

# COMPUTER NETWORKS LAB

## ITL355: SPRING 2023

### Report: Semester Project Submission 1

**Astitva Mishra (2020BITE016)**

**Ayush Kumar Dubey (2020BITE087)**

**Shubham Kumar (2020BITE089)**

## Network Simulator

We have developed the all the layer of network simulator i.e., Physical Layer, Data link layer, Network Layer, Transport Layer and Application Layer.

- **Language used:** Code has been written in C++ language.
- **IDE used:** We have implemented and compiled this code on **CodeBlocks** and **VS Code** as we have used many features that may or may not be supported by IDE. It is good to run this code on either **CodeBlocks** or **VS Code**.
- **Libraries Used:**
  - iostream
  - string
  - bitset
  - sstream
  - algorithm
  - vector
  - random
  - ctime
  - fstream
  - map

functional  
unordered\_map  
iostream  
limits

# Objectives

## **1. Developed functionalities at the Physical Layer**

- Generated End Devices and Hubs
- Established connections between them to form a network topology
- Enabled data transmission and reception
- Displayed the topology of the network visually

## **2. Developed functionalities at the Data Link Layer**

- Built Layer 2 devices such as Switch
- Implemented address learning when using Switch
- Applied at least one Access Control Protocol, Token Passing
- Implemented three Flow Control Protocols for noisy channels:  
Stop & Wait and Selective Repeat
- Calculated the number of Broadcast and Collision domains present  
in the network

## **3. Developed functionalities at the Network Layer**

- Created and configured a router
- Assigned well formatted classless IPV4 address to the devices
- Using ARP find the MAC address of a host within a network
- Performed static routing
- Implemented RIP protocols for dynamic routing

## **4. Developed functionalities at the Transport Layer and Application Layer**

- TCP (Transport Layer)
- UDP (Transport Layer)
- HTTP (Application Layer)
- FTP (Application Layer)
- SSH (Application Layer)
- DNS (Application Layer)

# References

- [https://piazza.com/class\\_profile/get\\_resource/lemb8epwmnz3wd/leqzw7703si27a](https://piazza.com/class_profile/get_resource/lemb8epwmnz3wd/leqzw7703si27a)
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- <https://www.geeksforgeeks.org/transport-layer-responsibilities/>