Address Resolution Protocol (ARP)

Aim

To construct a simple Local Area Network (LAN) using Cisco Packet Tracer and demonstrate how the Address Resolution Protocol (ARP) resolves IPv4 addresses into MAC addresses by capturing and analyzing ARP request and ARP reply packets.

Problem statement

Construct simple LAN and understand the concept and operation of Address Resolution Protocol(ARP) using Cisco Packet Tracer. Utilize PCs, 8 port switch and LAN cable

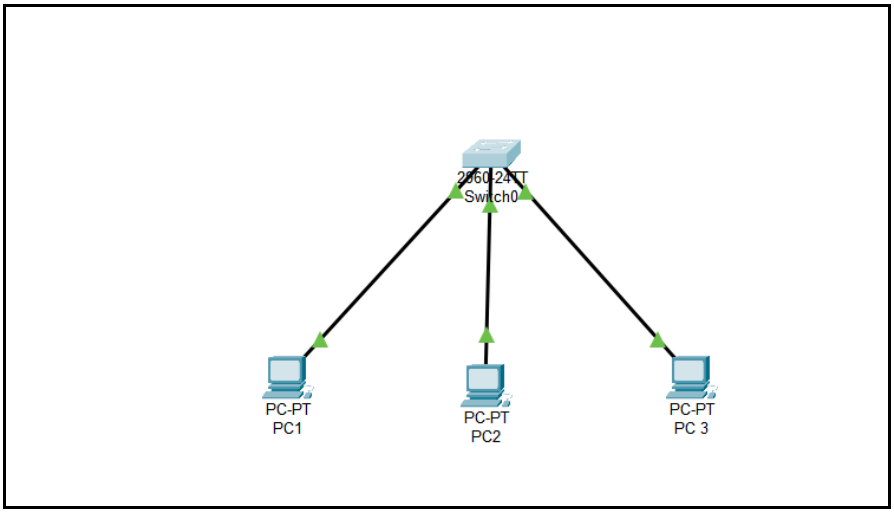
Scope of the solution

- Build a small LAN with 3 PCs and an 8-port layer-2 switch in Cisco Packet Tracer.
- Configure static IPv4 addresses for the PCs in the same subnet.
- Use Packet Tracer's Simulation mode to capture ARP request and response.
- Verify ARP entries on PCs and the MAC-address table on the switch.
- Produce a .pkt file and a short demo video showing the ARP process.

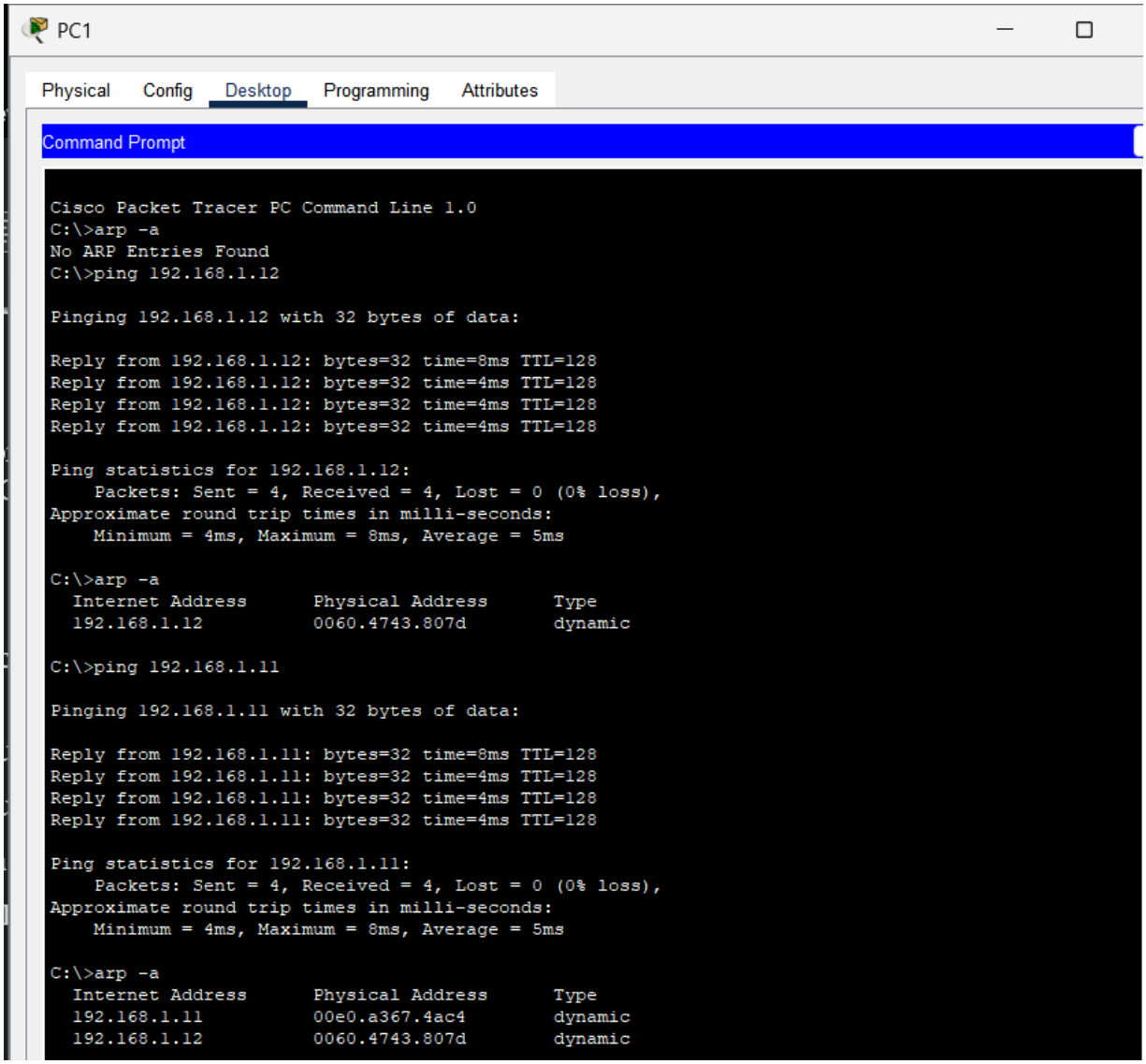
Required components

- **Software:** Cisco Packet Tracer
- **Hardware (simulated):** 3 × PC, 1 × 8-port Switch (e.g., 2960), Copper straight-through cables.

Simulated Network Topology:



Command Prompt on PC1:



Verification of ARP entries on PCs and the MAC-address table on the switch:

```
Switch#show mac address-table
          Mac Address Table
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Vlan    Mac Address       Type        Ports
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   1    0060.4743.807d    DYNAMIC     Fa0/3
   1    0090.21e2.95c4    DYNAMIC     Fa0/1
   1    00e0.a367.4ac4    DYNAMIC     Fa0/2
```

Result

A LAN was successfully in Cisco Packet Tracer, the simulation showed ARP Requests and ARP Replies being exchanged, followed by successful ICMP Echo Request and Echo Reply packets. This confirms that ARP correctly resolved the IP address of PC3 into its MAC address, enabling smooth communication within the LAN.

GITHUB LINK:

https://github.com/joshuajoseph-creator/L-T_IIoT_Project/tree/main/ECE_BATCH_6