	CSC-203L : Computer Networks Lab **Lab Project**	**Instructor:** Anam Iftikhar
	Roll No: **2023-CS-630**	**Total Marks: 35** **Marks Obtained:** **CLO4**

NOTE:

- You can work in the group of three**.**
- **Project Deadline: 22nd December, 2024.**
- All the members of the group must be present at the time of submission (Viva). Absentee would be graded zeros.
- **The project will be evaluated on the basis of rubrics shared.**

❖ **Deliverables:**

- The designed network should be implemented in packet tracer, with necessary devices and full configuration details *(preferably CLI)*
- The network should be tested for all the mentioned parameters.

❖ **In Report:**

- Network topology (Properly labelled Packet Tracer Network Diagram)
- Sub Nets / VLANs / VLSM details
- Configuration Details
- Test Cases Simulations
- Fill this document according to your project specification and add at start of the report.

The term unit is to represent the no of departments in the organization or institute selected

1. You are designing a network for:
   Banking Networking System.
2. No of Separate Units in *above mentioned:*
   6.
3. Define the cost or budget of the *above mentioned* in terms of networking devices*:*
   - 😐 No. of Routers: _____**4**_____
   - 😐 No. of Switches: _____**6**_____

4. Define the number of End Devices allowed in each Unit:
   - ☺ No. of Personal Computers ____**4+**_____
   - ☺ Printers _____**4+**_____
   - ☺ Cellular Devices _____**4+**_____
   - ☺ *Any other* _____***4+***_____
5. Define the number of Border Router:
   _____***2***_____
6. Define the number of Routers connected to ISP for internet:
   _____***1***_____

7. Communication amongst the Units:
   Used *ACL to limit the access of unit 1 from other units.*

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#access-list 101 deny ip 192.168.2.0 255.255.255.0 host 1.0.0.2
Router(config)#access-list 101 deny ip 192.168.2.0 255.255.255.0 host 1.0.0.3
Router(config)#access-list 101 deny ip 192.168.2.0 255.255.255.0 host 1.0.0.5
Router(config)#access-list 101 permit ip any any
Router(config)#interface fastethernet0/1
%Invalid interface type and number
Router(config)#interface fastethernet1/0
Router(config-if)#ip access groip 101 in
                                  ^
% Invalid input detected at '^' marker.

Router(config-if)#ip access group 101 in
                                  ^
% Invalid input detected at '^' marker.

Router(config-if)#ip access-group 101 in
Router(config-if)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#write memory
Building configuration...
[OK]
Router#
```

Ctrl+F6 to exit CLI focus Copy Paste

8. Define the number of servers and Types:
   5 types of servers used.
   Email, HTTP, FTP, DHCP and DNS.
9. Un-authorized Access:

Unit 6 has access to all servers.

Rest of the units are restricted to use email and web server only.

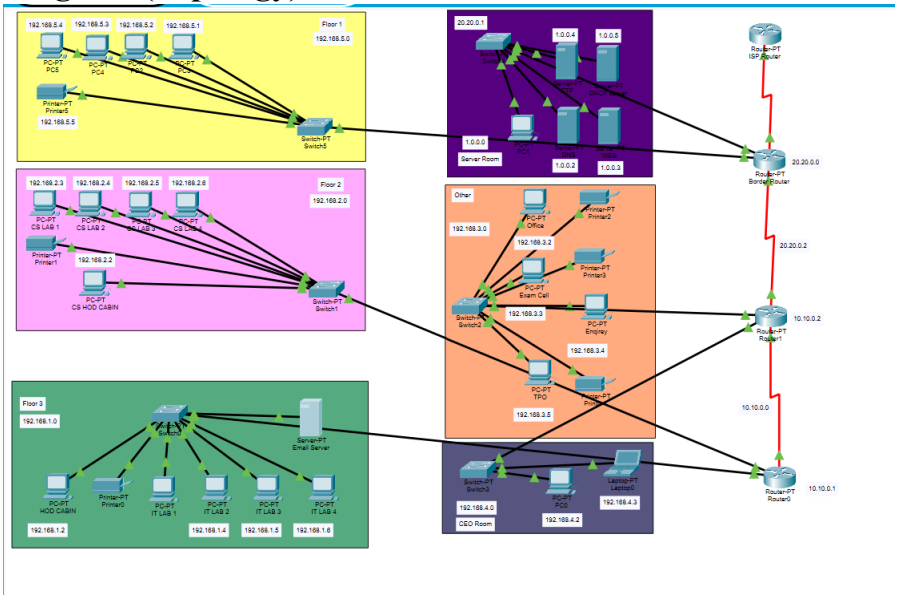
10. Routing Protocols used:
    a) Between internal routers:
    RIP and Static Routing.
    b) With ISP router:
    Static Routing.
11. Private IP used (*select one prefix*):
    192.168.1/24
    DHCP is used to assign Ips to 2 units. Rest IP configuration is done static.
12. No. of Public Addresses allocated by ISP to *above mentioned*:
    - **Number of Public Addresses Allocated by ISP**: 10 public addresses allocated from 203.0.113.1 to 203.0.113.10.

    Reserved Addresses:
    - **Web Server**: 203.0.113.9 (Mapped from 1.0.0.3 via NAT)

- **Email Server**: 203.0.113.10 (Mapped from 192.168.1.10 via NAT)
- **Translation**:
- FTP Server: 203.0.113.7 (Mapped from 1.0.0.4 via NAT)
- DNS Server: 203.0.113.8 (Mapped from 1.0.0.2 via NAT)
- DHCP Server: 203.0.113.6 (Mapped from 1.0.0.5 via NAT)
- **Private Network NAT**: All private IP addresses within 192.168.0.0/16 will be translated to the allocated public IPs when accessing the internet.

