Experiment – 7

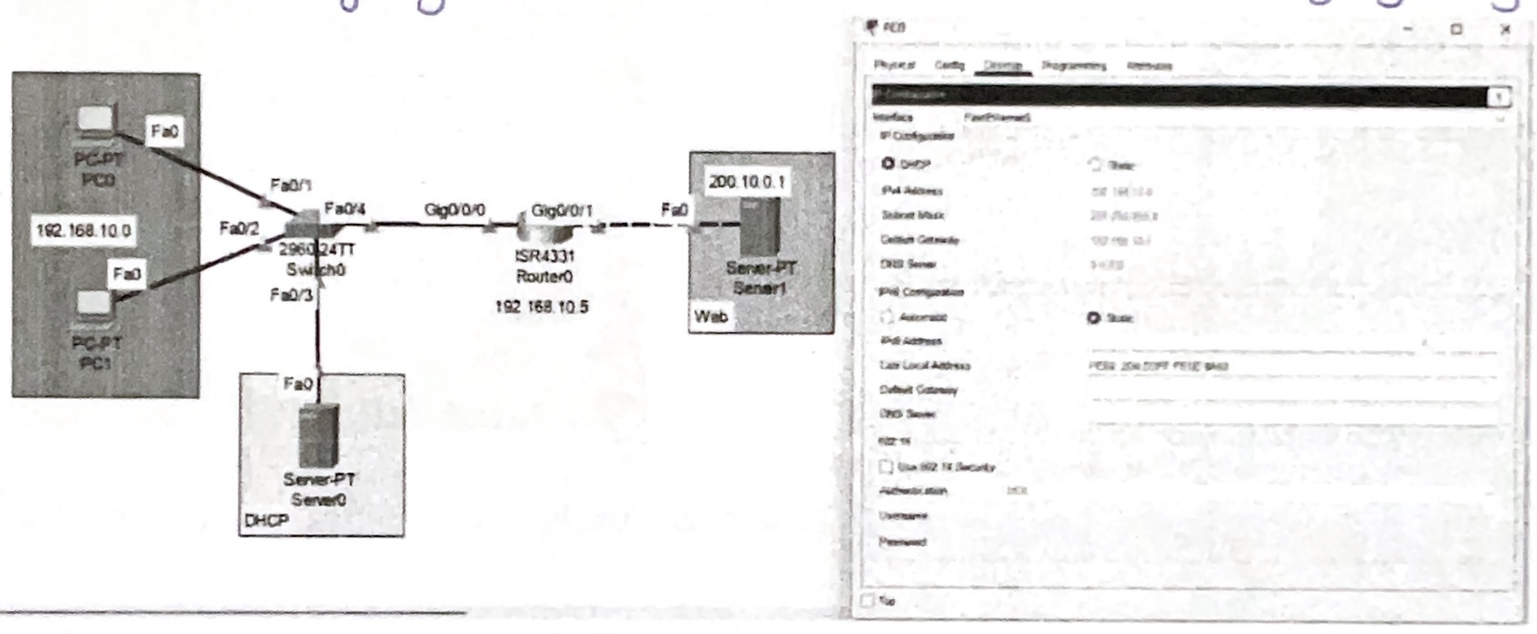
Aim → Implementation of DHCP, APIPA and analysis of FTP & TELNET packets using CPT

Objective 1 → Understanding the use of DHCP and APIPA.

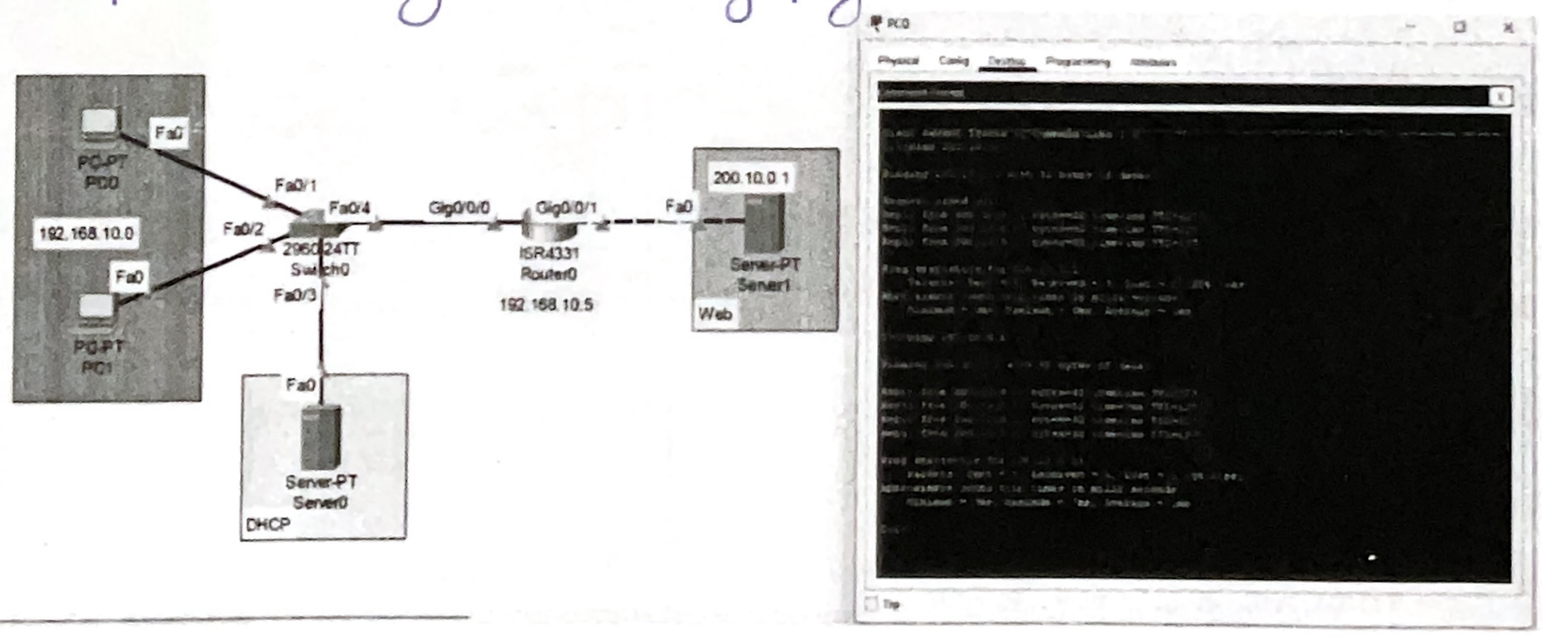
Dynamic Host Control Protocol (DHCP) → It automatically assigns IP address and network configurations through a server, ensuring devices can communicate within the network and access the internet. It's reliable and widely used in managed networks.

