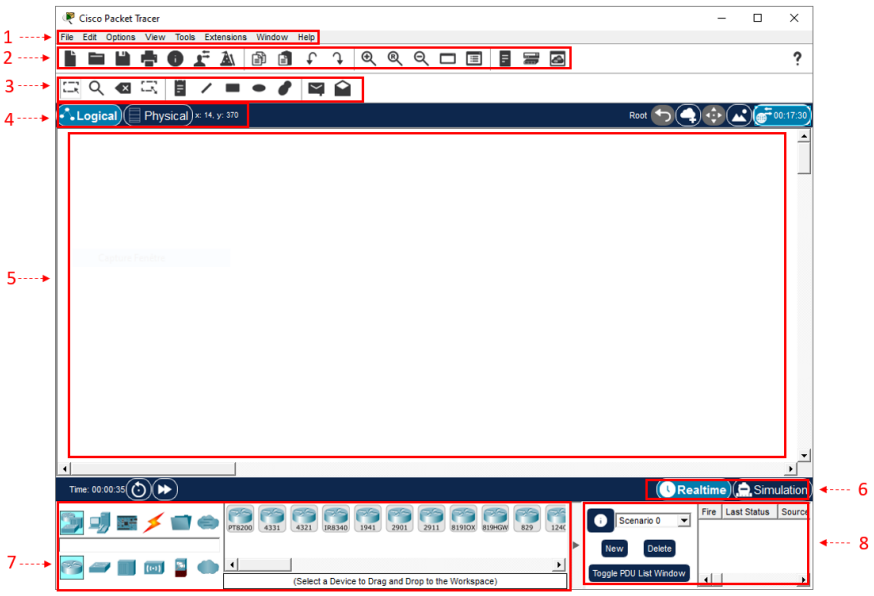
Lab 0: Introduction to Cisco Packet Tracer

Cisco Packet Tracer (CPT) is a network simulation and visualization tool used for designing, configuring, and troubleshooting network topologies before deployment on real hardware. It provides a virtual environment in which networking concepts can be explored and validated safely.

By using CPT, users can create a logical network topology, interconnect networking devices, configure network parameters, and analyze packet transmission behavior.

2. Interface Overview

The CPT workspace is organized into several functional areas:



Menu Bar (1)

Provides access to file management, preferences, and application settings.

Main Toolbar (2)

Contains shortcut icons for frequently used operations such as open, save, zoom, undo, and redo.

Common Tools Bar (3)

Allows manipulation of devices and topologies (select, move, delete, inspect, add PDU).

Logical/Physical Tabs (4)

Enable switching between logical and physical representations of the network.

Workspace (5)

Area where network topologies are created and visualized.

Realtime/Simulation Tabs (6)

Allow switching between real-time execution and simulation mode for packet analysis.

Network Component Box (7)

Contains all available network devices and connection types.

User-Created Packet Window (8)

Displays custom packets generated for testing purposes.

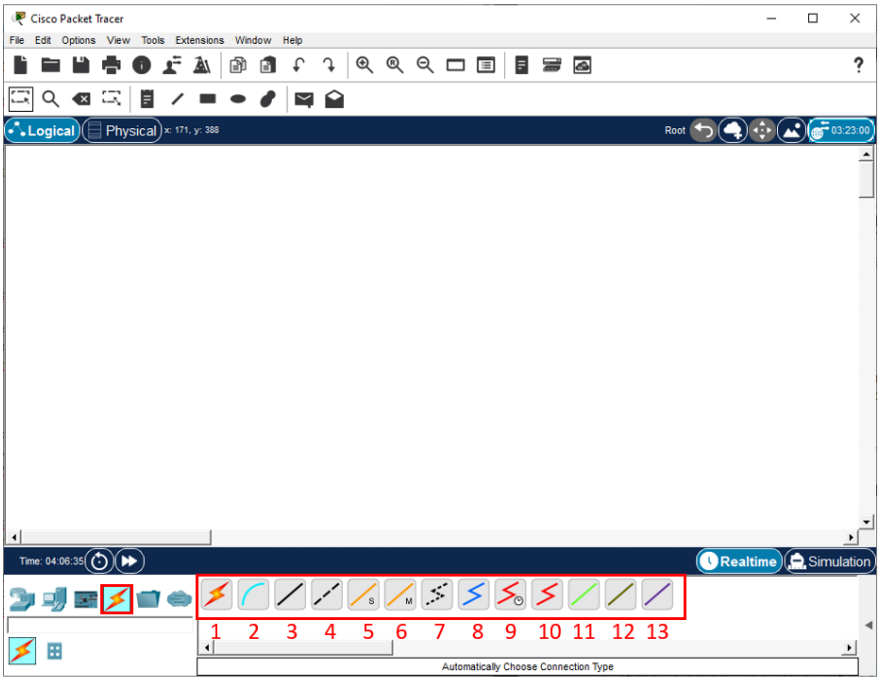
3. Deploying Devices

After understanding the interface, a simple topology can be constructed.
To deploy devices:

1. Select a category from the Device-Type Selection Box.
2. Choose the desired device (e.g., Router 2911, Switch 2960, PC).
3. Drag and drop the device into the workspace.

