

PROJECT INSTRUCTIONS

Overview

IUB connects to the Internet through an Internet Service Provider (ISP), which has assigned the IP address block `171.122.12.64/26` to IUB. The goal of this project is to design a network addressing scheme for IUB, ensuring proper allocation and usage of IP addresses for its schools, administrative divisions, and hosted websites.

Instructions

1. IP Address Allocation

- **IP Block Received:** IUB receives `171.122.12.64/26` from the ISP.
- **Allocation to Schools:** IUB has six (06) schools, and each school is allocated eight (08) IP addresses from the received block.
- **Allocation to CITS:** The remaining sixteen (16) IP addresses will stay with the Center for Information Technology Services (CITS). Of these:
 - Eight (08) IP addresses are allocated for administrative offices to connect to the Internet.
 - The remaining IP addresses are used to host three websites:
 - `https://iub.ac.bd`
 - `https://iras.iub.edu.bd`
 - `https://jukti.com`

2. Administrative Divisions

- **Number of Divisions:** IUB has four (04) administrative divisions:
 1. Executive Offices
 2. HR & Admin Offices
 3. Accounts and Payroll Offices
 4. Registration and Admissions Offices
- **Subnetting:** Each division will have a separate subnet and use NAT (Network Address Translation) to hide private IP blocks.
- **Services:** Administrative divisions will have their own DNS and DHCP services.
- **Key Configuration:**
 - First usable IP address of the first sub-block (administrative division): Assigned to DNS.
 - Second usable IP address of the first sub-block (administrative division): Assigned to DHCP.
 - Last usable IP address of each sub-block : Configured as the gateway.

3. School Networks

- **Private IP Blocks:** Each school will be assigned a private IP block.
- **Subnetting:** Each school will have four (04) sub-networks:
 1. Administrative Office
 2. Faculty Room
 3. Classroom
 4. Lab Classroom

- **NAT Usage:** All school sub-networks will use NAT to hide private IP blocks.
- **Services:** Each school will have its own DNS and DHCP services.
- **Key Configuration:**
 - First usable IP address of each school: Assigned to DNS.
 - Second usable IP address school: Assigned to DHCP.
 - Last usable IP address each subnet: Configured as the gateway.

4. Subnetting Details

- **Number of Hosts per Subnet:** Each subnet must accommodate 60 hosts.
- **Classless Addressing:** Use classless addressing to distribute IP addresses from the parent IP range allocated to each school or administrative division.
- **Packet Tracer Setup:** For simulation, show only four (04) hosts per subnet in Cisco Packet Tracer.

5. Connectivity Requirements

- **SSH Access:** Administrators must be able to access all routers and switches using the SSH protocol.
- **Host Communication:** All hosts across the network must be able to communicate with each other.

6. Parent IP Block for Private Addresses

- Use a parent private IP block must have the following IP address in the block: $192.168.x1.x2/x3$, where:
 - $x1$: Third two digits of your student ID
 - $x2$: Second two digits of your student ID
 - $x3$: First two digits of your student ID

Example:

Suppose your Student ID is = 2120290

So, the IP address will be = 192.168.29.20/21

So the parent block will be 192.168.24.0/21 (1st IP address of the block 192.168.24.0 and the last IP address of the block 192.168.31.255)

Deliverables

1. **IP Address Allocation Table:** Clearly show how IPs are allocated to schools, administrative divisions, and websites.
2. **Subnetting Details:** Provide subnet masks, ranges, and key configurations (DNS, DHCP, gateway) for each subnet.
3. **Packet Tracer Simulation:** Include a simulation with:
 - Four hosts per subnet.
 - Proper connectivity.
 - DNS, DHCP and HTTPS configuration
 - NAT and SSH and configurations