Automatic Private IP Addressing (APIPA) → It assigns a private IP (169.254.x.x) when DHCP is unavailable, enabling local subnet communication but no internet or external network access. It acts as a fallback for small or unmanaged networks.

Step 1 → Assigning IP address to PC0 & PC1 automatically by using DHCP.



Step 2 → Checking connection by ping web server from PC0



Objective 2 → An overview on message communication between two end hosts using FTP & TELNET packets.

FTP → Used for file transfer between two hosts. It uses two TCP connections: one on port 21 for control commands and another for transferring data. It enables reliable file exchange but lacks security unless encrypted versions like SFTP are used.

Telnet → Used for remote command-line access over port 23. It allows text-based communication, sending commands and receiving responses in plain text. It's insecure compared to modern alternatives like SSH.

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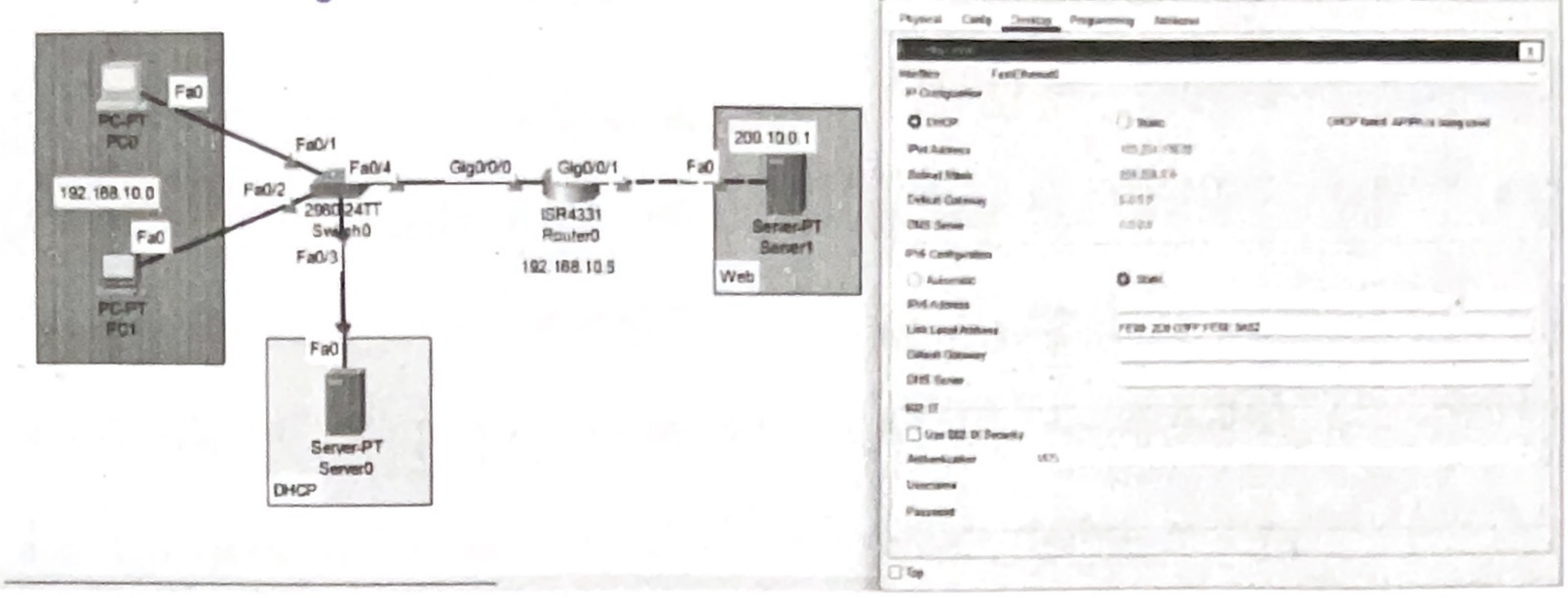
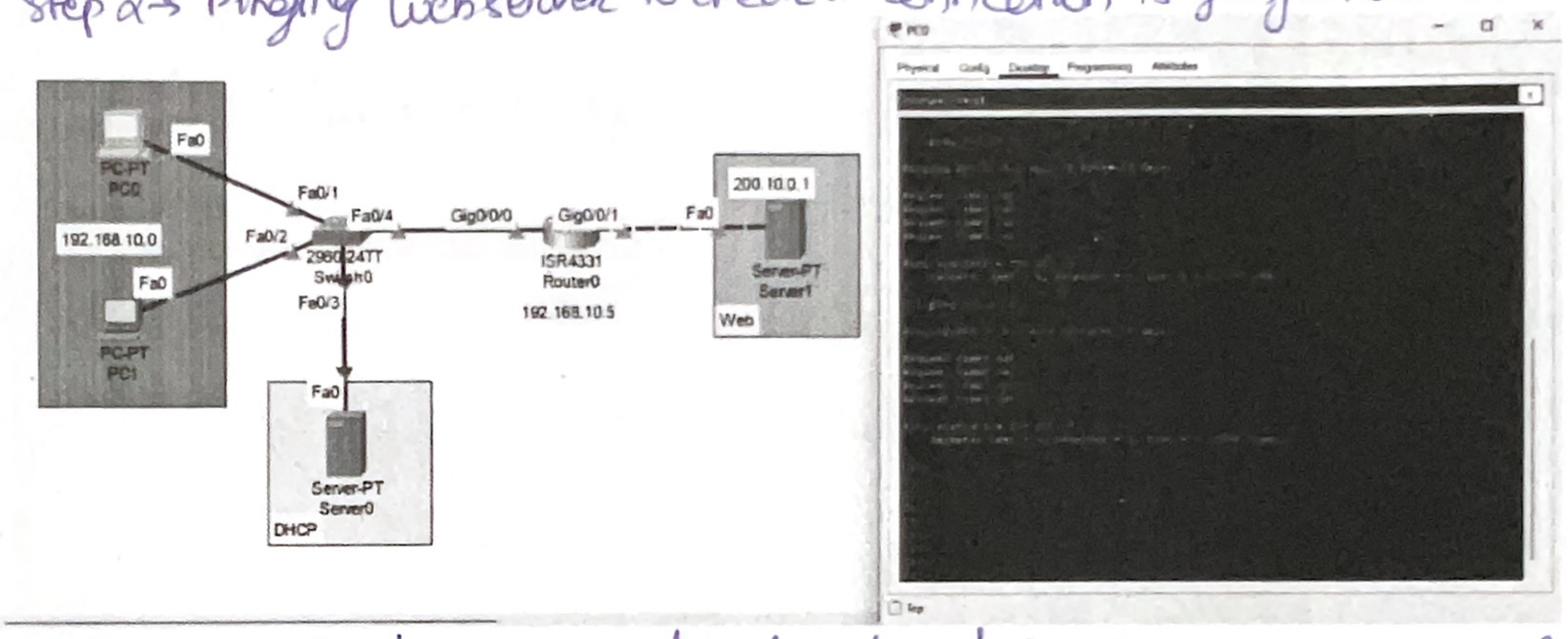
Objective 3 → Implementing APIPA to generate and verify IPv4 address for a PC connected to a network

Step 1 → Disconnecting DHCP server to configure PC0 IP address using APIPA.

