Terna Engineering College

Computer Engineering Department

Program: Sem V

Course: Computer Network Lab

Faculty: Umesh B Mantale, D V Thombre and Ramesh Shahabade

LAB Manual

PART A

Experiment No. 5

A.1 Objective:

Implementation of a LAN Network with the following topologies by using CISCO Packet Tracer.

1. Ring Topology.
2. Star Topology.
3. Mesh Topology.
4. Tree Topology.

A.2 Prerequisite:

- Knowledge about PAN, LAN and NW Elements.
- HW and IP Address concepts.
- Network Topology.
- Concept of Analysis, Design, Simulation and Modelling.
- Cisco Packet tracer as simulation tool.

A.3 Outcome:

After successful completion of this experiment students will be able to -

- Ability to select the proper NW Elements required to design NWs.
- Design of LANs using different topologies.
- Connect the LANs through the switch/hub by addressing the proper addresses.
- To Design an LAN environment to learn various Topologies, messaging and acknowledgements.

- Thorough understanding of DLL.
- Simulate the designed LAN NWs.

A.4 Theory/Tutorial:
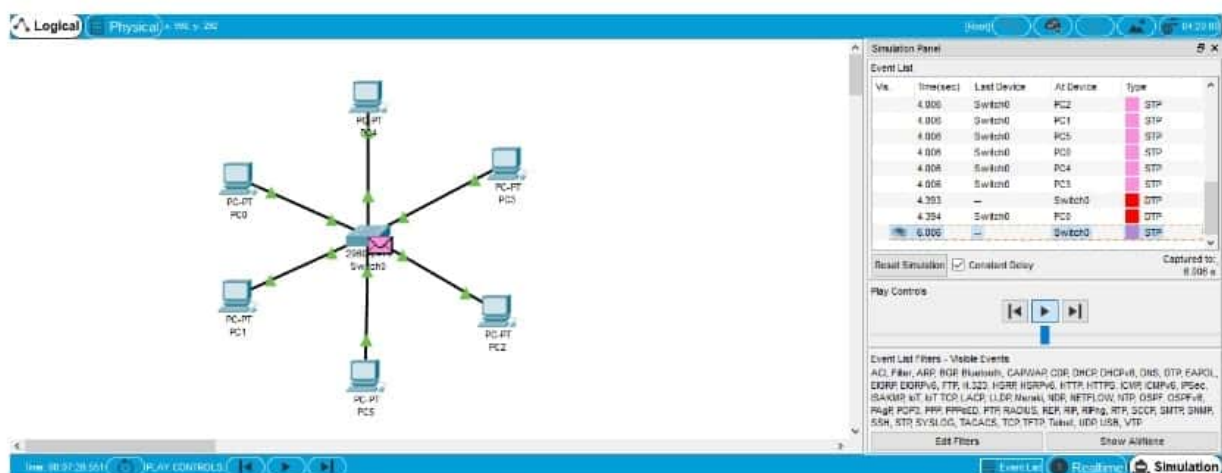
➤ Steps to create LAN

Cisco Packet Tracer is an application designed to be able to simulate a network before actually doing the network development, and also can be used for simulation research in a network.

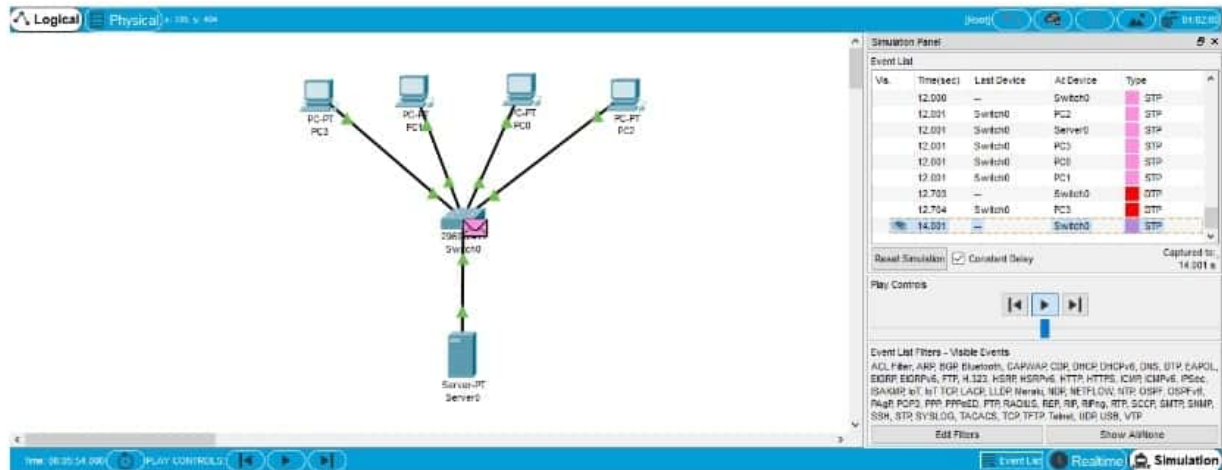Create a LAN network using an Access Point consisting of 4-6 PCs and Hub/switches.