REPORT

1. Diagram (Topology)



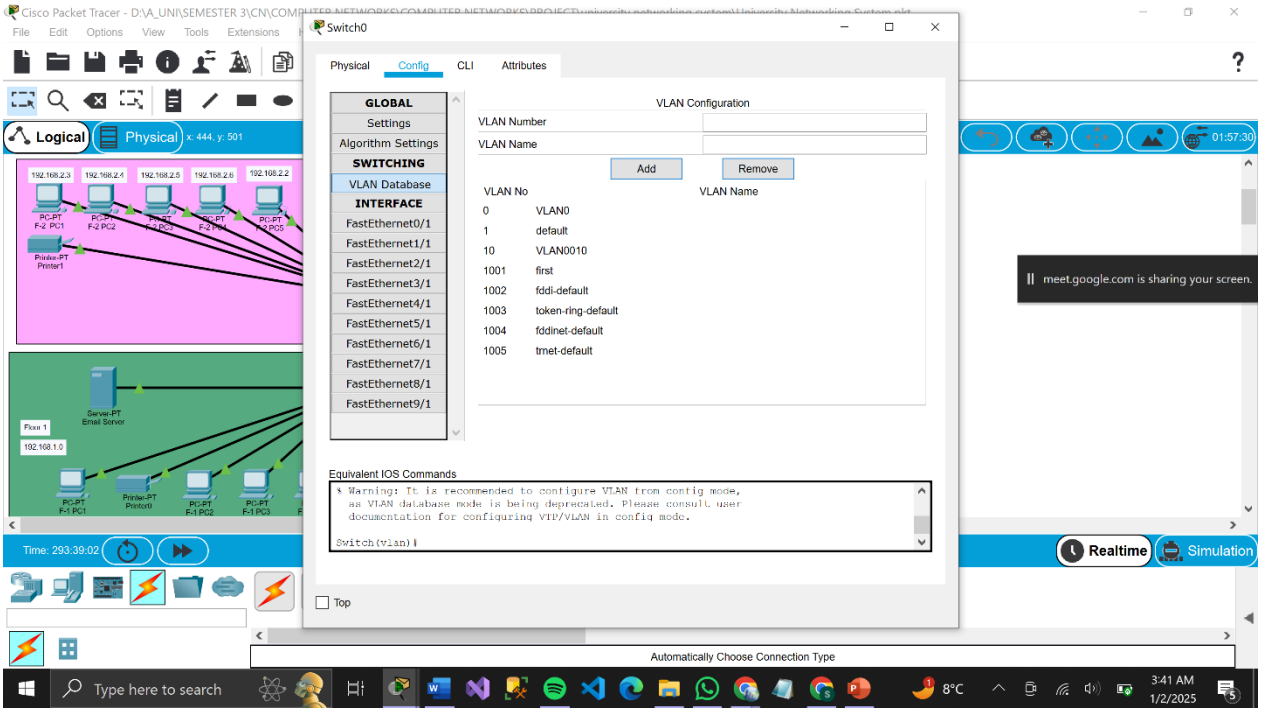
2. Sub netting

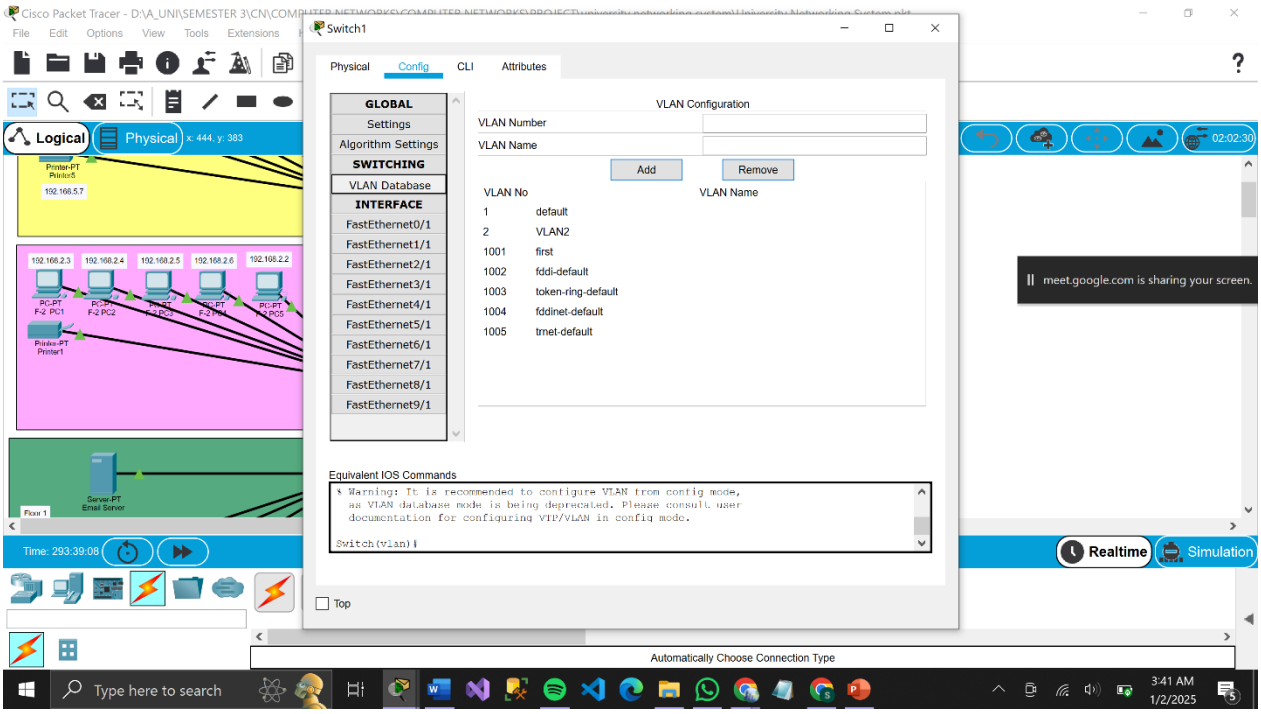
VLAN

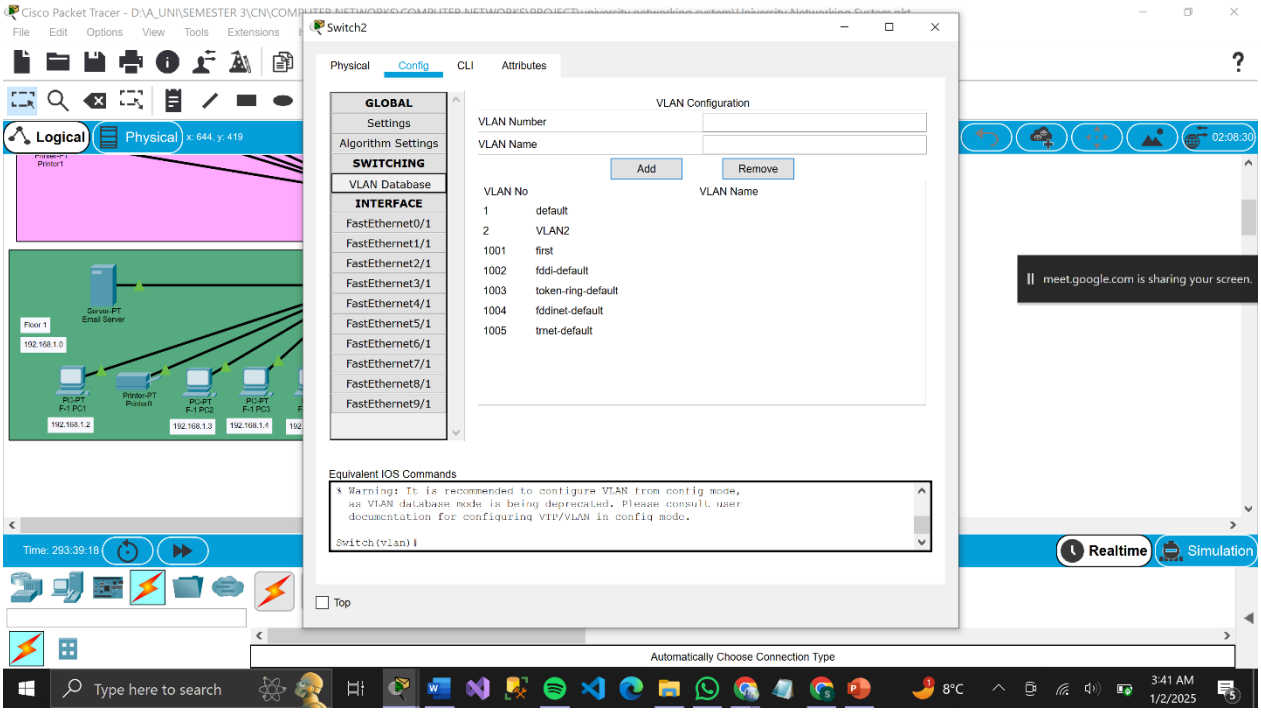
VLAN	IP Address	Subnet Mask
1	192.168.1.0	255.255.255.0
2	192.168.2.0	255.255.255.0
3	192.168.3.0	255.255.255.0
4	192.168.4.0	255.255.255.0
5	192.168.5.0	255.255.255.0

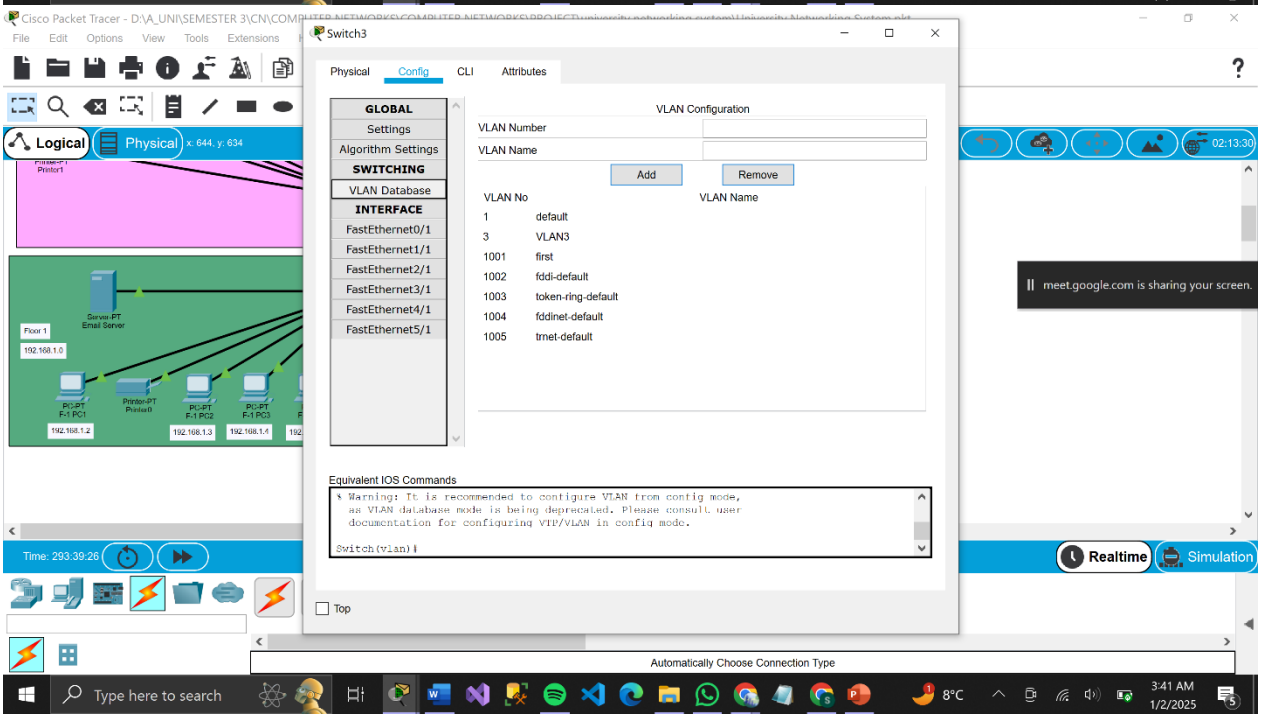
3. Configurations

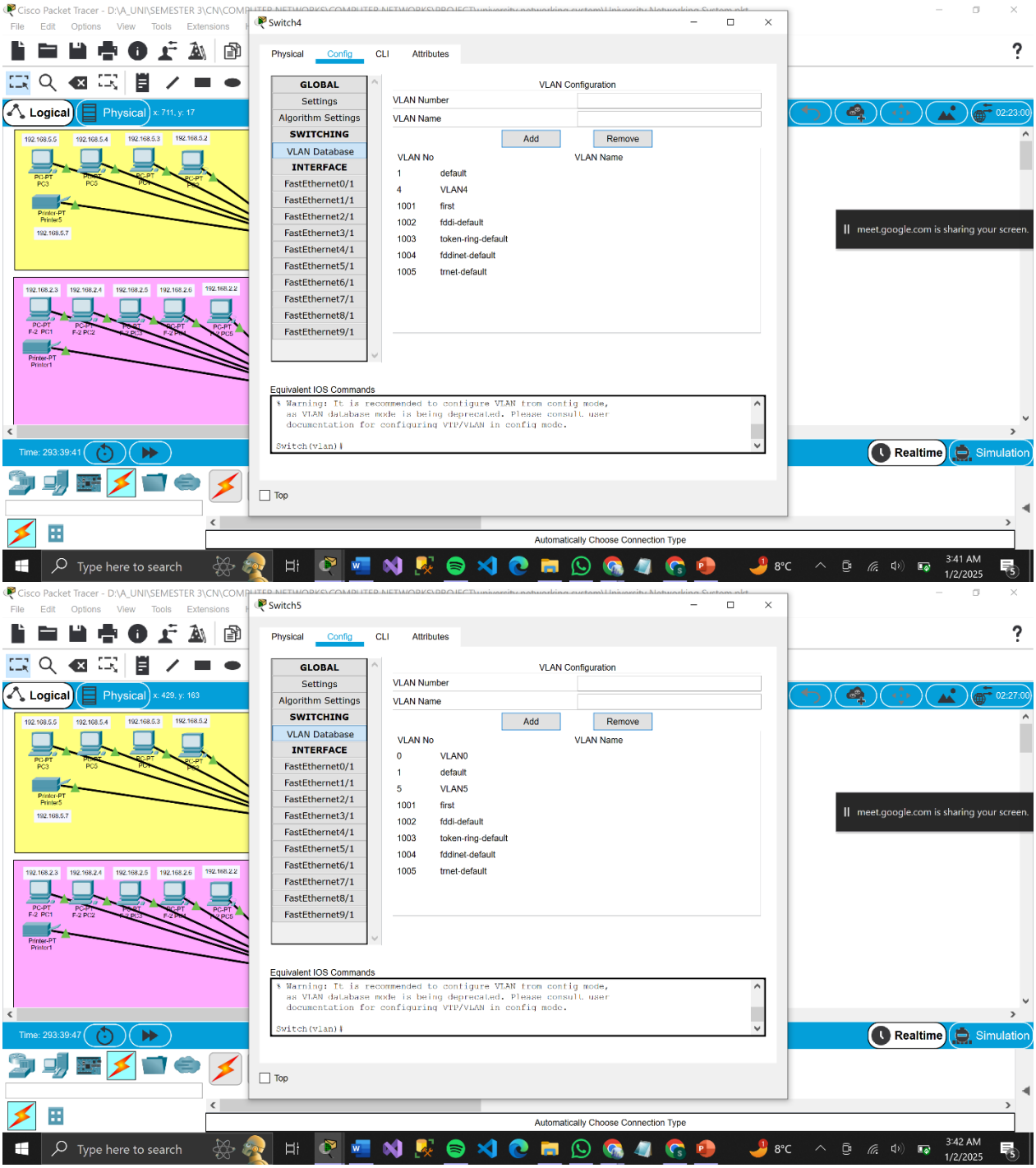
a. Switch



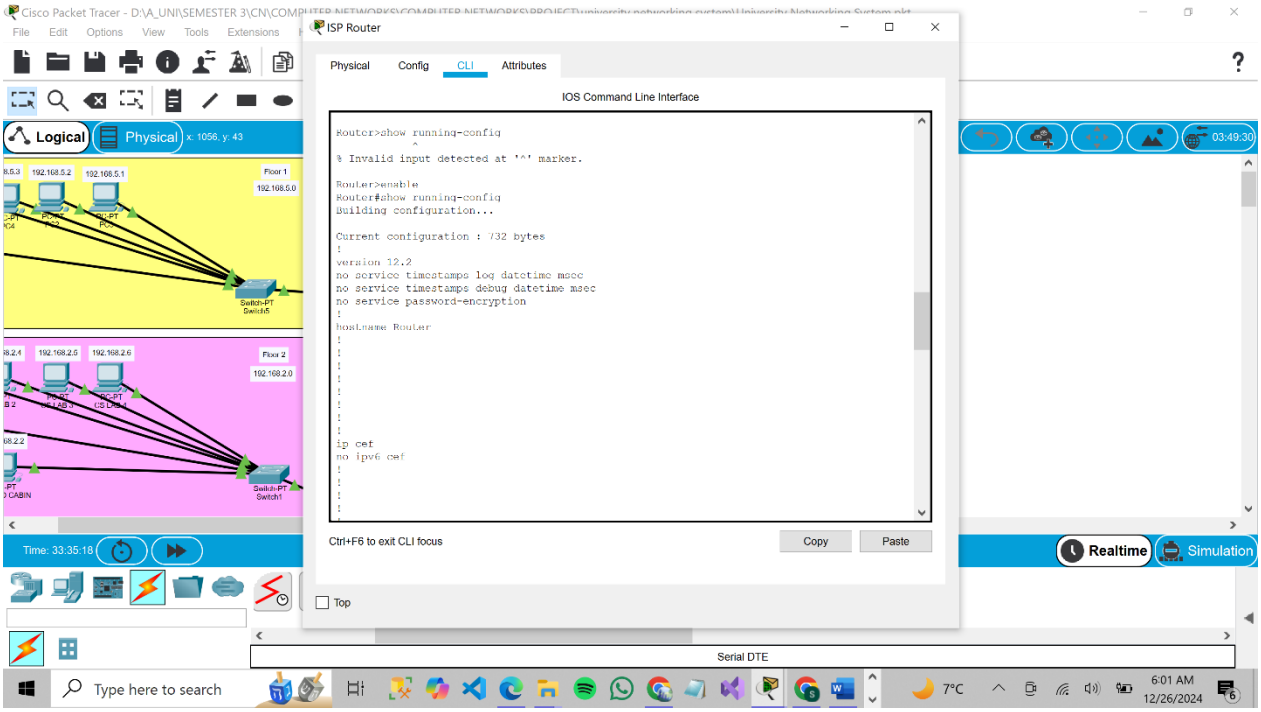