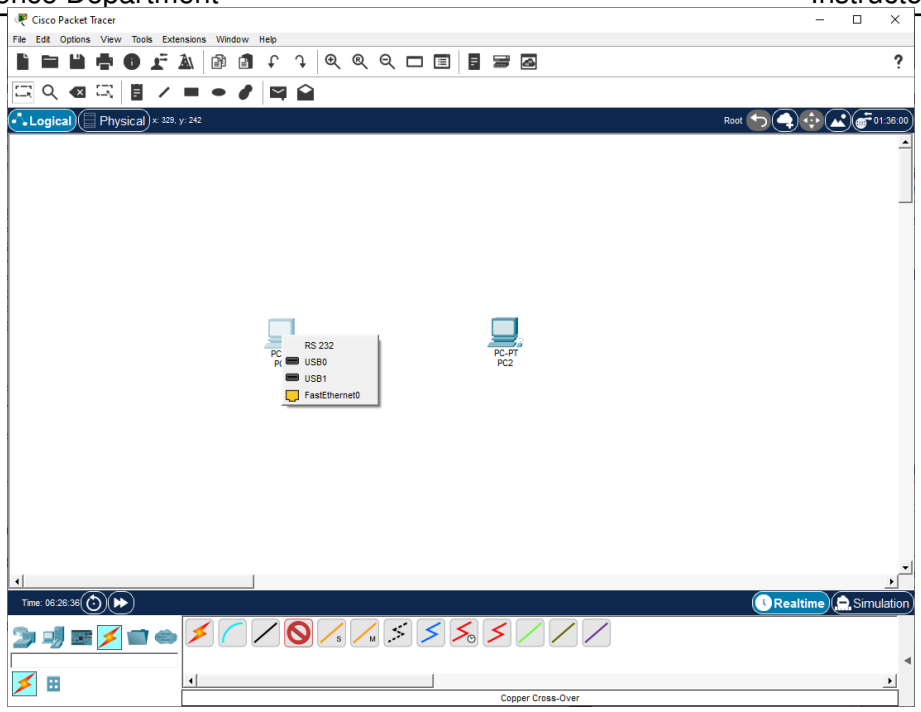
4. Connecting Devices

CPT provides multiple cable types, each compatible with specific interfaces.