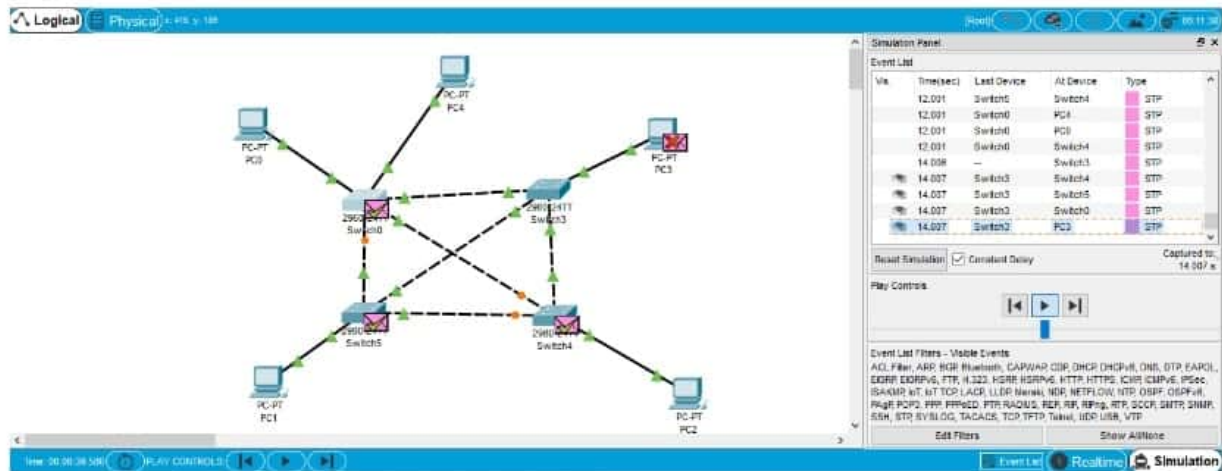- LAN using Ring Topology as below.
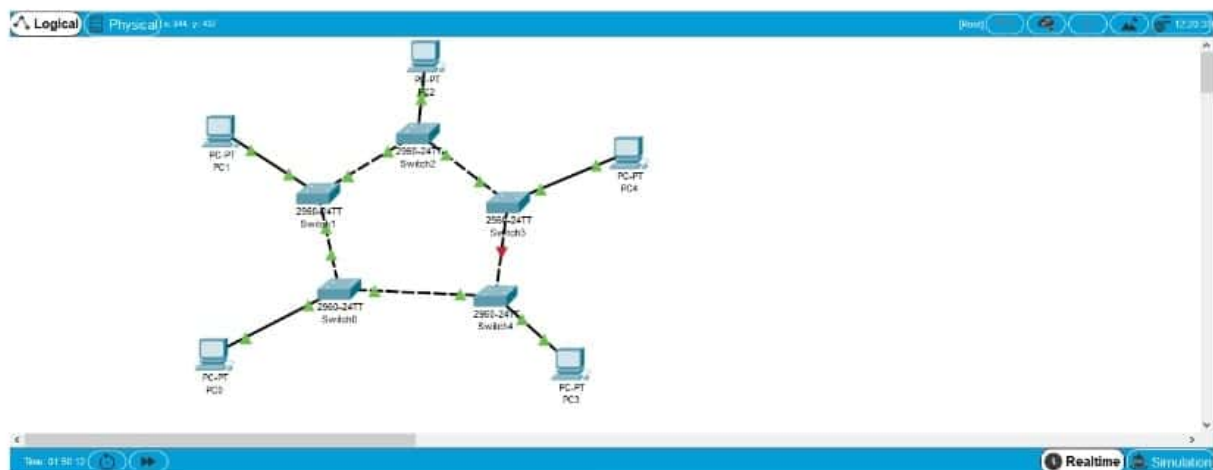
- Create LAN using Star Topology