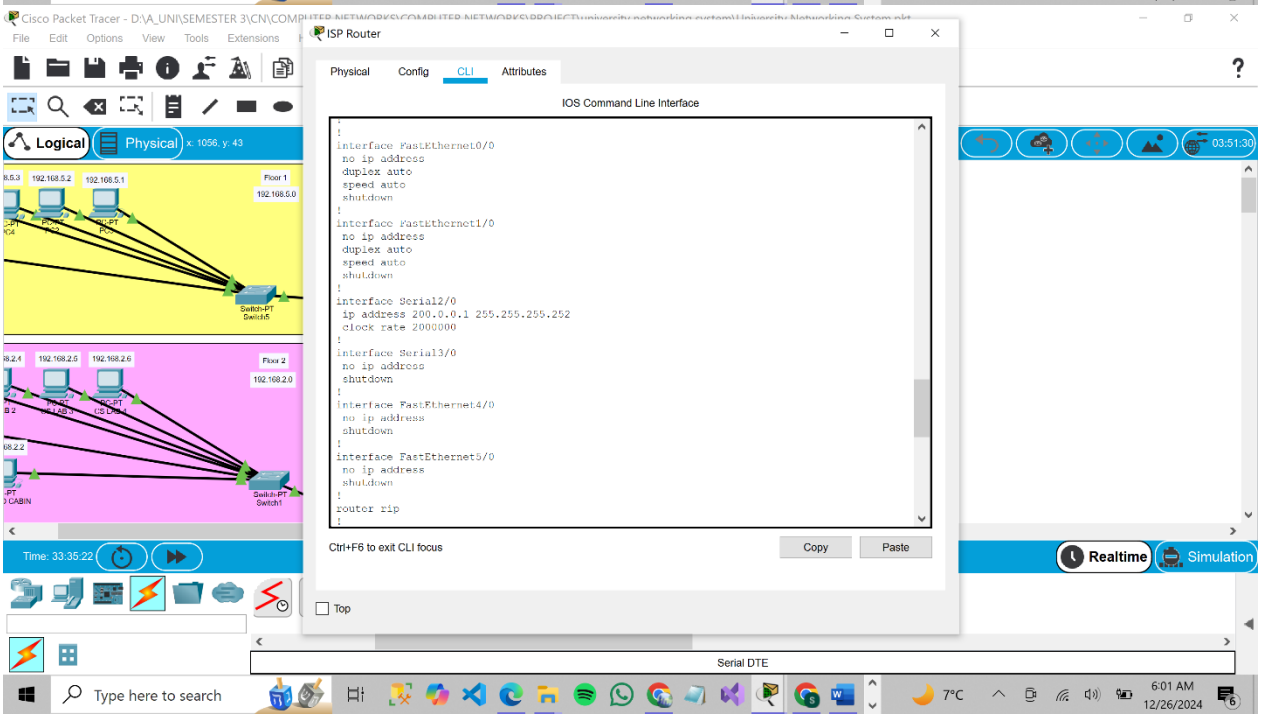

Switch2
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
SWITCHING
VLAN Database
INTERFACE
FastEthernet0/1
FastEthernet1/1
FastEthernet2/1
FastEthernet3/1
FastEthernet4/1
FastEthernet5/1
FastEthernet6/1
FastEthernet7/1
FastEthernet8/1
FastEthernet9/1
VLAN Configuration
VLAN Number
VLAN Name
Add
Remove
VLAN No
VLAN Name
1 default
2 VLAN2
1001 first
1002 fddi-default
1003 token-ring-default
1004 fddinet-default
1005 trnet-default
Equivalent IOS Commands