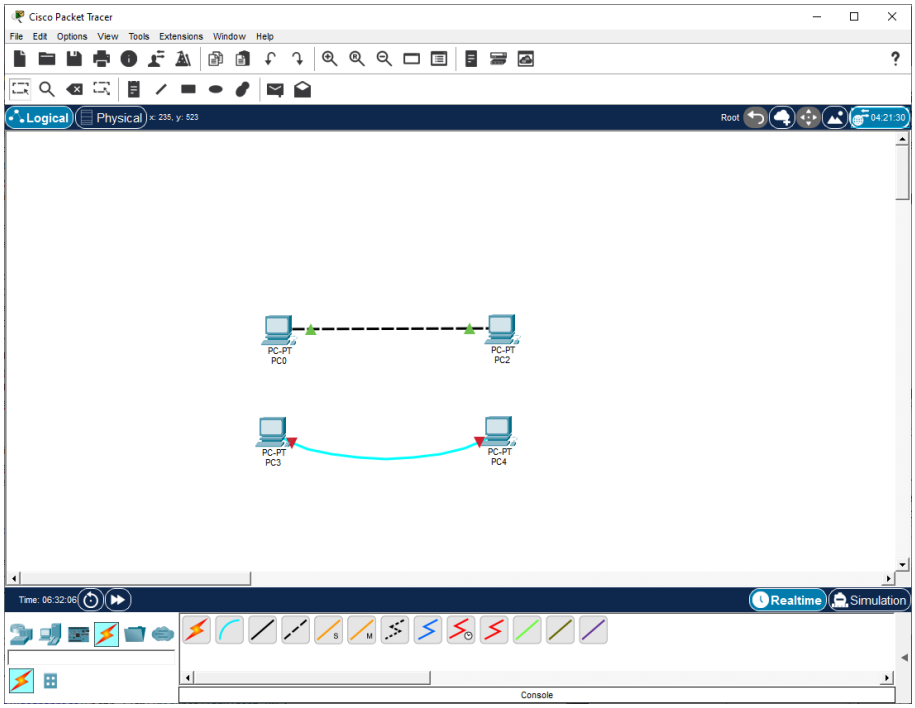


- **Automatic (1)**: Automatically selects the appropriate cable.
- **Console (2)**: Used for direct configuration of routers and switches.
- **Copper Straight-Through (3)**: Connects devices operating at different OSI layers.
- **Copper Cross-Over (4)**: Connects devices operating at the same OSI layer.
- **Fiber (5)**: Used for fiber optic interfaces.
- **Phone (6)**: Used for modem connections.
- **Coaxial (7)**: Used for coaxial ports.
- **Serial (9-10)**: Used for WAN connections.
- **Octal (11)**: Connects a terminal server to multiple console ports.
- **IoT Custom Cable (12)**: Used in IoT scenarios.
- **USB (13)**: Provides USB console connectivity.

When a cable is selected and a device is clicked, compatible interfaces are automatically displayed. After selecting the appropriate interfaces on both devices, the physical link is established.



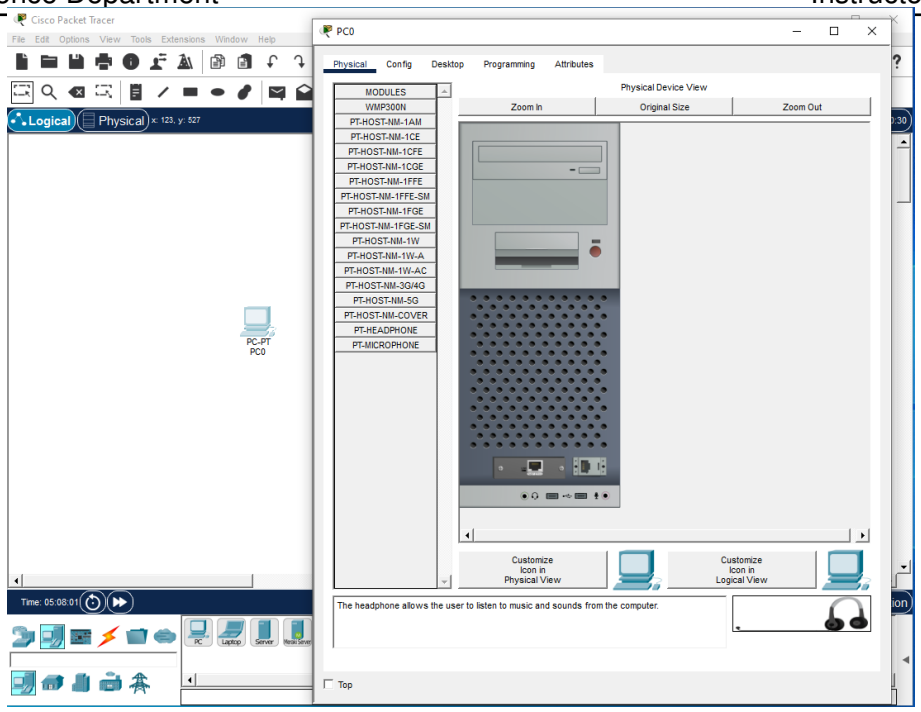
If the correct cable is used and interfaces are active, the link indicator turns green. Otherwise, it remains red or orange.



5. Device Configuration

Devices can be configured using the graphical interface.

Click on a device and select the **Config** tab.



- **Physical Tab**: Manages hardware modules and power status.
- **Config Tab**: Configures interfaces, IP addresses, VLANs, routing, and services.
- **Desktop Tab**: Available on end devices; includes IP Configuration and Command Prompt.
- **Programming Tab**: Used for IoT device programming.
- **Attributes Tab**: Allows modification of general device properties.

Each device provides a dedicated configuration interface adapted to its function within the network.