- Create LAN using Tree Topology

- Create LAN using Mesh Topology

References:

- https://www.youtube.com/watch?v=Er3X-X3fkZU&t=12s
- https://www.youtube.com/watch?v=TNczCm9fbj8
- https://www.youtube.com/watch?v=QxB-CBS1bbU
- https://www.youtube.com/watch?v=cXZedUwvP-A

PART B

(Students must submit the soft copy as per following segments within two hours of the practical. The soft copy must be uploaded on the Blackboard or emailed to the concerned lab in charge faculties at the end of the practical in case the there is no Blackboard access available)

Roll No. 50	Name: Amey Thakur
Class: TE-Comps B	Batch: B3
Date of Experiment: 31/08/2020	Date of Submission: 31/08/2020
Grade :	

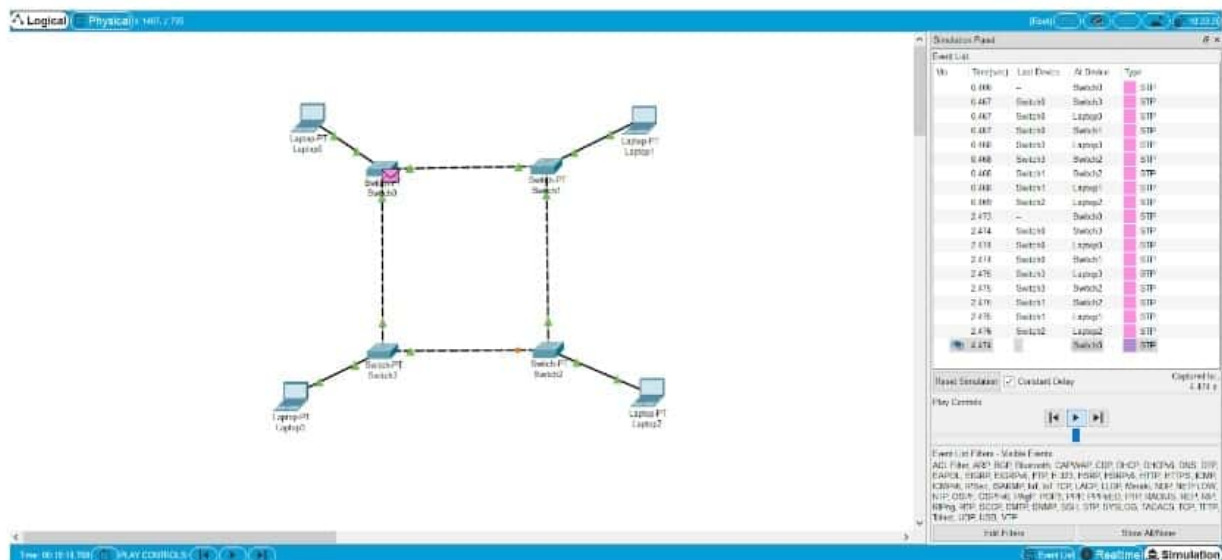## B.1 Document created by the student:

(Write the answers to the questions given in section 5.1 during the 2 hours of practical in the lab here)
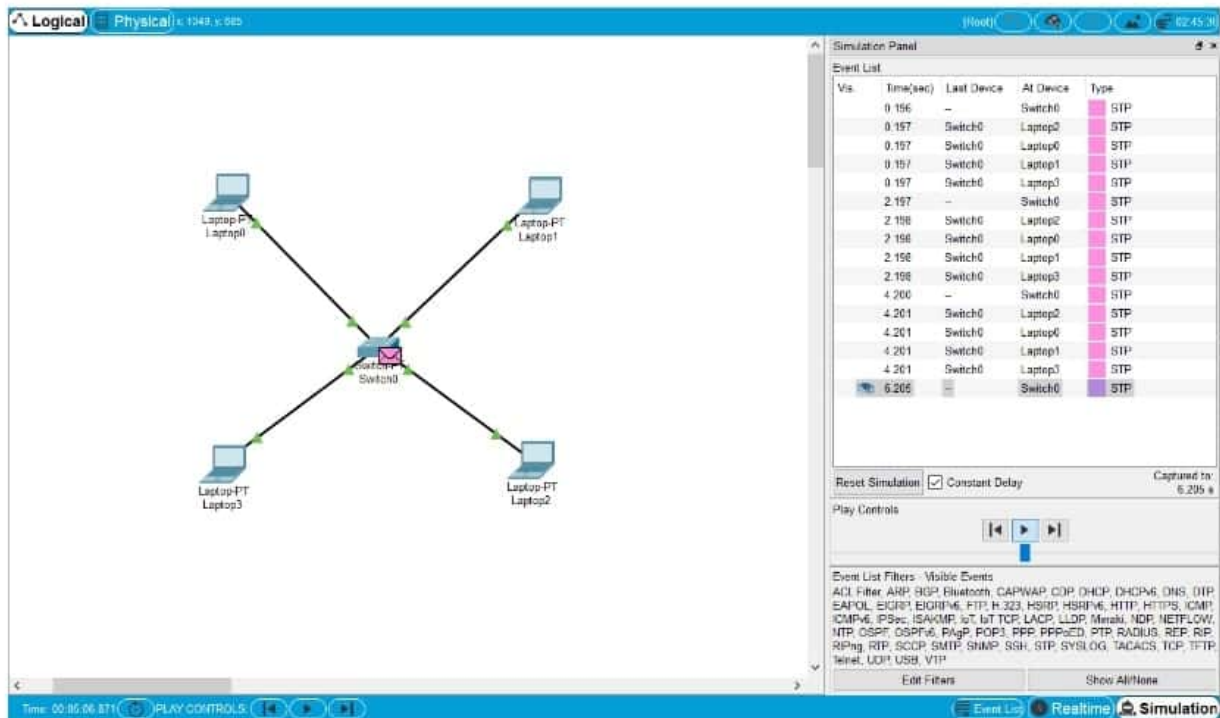
Refer B.5

B.2 Perform the experiment as suggested above add the following documents.