% Warning: It is recommended to configure VLAN from config mode,
as VLAN database mode is being deprecated. Please consult user
documentation for configuring VTP/VLAN in config mode.
Switch(vlan)#
Top
Logical
Physical
Time: 293:39:18
Realtime
Simulation
Automatically Choose Connection Type
meet.google.com is sharing your screen.
Type here to search
8°C
3:41 AM
1/2/2025

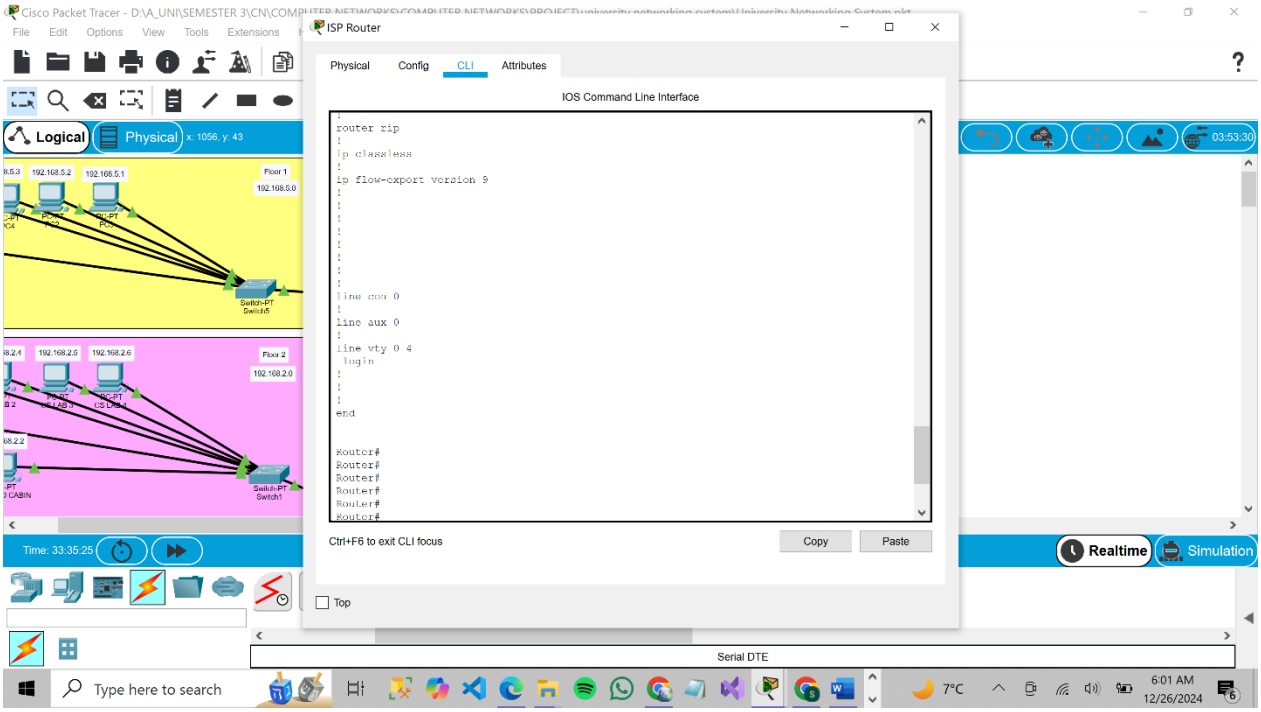

Switch3
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
SWITCHING
VLAN Database
INTERFACE
FastEthernet0/1
FastEthernet1/1
FastEthernet2/1
FastEthernet3/1
FastEthernet4/1
FastEthernet5/1
VLAN Configuration
VLAN Number
VLAN Name
Add
Remove
VLAN No
VLAN Name
1 default
3 VLAN3
1001 first
1002 fddi-default
1003 token-ring-default
1004 fddinet-default
1005 trnet-default
Equivalent IOS Commands
% Warning: It is recommended to configure VLAN from config mode,
as VLAN database mode is being deprecated. Please consult user
documentation for configuring VTP/VLAN in config mode.