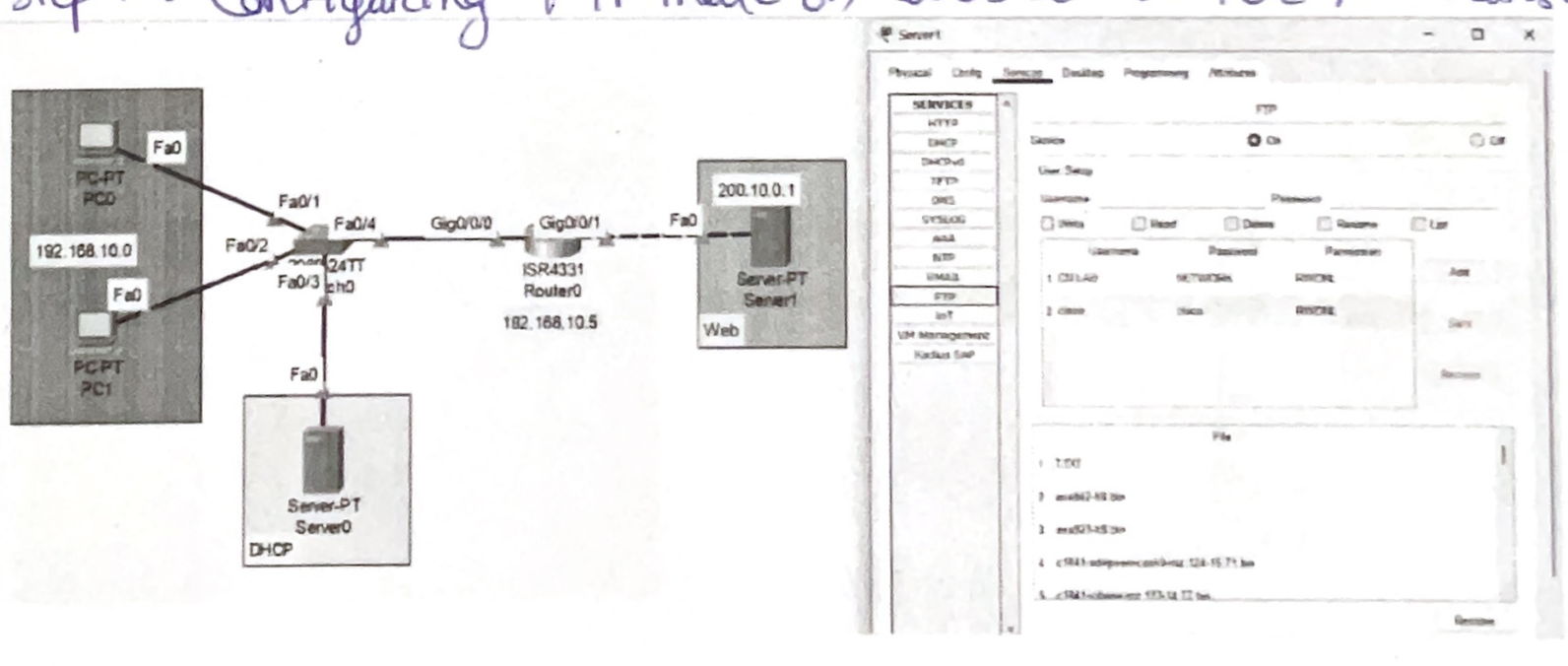


Step 2 → Pinging webserver to check if connection is going on or failed.

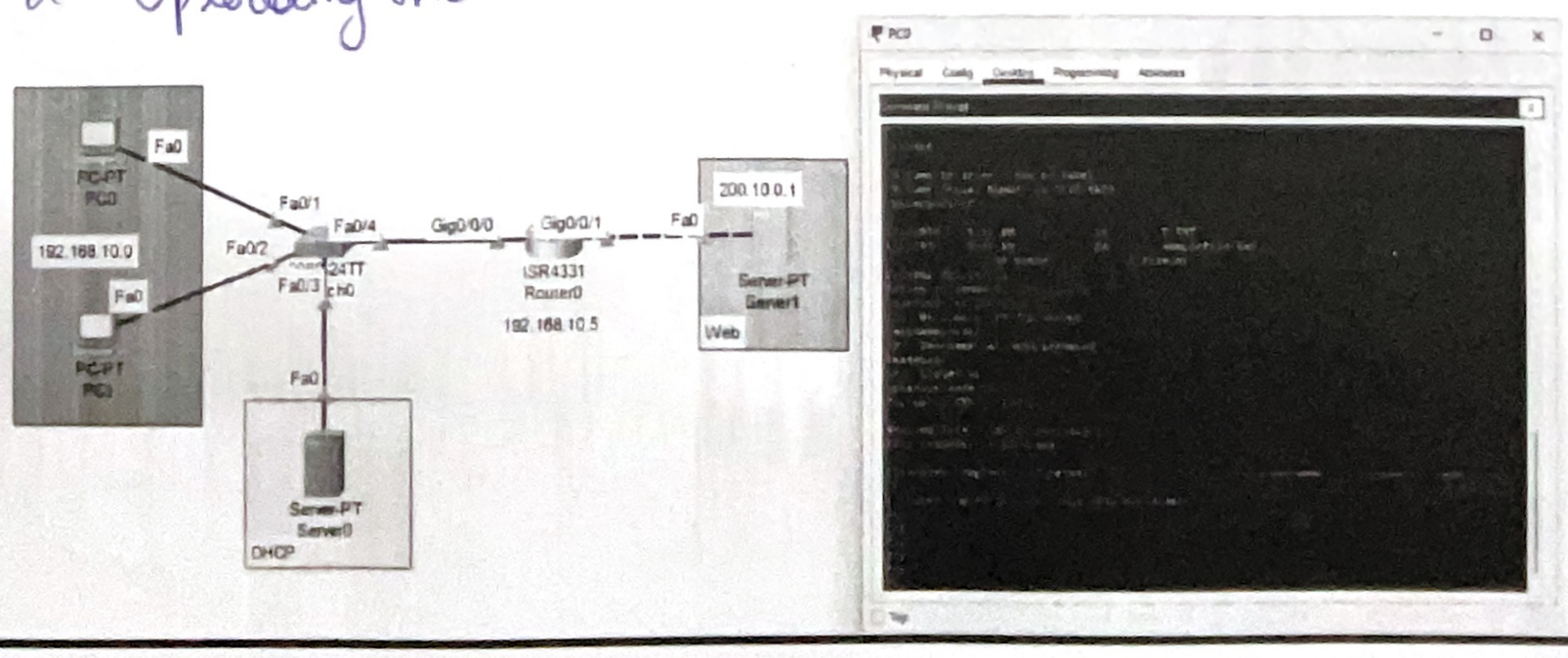


Objective 4 → Configuring a client-server network and analysing the message communication between them using FTP and TELNET packets.

