 1: Assign IP to Router Interface

Go to router CLI:

enable

conf t

int g0/0

ip address 192.168.10.1 255.255.255.0

no shutdown

✓ Why "no shutdown"?

To activate the interface.
By default, router ports are OFF.

🟧 Step 2: Create DHCP Pool

A **pool** means a group of IPs that DHCP will assign to devices.

ip dhcp pool Test

🟧 Step 3: Define Network Range

network 192.168.10.0 255.255.255.0

Tells DHCP:

✓ The network starts at 192.168.10.0
✓ Subnet mask = /24

🟧 Step 4: Define Default Gateway

This is the router's IP:

default-router 192.168.10.1

Used by PCs to send traffic out of network.

🟧 Step 5: Assign DNS Server

Google DNS:

dns-server 8.8.8.8

🟧 Step 6: SAVE the configuration

do write

or

do wr

🟧 Step 7: Exclude IP for Static Devices

Some devices need permanent IP (servers, CCTV, printers).

Example: if 192.168.10.5 must NOT be assigned:

ip dhcp excluded-address 192.168.10.5

Or a range:

ip dhcp excluded-address 192.168.10.2 192.168.10.20

✓ Real-Life Example

Web servers or CCTV cameras always use **fixed IP**, so DHCP must not give that IP to random users.

🟦 4. ROMMON Mode (ROM Monitor Mode)

✓ What is ROMMON?

ROMMON (ROM Monitor) is a **low-level operating mode** used for:

- Password recovery
- IOS corruption recovery
- Break mode for troubleshooting
- Loading system images manually
- Emergency maintenance

It is similar to **BIOS** in a computer.

✓ When does a router enter ROMMON?

1. When the IOS is missing
2. When the configuration register is wrong
3. When the router boots with **break**
4. When manually forced into ROMMON

Prompt looks like:

rommon 1 >

🟦 5. Configuration Register (Very Important)

The **Configuration Register** is a 16-bit value that controls how a router boots.

Common values:

- **0x2102** → Normal boot (load startup-config)
- **0x2142** → Ignores startup-config (used for password recovery)

✓ View config register:

show version

✓ Change config register:

conf t

config-register 0x2102

🟦 6. Password Recovery using ROMMON (Full Steps)

Step 1: Restart Router

Press **Break** during boot.
Router enters:

rommon 1 >

Step 2: Change Configuration Register

To ignore startup-config:

confreg 0x2142

reset

Router will reboot.

Step 3: Enter Privileged Mode

enable

Step 4: Copy old configuration

copy startup-config running-config

Now you have the old config **WITHOUT PASSWORD PROTECTION**.

Step 5: Set NEW password

enable secret NEWPASSWORD

Step 6: Restore normal config register

config-register 0x2102

Step 7: Save everything

write memory

Password recovery complete.

🟩 SUMMARY (Perfect for Exams)

DHCP:

- Assigns IP automatically
- Uses DORA: Discover → Offer → Request → ACK
- Needs DHCP pool, network, default-router, DNS
- Excluded addresses protect static devices

ROMMON:

- Low-level mode for troubleshooting
- Used for password recovery, IOS repair

Configuration Register:

- Controls the boot process
- 0x2102 → Normal boot
- 0x2142 → Ignore startup-config (Password recovery)

Password Recovery:

- Enter ROMMON → Change register → reboot
- Load startup-config → change password → restore config