Switch(vlan)#
Top
Logical
Physical
Time: 293:39:26
Realtime
Simulation
Automatically Choose Connection Type
meet.google.com is sharing your screen.
Type here to search
8°C
3:41 AM
1/2/2025

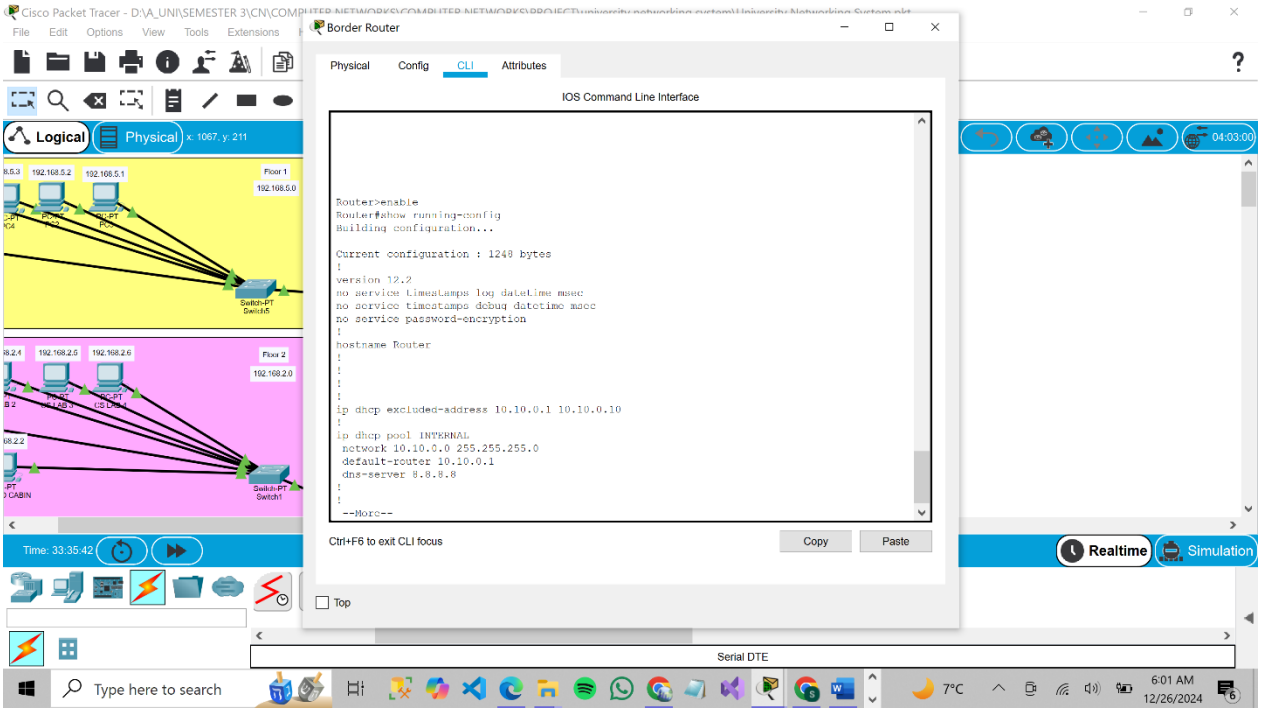

Switch4
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
SWITCHING
VLAN Database
INTERFACE
FastEthernet0/1
FastEthernet1/1
FastEthernet2/1
FastEthernet3/1
FastEthernet4/1
FastEthernet5/1
FastEthernet6/1
FastEthernet7/1
FastEthernet8/1
FastEthernet9/1
VLAN Configuration
VLAN Number
VLAN Name
Add
Remove
VLAN No
VLAN Name
1 default
4 VLAN4
1001 first
1002 fddi-default
1003 token-ring-default
1004 fddinet-default
1005 trnet-default
Equivalent IOS Commands
% Warning: It is recommended to configure VLAN from config mode,
as VLAN database mode is being deprecated. Please consult user
documentation for configuring VTP/VLAN in config mode.
Switch(vlan)#
Top
Logical
Physical
Time: 293:39:41
Realtime
Simulation
Automatically Choose Connection Type
meet.google.com is sharing your screen.
Type here to search
3:41 AM
1/2/2025
Switch5
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
SWITCHING
VLAN Database
INTERFACE
FastEthernet0/1
FastEthernet1/1
FastEthernet2/1
FastEthernet3/1
FastEthernet4/1
FastEthernet5/1
FastEthernet6/1
FastEthernet7/1
FastEthernet8/1
FastEthernet9/1
VLAN Configuration
VLAN Number
VLAN Name
Add
Remove
VLAN No
VLAN Name
0 VLAN0
1 default
5 VLAN5
1001 first
1002 fddi-default
1003 token-ring-default
1004 fddinet-default
1005 trnet-default
Equivalent IOS Commands
% Warning: It is recommended to configure VLAN from config mode,
as VLAN database mode is being deprecated. Please consult user
documentation for configuring VTP/VLAN in config mode.
Switch(vlan)#
Top
Logical
Physical
Time: 293:39:47
Realtime
Simulation
Automatically Choose Connection Type
meet.google.com is sharing your screen.