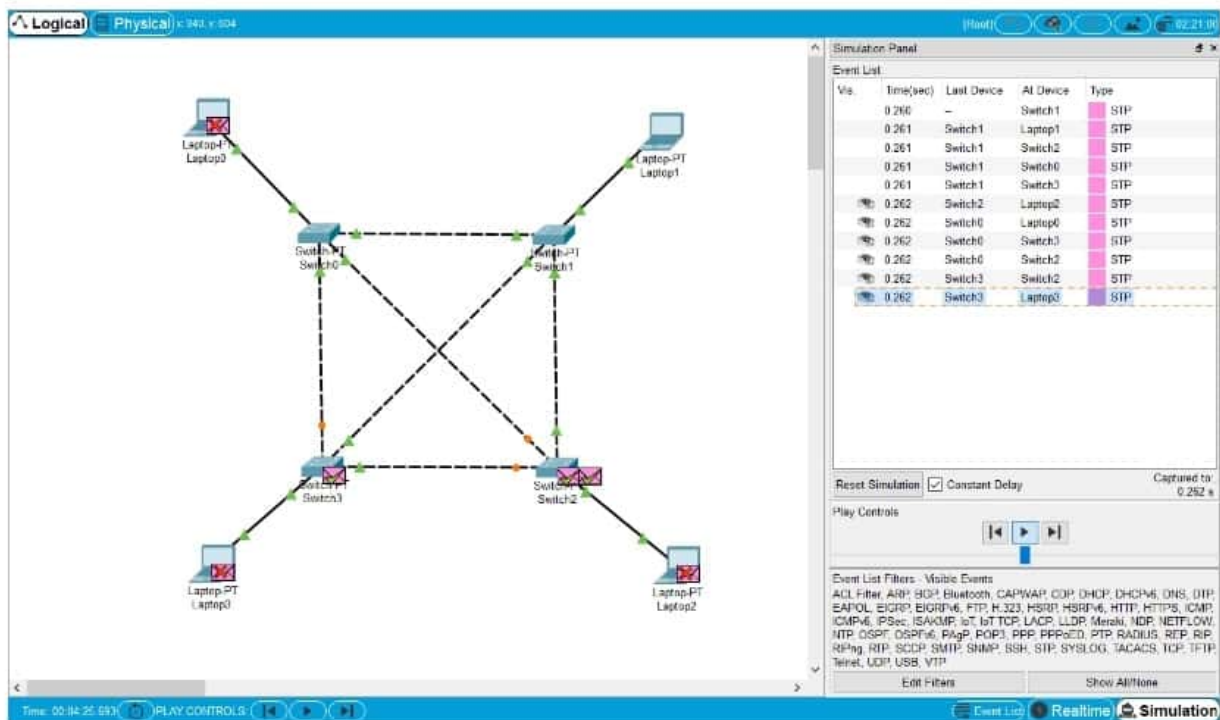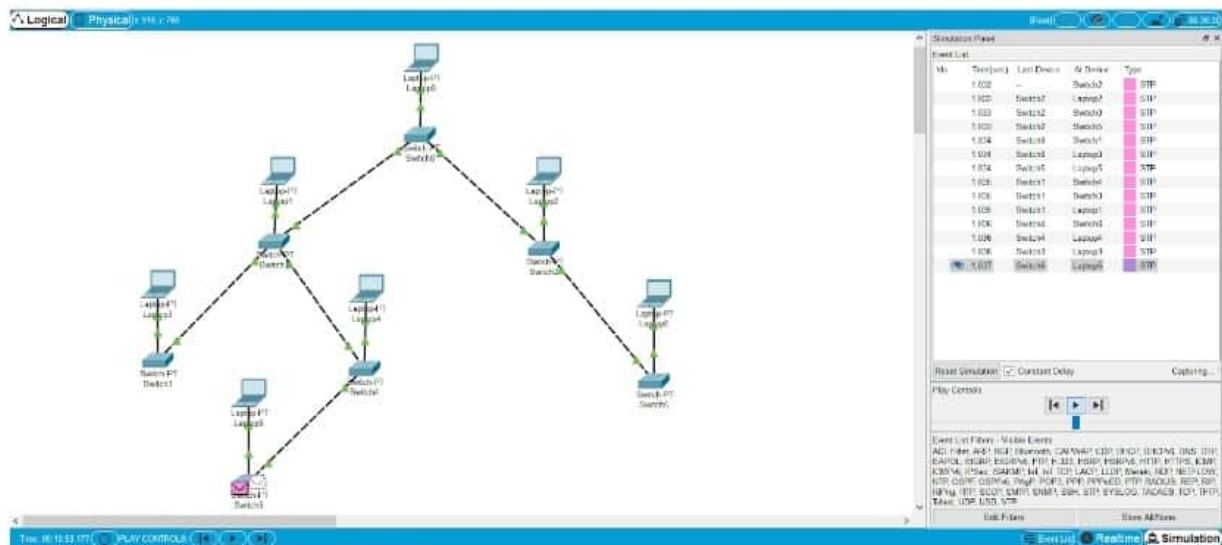*(Screenshots of the performed experiments along with results.)*

- **Ring Topology**

- ## Star Topology

- ## Mesh Topology

- **Tree Topology**

B.3 Observations and learning:

(Students are expected to understand the selected topic. Have to list out the components & functionality. Prepare a flow of the algorithm defined in the paper. List the performance metrics that is used)

After successful completion of this experiment, we are now able to select the proper NW Elements required to design NWs. Design of LANs using different topologies.Connect the LANs through the switch/hub by addressing the proper addresses, and to Design an LAN environment to learn various Topologies, messaging and acknowledgements. We could Thoroughly understand DLL, and simulate the designed LAN NWs.

B.4 Conclusion:

(Students must write the conclusion as per the attainment of individual outcome listed above and learning/observation noted in section B.3)

Cisco Packet Tracer is a cross-platform visual simulation tool designed by Cisco Systems that allows students to design complex and large networks, which is often not feasible with physical hardware, due to costs.

Computer Networks Laboratory Experiment - 5

Amey Thakur   D.O.E - 31·08·2020

TE COMPS   B-50   D.O.S - 31·08·2020

B3

Q.1. What is cisco packet tracer? How can one use of it learning CN?

Ans!

- Cisco packet tracer is a cross platform visual simulation tool designed by Cisco systems that allows users to create network topologies and imitate modern computer networks.

- The software allows user to simulate the configuration of cisco routers and switches using a simulated command line interface.