Step 1 → Configuring FTP mode on webserver for file transfer.



Step 2 → Uploading the file from PC0 to web server.



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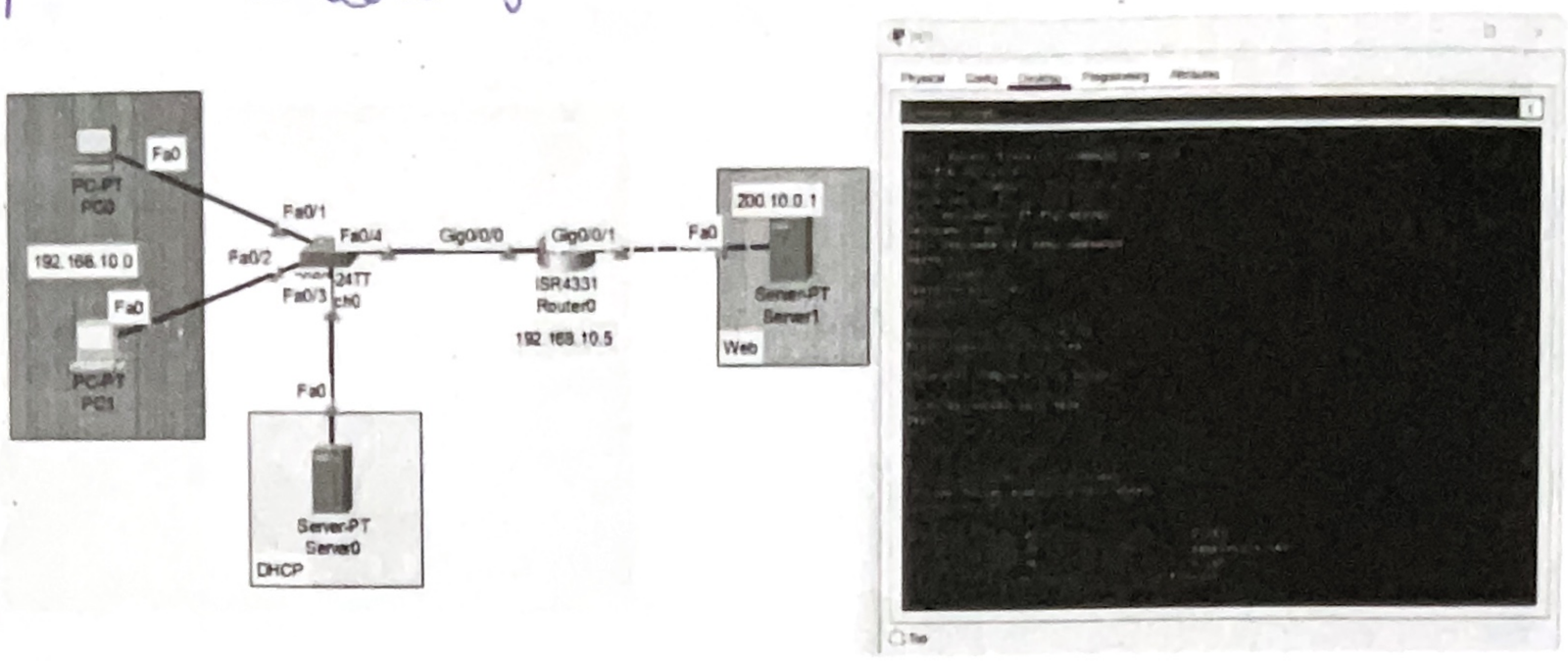
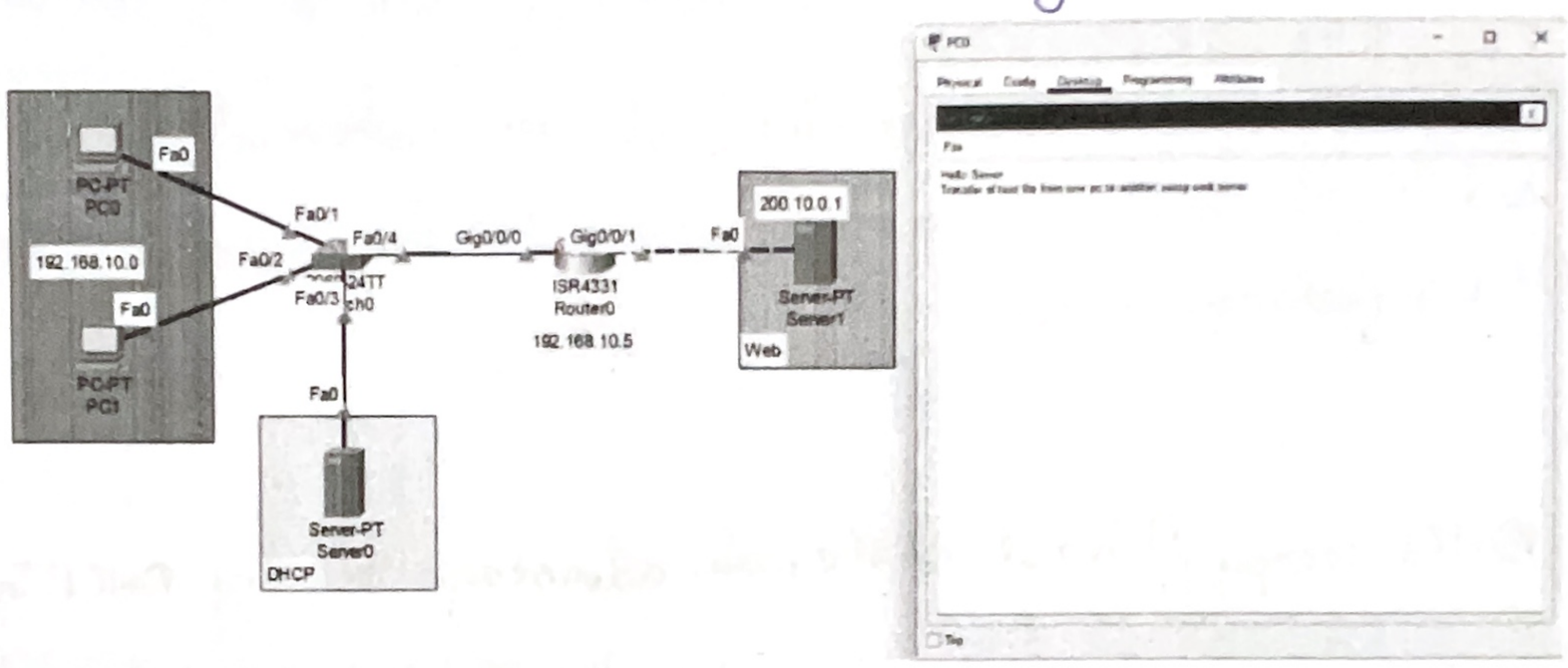
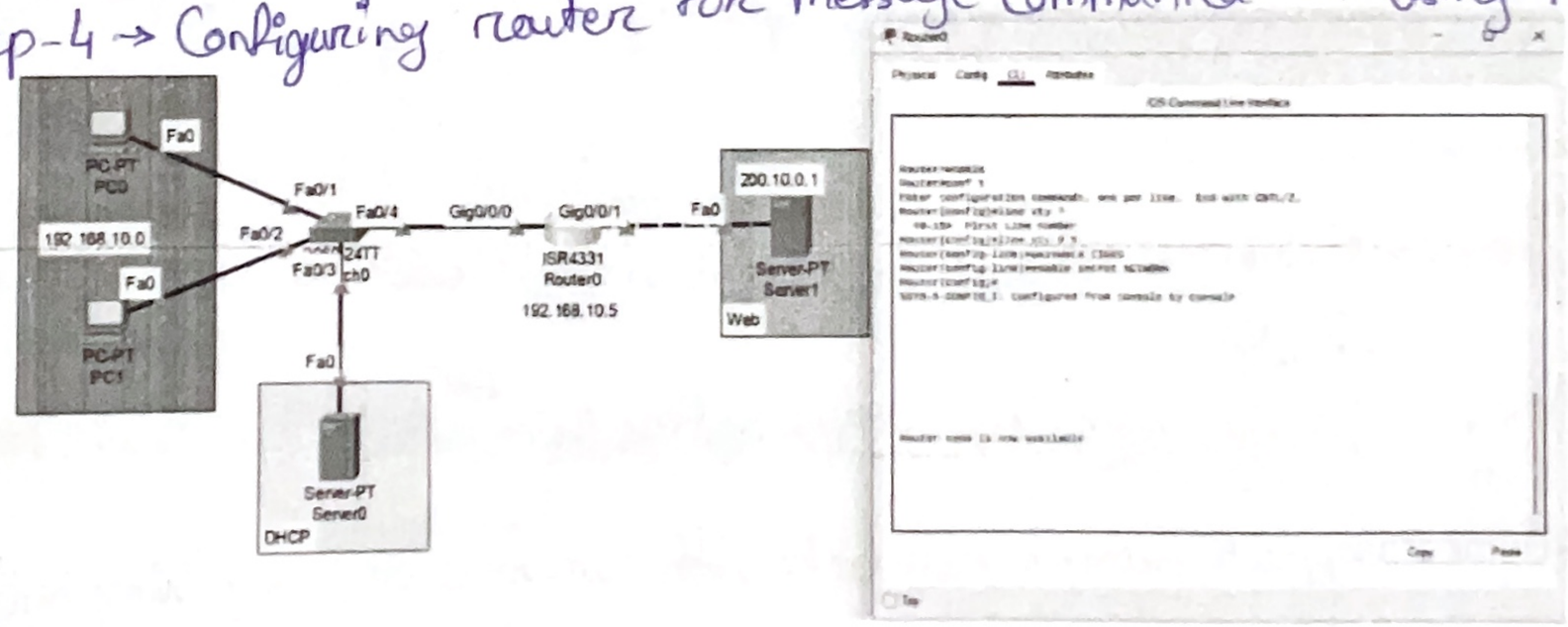
Step 3 → Downloading the file from webserver to PC1.