Type here to search
3:42 AM
1/2/2025

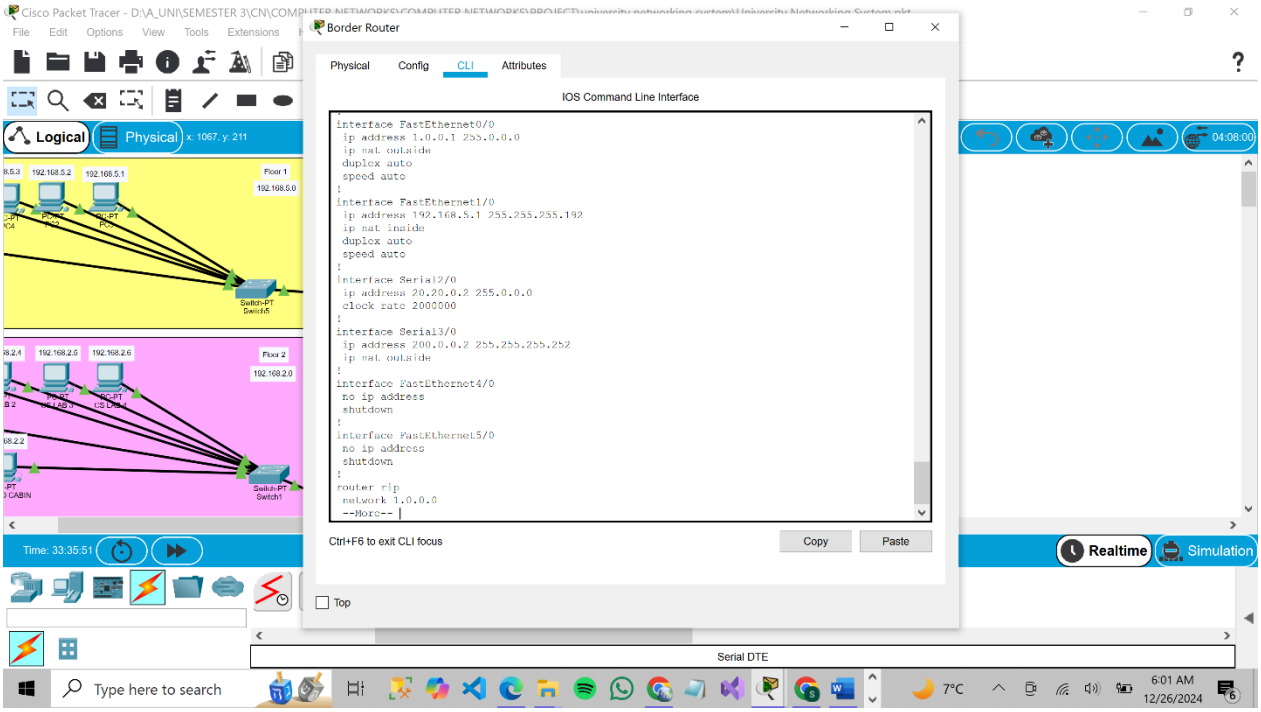
b. Router

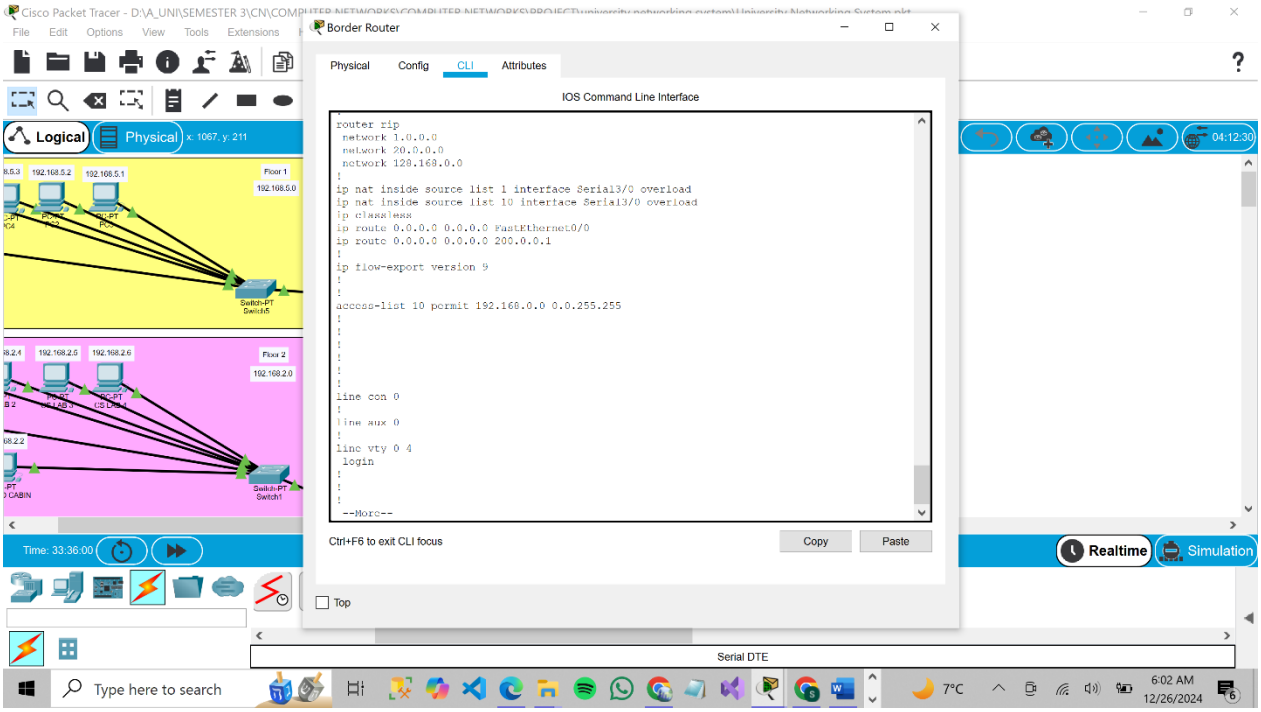

ISP Router
Physical
Config
CLI
Attributes
IOS Command Line Interface
Router>show running-config
^
% Invalid input detected at '^' marker.
Router>enable
Router#show running-config
Building configuration...
Current configuration : 732 bytes
!
version 12.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname Router
!
!
!
!
!
!
!
!
ip cef
no ipv6 cef
!
!
!
!
