



# DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Discover. Learn. Empower.

## **Experiment 5**

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**Section/Group:** 22BCS\_IOT-627/B

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**Subject Name:** Computer Networks

**Subject Code:** 22CSH-312

**1. Aim:** Implement Data link Layer Protocols such as CSMA,CSMA/CD.

**2. Requirements (Hardware/Software):**

**S/W Requirement :-** Packet Tracer or NS2

**H/W Requirement :-** Processor , Main Memory (128 MB RAM) ,Hard Disk(minimum 20 GB IDE Hard Disk ), Removable Drives, PS/2 HCL Keyboard and Mouse

**3. Procedure:**

- **Network Topology Setup:**

1. Launch Packet Tracer and create a new network topology.
2. Place PCs or end devices on the workspace.
3. Connect each device to a central switch using Ethernet cables. Alternatively, use a hub for early Ethernet simulation.

- **Configure Devices:**

1. Double-click on each PC or end device to configure basic network settings (IP address, subnet mask, gateway).
2. Focus on Layer 2 settings as IP configuration is secondary to CSMA/CD operations.

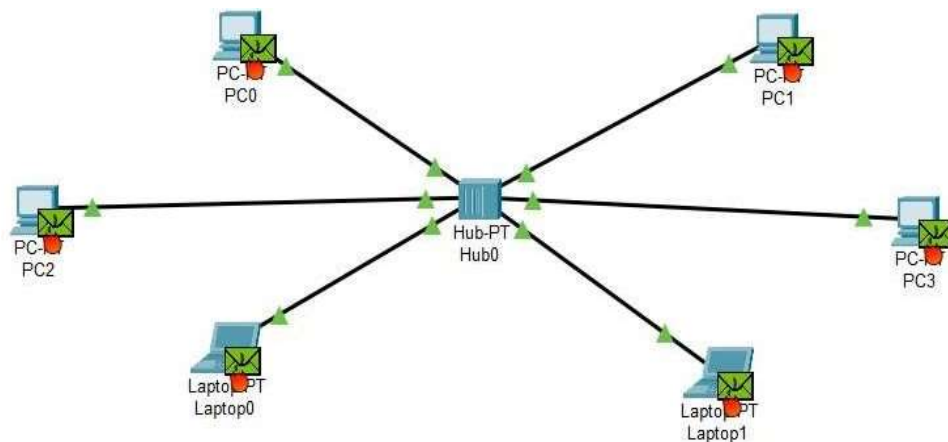
- **Enable CSMA/CD:**

1. CSMA/CD operates primarily at the data-link layer (Layer 2).
2. Ensure all Ethernet interfaces on devices and the switch/hub are operational (indicated by green lights).

- **Simulate Data Transmission:**
  1. Open a command prompt or terminal on one PC.
  2. Initiate a ping command to another PC/device in the network to simulate data transmission.
- **Observe CSMA/CD Mechanism:**
  1. When a PC/device wishes to transmit data, it first senses (Carrier Sense) if the Ethernet medium is free.
  2. If the medium is busy, the device waits for a random period (Multiple Access) before attempting to transmit.
  3. Upon successful transmission, continue to monitor for collisions (Collision Detection).
  4. If a collision occurs (detected by simultaneous transmissions from multiple devices), devices stop transmitting, wait for a random backoff period, and re-attempt transmission.
- **Analysing Results:**
  1. Use Packet Tracer's interface to observe activities such as lights on switch ports (indicating activity and collisions).
  2. Monitor the command prompt or terminal for ping responses and any delays due to collisions.

#### 4. Output:

When we try to send multiple data in the same network, Collision may arise which is depicted in the fig given below.





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## 5. Learning Outcomes:

1. **Understanding CSMA/CD:** Participants will comprehend the fundamental mechanism of CSMA/CD and its role in managing collisions in Ethernet networks.
2. **Hands-on Experience:** Gain practical experience in configuring network devices, simulating data transmission, and observing network behavior in a controlled environment.
3. **Troubleshooting Skills:** Develop troubleshooting skills by identifying and resolving network issues such as collisions and transmission failures.
4. **Network Simulation Proficiency:** Improve proficiency in using Packet Tracer as a tool for network simulation and analysis