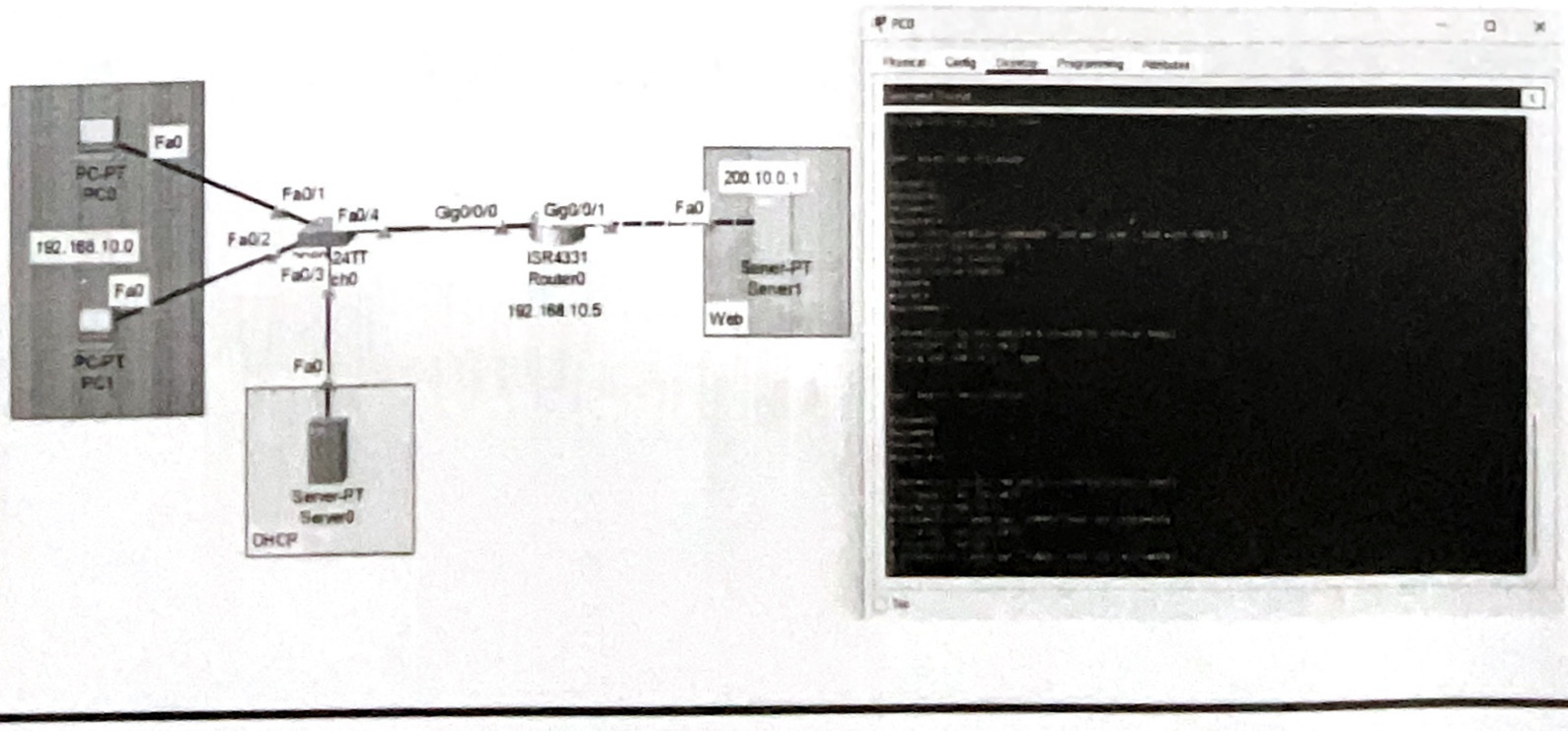


T.TXT file that was being transferred.