- Packet tracer allows students to design complex and large networks which is often not feasible with physical hardware due to cost.

Q.2 What is simulation? How cisco packet tracers help in simulation of NWs?

Ans:

- A simulation is an approximate imitation of the operation of a process or system. that represents its operation over time.

- Packet tracer allows user to create simulated network topologies by dragging and dropping routers, switches and various other types of network devices.

Q.3. What are different types of end to end devices supported by cisco packet tracer?

Ans:

- The end to end devices supported by cisco packet tracer are workstations, laptops, file servers, web servers, etc.

Q.4. What are all the NW elements you will have in cisco packet tracer?

Ans:

- Network devices, End devices, components, Connections, Multiuser connection, etc. These are available elements from cisco packet tracer.

Q.5. What are the different types of cables supported by cisco packet tracer?

Ans:

- Console, Copper straight-Through, Copper cross-over, Fiber, Phone, Coaxial, serial DTc, Serial DTE, Octal, IOT custom cables, USB.

Q.6. Write the steps to assign static addresses to the nodes.

Ans:

- First click on the device such as PC, Laptop, etc which is connected to the switches.
- Then click on the desktop tab.
- Then click on IP configuration.
- Then type in the IP address box.

Q.7. Define the following with example

A. IP address

- IP address is a decimal number that defines the routing information of the Internet user. The address is composed of four sets of numbers, each separated by a decimal point.
- Example: 127.0.0.1.

B DNS

- DNS or Domain Name System translates human readable domain names (Example, WWW.amey.com) to machine readable IP addresses.
- Example: 192.168.2.33

C. Subnet Mask

- Subnet masks are also expressed in dot-decimal notation like an address. Traffic is exchanged between subnetworks through routers when the routing prefixes of the source addresses and the destination addresses differ.
- Example: 255.255.255.0 is the subnet mask for 192.168.0.1

D. Gateway

- A gateway is a hardware device that acts as a gate between two networks. It may be a router, firewall, server, or other devices that enables traffic to flow in or out of the network.
- Example: A proxy server may only allow local computers to access a list of authorized websites.

E. RIP.
- Routing Information Protocol (RIP) is a distance vector protocol that uses hop count as its primary metric. RIP defines how routers should share information when moving traffic among an interconnected group of Local Area Network.
- Example: RIPv1, RIPv2 and RIPng

Q.8. Can we create ring topology just using end nodes i.e. without using switch, hub, router?

Ans:
- No, to create ring topology we need computers, intelligent switches and connecting wires.
- To create ring network we need to connect all the switches in a closed path format. Each switch in the closed path will be connecting to two neighbouring switches. Next connect a single computer to a switch and assigned IP addresses.

Q.9. Can we create LAN without assigning an IP address to switch / hub? Give reason.
- To create LAN and to enable the computers to be able to communicate with each other it is compulsory to assign IP address to computers. ~~Also~~
- Also switches / hub does not have the capability to assign IP address so they will get an Automatic Private IP Address (APIPA)
- But if the switch is connected to a router then we need not to assign an IP address to switch / hub.

Q.10. Define

A. STP

- Spanning Tree Protocol
- STP is a Layer 2 network protocol used to prevent looping within a network topology. The protocol allows two bridges to exchange information for only one bridge to handle a given message sent between two computers within the network. STP prevents the condition known as bridge looping

B. DTP

- Dynamic Trunking Protocol.
- DTP is a Ciso proprietary protocol used for negotiating a trunk link between two switches as well as the encapsulation type of either 802.1q or ISL. It is a layer 2 protocol.

C. CDP

- Cisco Discovery Protocol
- CDP is used to discover other cisco devices and can be used to share information such as os version IP address, etc. CDP can be used for on demand routing to include routing information in CDP.

D. ICMP

- Internet Control Message Protocol
- ICMP is an error reporting and message control protocol that network devices use to report problems in packet delivery.

Q.11   Define

A.   Packet

- A packet is the unit of data that is routed between an origin and a destination on the Internet or any other packet switched network.

B.   Frame

- A frame is data that is transmitted between network points as a unit complete with addressing and necessary protocol control information.

- A frame is usually transmitted serial bit by bit and contains a header field and a trailer field that frame the data.

C.   ACK   or   Acknowledgement.

- In some digital communication protocol, ACK is the name of a signal that data has been received successfully.