**Task 1: Multi-Level Network Topology Using Hub, Switch, and Bridge -** (Destination pc0 to pc5)

A computer screen shot of a network

AI-generated content may be incorrect.

**Steps Followed:**

To complete this task, we first selected the required devices from the End Devices section, including PC0 through PC7. After placing all the PCs on the workspace, we began configuring their IP addresses and subnet masks. For example, PC0 was assigned an IP address of 192.168.1.1 with a subnet mask of 255.255.255.0. Similarly, the remaining PCs were also configured using values visible in the image provided above. The IP configurations were as follows:

These values are also clearly visible in the simulation image provided above

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Device Name** | **Device Type** | **IP Address** | **Subnet Mask** | **Connected To** |
| PC0 | End Device | 192.168.1.1 | 255.255.255.0 | Hub0 |
| PC1 | End Device | 192.168.1.2 | 255.255.255.0 | Hub0 |
| PC2 | End Device | 192.168.1.3 | 255.255.255.0 | Hub0 |
| PC3 | End Device | 192.168.1.4 | 255.255.255.0 | Switch1 |
| PC4 | End Device | 192.168.1.5 | 255.255.255.0 | Switch1 |
| PC5 | End Device | 192.168.1.6 | 255.255.255.0 | Switch0 |
| PC6 | End Device | 192.168.1.7 | 255.255.255.0 | Switch0 |
| PC7 | End Device | 192.168.1.8 | 255.255.255.0 | Switch0 |

Once the PCs were configured, we added Hub0, Switch0, Switch1, and Bridge0 to the network. For connecting all devices, we used the Copper Straight-Through cable from the Connections menu. This is because straight-through cables are used for connecting different types of devices, such as a PC to a switch or hub. However, for connections between similar devices, such as switches and hubs, we used Copper Crossover cables, following proper networking practices.

Following the diagram shown in the image, we connected all devices accordingly. After finishing the physical topology, we tested data transmission. We selected the Simple PDU tool and sent data from PC0 to PC5. This data traveled through Hub0 → Switch1 → Bridge0 → Switch0 before reaching PC5. After running the simulation and clicking the Play button, the packet successfully reached its destination. This confirmed that the network setup and configuration were completed correctly.

**Task 2: Router-Based Inter-Switch Communication Between PCs** - ( Destination pc0 to pc2)

**A computer screen shot of a computer

AI-generated content may be incorrect.**

**Steps Followed:**

To complete this task, we first selected and placed four PCs on the workspace, then added Switch0, Switch1, and Router0. After positioning the devices, we configured their IP addresses and subnet masks. For the PCs connected to Switch0 (i.e., PC0 and PC1), the default gateway was set to 192.168.10.1. For the PCs connected to Switch1 (PC2 and PC3), the default gateway was set to 192.168.20.1. These gateway values are clearly shown in the reference image. Next, we proceeded to configure the router. By clicking on Router0, we accessed the Config tab, and under FastEthernet0/0, we set the appropriate IP address and subnet mask corresponding to the 192.168.10.0 network. Similarly, under FastEthernet1/0, we entered the values for the 192.168.20.0 network. This configuration allowed the router to interface with both switches and route data between the two different subnets. The IP configurations were as follows:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Device Name** | **IP Address** | **Subnet Mask** | **Default Gateway** | **Connected To** |
| PC0 | 192.168.10.2 | 255.255.255.0 | 192.168.10.1 | Switch0 |
| PC1 | 192.168.10.3 | 255.255.255.0 | 192.168.10.1 | Switch0 |
| PC2 | 192.168.20.2 | 255.255.255.0 | 192.168.20.1 | Switch1 |
| PC3 | 192.168.20.3 | 255.255.255.0 | 192.168.20.1 | Switch1 |
| Switch0 | N/A | N/A | N/A | Router0 (F0/0) |
| Switch1 | N/A | N/A | N/A | Router0 (F1/0) |

For Router:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Device Name** | **IP Address** | **Subnet Mask** | **Default Gateway** | **Connected To** |
| Router0 | F0/0: 192.168.10.1 | 255.255.255.0 | N/A | Both Switches |
| Router0 | F1/0: 192.168.20.1 | 255.255.255.0 | N/A | Both Switches |

For connections, we once again used the Copper Straight-Through cable from the Connections menu for connecting different types of devices (e.g., PC to switch or switch to router). For any same-type device connections, we would have used Cross-Over cables if applicable. We connected each PC to its respective switch and connected both switches to the router using the correct interfaces.

After completing the physical and logical setup, we tested the communication. Using the Simple PDU tool, we initiated a packet transfer from PC0 to PC2. The packet traveled from PC0 → Switch0 → Router0 → Switch1 → PC2. After running the simulation and clicking the Play button, we observed that the data packet successfully reached its destination, confirming a successful and properly routed network configuration.