Step-4 → Configuring router for message communication using TELNET





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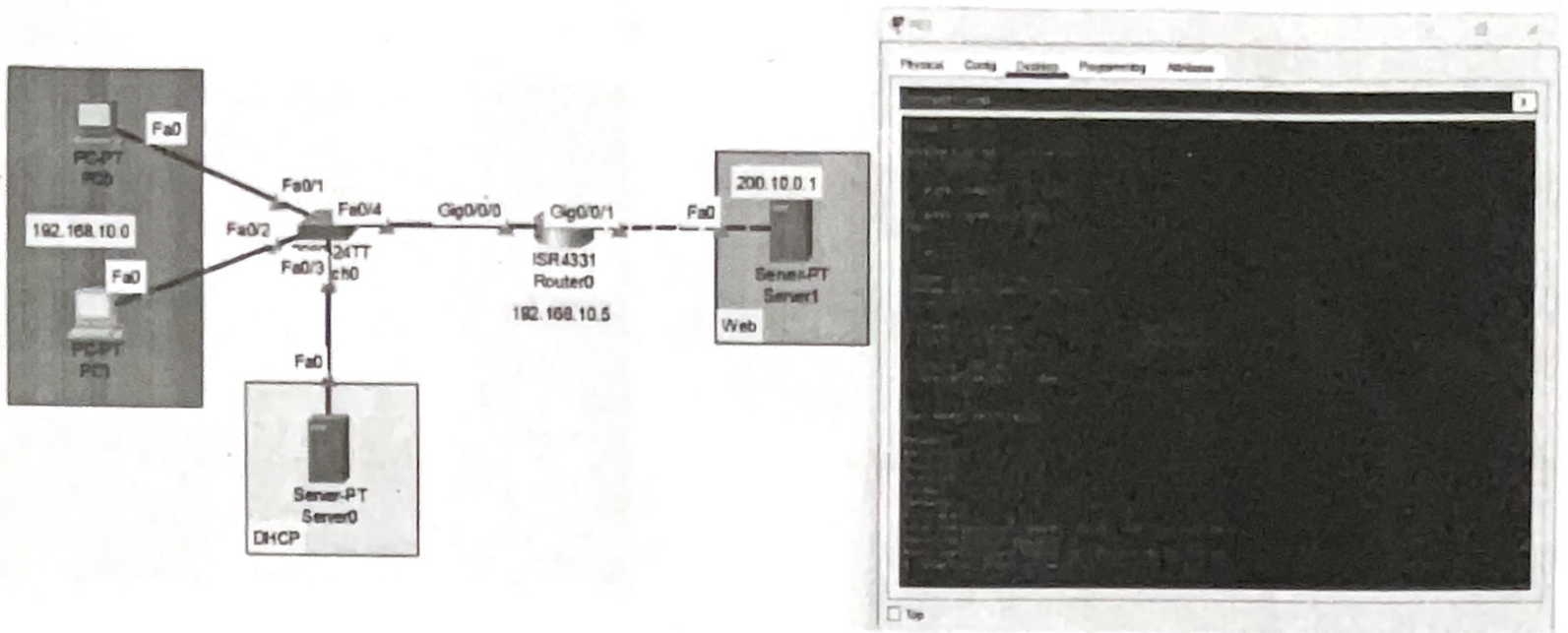
The routers is now giving access to only one end device inside the network.



Conclusion → DHCP and APIPA play crucial role in network configuration by automating IP address assignment, with APIPA ensuring local communication when DHCP fails. FTP enables file transfer, and TELNET facilities remote command execution, through modern secure alternatives like SFTP and SSH are preferred today.

Exercises →

Q1) What is DHCP snooping? What are the main advantages of using DHCP in a network?

Ans → DHCP snooping is a security feature on network switches that monitors and filters DHCP traffic. It prevents unauthorized or rogue DHCP servers from assigning IP addresses, protecting against attacks like address spoofing.

Advantages of using DHCP →

i) Automation → Eliminates manual configuration of IP addresses, reducing administrative effort.

ii) Efficiency → Quickly assigns IP addresses and reclaim them when devices leave the network.

iii) Scalability → Supports dynamic networks with numerous devices joining and leaving.

iv) Error reduction → Prevents IP conflicts and misconfigurations by ensuring unique address assignment.

v) Centralised Management → Allows network administrators to manage IP address distribution centrally.

vi) Flexibility → Provides option for assigning additional configurations, like DNS servers & default gateways.

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Q3) State the use of APIPA highlighting its advantages. What is the range of IP addresses for APIPA? Write the APIPA address generated for your device in this experiment.

Ans → APIPA is used when a device cannot obtain an IP addresses from a DHCP server. It assigns an IP address from a predefined private range, enabling basic communication within the local subnet.

Advantages of APIPA →

i) Automatic Assignment → No need for manual configuration or a DHCP server.

ii) Local Communication → Ensures devices on the same network can communicate even when DHCP fails.

iii) Simple Configuration → Requires no additional setup or administrator intervention.

Range of APIPA Addresses →

→ Range = 169.254.0.1 to 169.254.255.255

→ Subnet Mask = 255.255.0.0

APIPA address generated → 169. 254. 25. 34

Q4) Compare FTP and TELNET protocols in terms of functionality and security.

Ans →

Feature	FTP	Telnet
Functionality	Used for transferring files between hosts.	Provides remote command-line access to a host.
Primary purpose	File upload, download and management.	Remote system management and interaction.
Communication	Two channels : Control (Commands) and Data (file transfer)	Interactive text-based session over a single channel.
Default Port	Ports 21 (control) and 20 (Data).	Port 23.
Security	Transmits data, including credentials in plain text (insecure).	Transmits all data, including commands and credentials, in plain text (insecure).
Modern Alternatives	SFTP or FTPS for secure file transfers.	SSH for secure remote access.

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5) Mention true/false.

a) FTP uses two TCP connections. True

b) FTP sends exactly one file over the data connection. False

c) FTP server is stateless. False

d) Telnet is a general-purpose client-server program. True

e) Telnet can be used for file transfer. False

f) Telnet is used to establish a connection to TCP port number 23. True

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