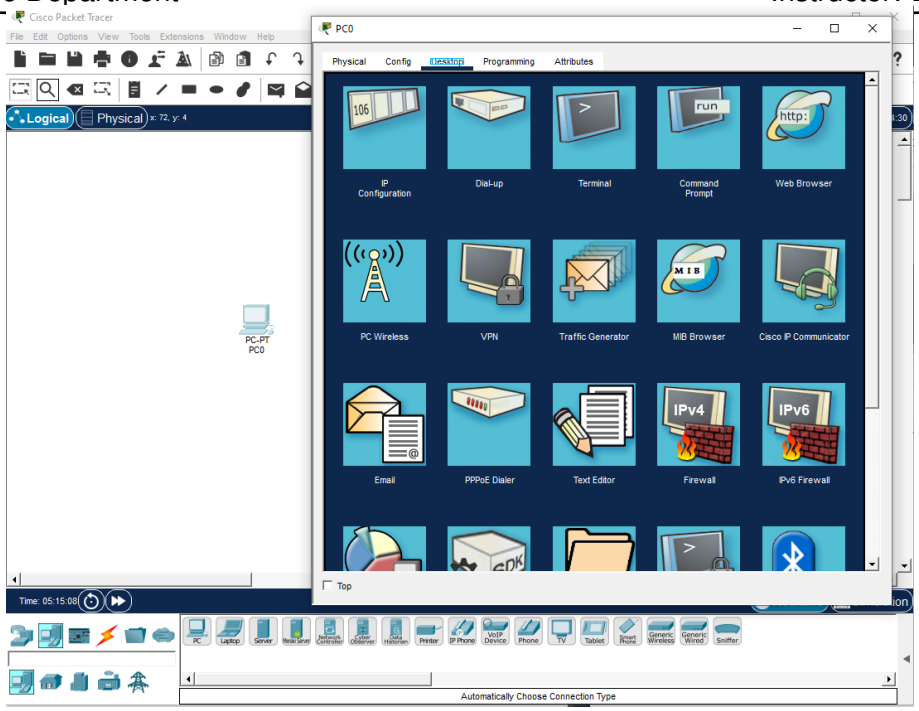
6. Testing Connectivity

Testing connectivity ensures proper communication between devices and validates configuration accuracy.

The **ping** command is commonly used for connectivity verification.

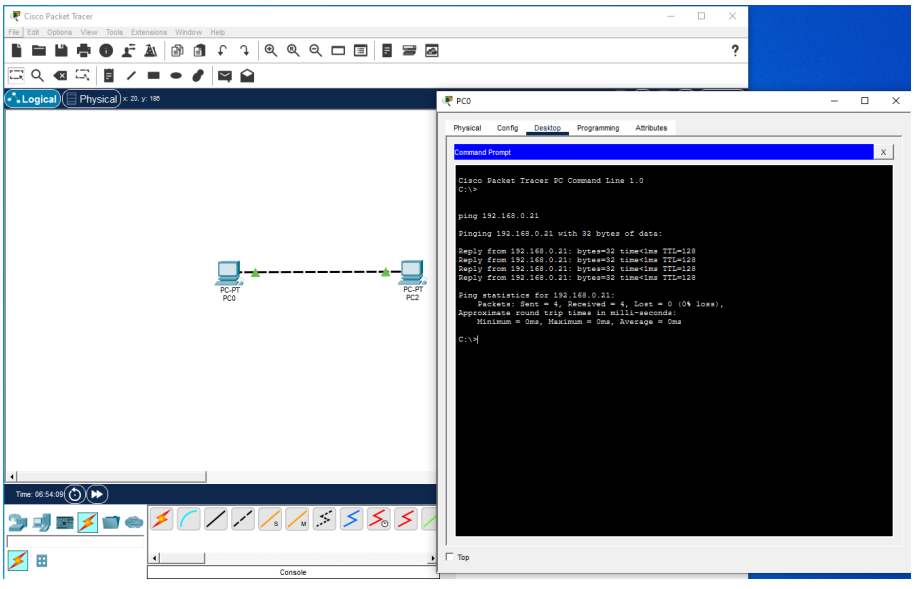
To test communication between two PCs using **ping** command:

1. Click on the first PC.
2. Open the Desktop tab.



3. Select Command Prompt.
4. Enter:

```
ping <IP_address_second_pc>
```



If reply messages are received, connectivity is successful. If “Request timed out” appears, a configuration issue must be investigated.

Simulation Mode can also be used to visualize packet transmission step by step. Additionally, the tracert command can be used to identify the path taken by packets across the network.

Mini Task: Implementation of Physical Topologies

1. Bus Topology (simulated)

Instructions:

- Add 1 Hub.
- Add 4 PCs.
- Connect each PC to the Hub using Copper Straight-Through cables.
- Arrange the devices in a linear structure to simulate a bus.

Note: CPT cannot create a true physical bus. Using a hub simulates the bus because it broadcasts traffic to all ports.

2. Star Topology

Instructions:

- Add 1 Switch.
- Add 4 PCs.
- Connect each PC directly to the Switch using Copper Straight-Through cables.
- Arrange the devices clearly in a star shape.

3. Ring Topology

Instructions:

- Add 4 PCs.
- Connect each PC to a Switch using Copper Straight-Through cables to simulate a ring.
- Arrange the PCs in a circular shape.

Note: A true ring network cannot be implemented with PCs alone in Packet Tracer. Using a switch simulates the ring logically, allowing all PCs to communicate.

4. Mesh Topology

Instructions:

- Add 4 Routers.
- Connect each router to all other routers using Copper Cross-Over cables.
- Verify that every router has multiple connections.

Note: A true mesh network cannot be implemented using only PCs in CPT because each PC has only one Ethernet port. Using routers allows multiple interconnections and proper testing of connectivity.