Ctrl+F6 to exit CLI focus
Copy
Paste
Top
Logical
Physical
Realtime
Simulation
Serial DTE
Type here to search
6:01 AM
12/26/2024

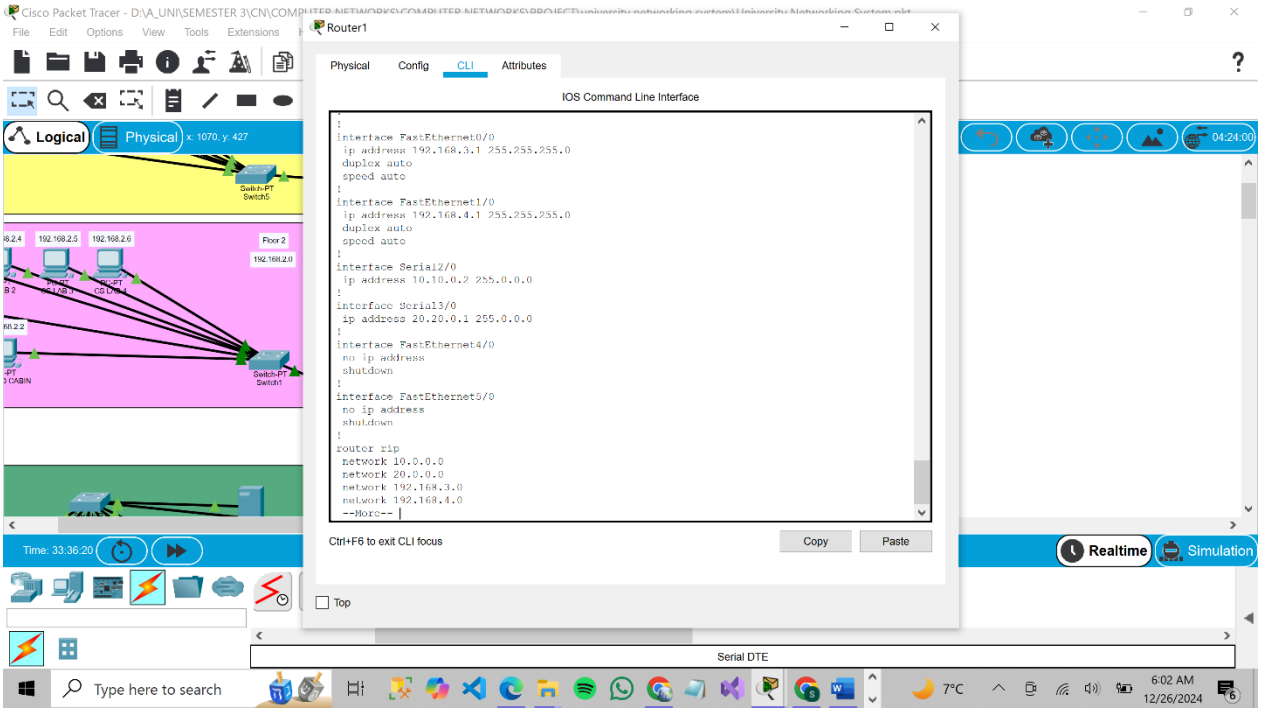

ISP Router
Physical
Config
CLI
Attributes
IOS Command Line Interface
!
interface FastEthernet0/0
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface FastEthernet1/0
 no ip address
 duplex auto
 speed auto
 shutdown
!
interface Serial2/0
 ip address 200.0.0.1 255.255.255.252
 clock rate 2000000
!
interface Serial3/0
 no ip address
 shutdown
!
interface FastEthernet4/0
 no ip address
 shutdown
!
interface FastEthernet5/0
 no ip address
 shutdown
!
router rip
!
Ctrl+F6 to exit CLI focus
Copy
Paste
Top
Logical
Physical
Realtime
Simulation
Serial DTE
Type here to search
6:01 AM
12/26/2024

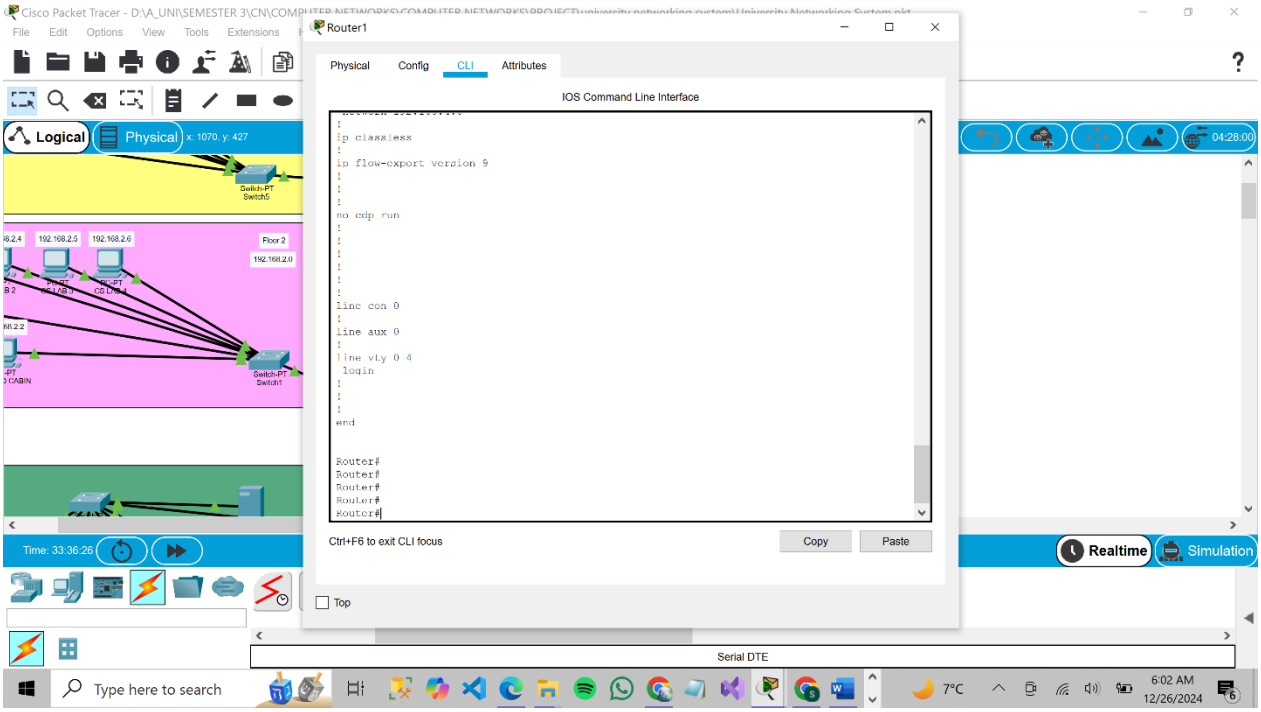

ISP Router
Physical
Config
CLI
Attributes
IOS Command Line Interface
router rip
!
ip classless
!
ip flow-export version 9
!
!
!
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
login
!
!
!
end
Router#
Router#
Router#
Router#
Router#
Router#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top
Logical
Physical
Realtime
Simulation
Serial DTE
Type here to search
6:01 AM
12/26/2024

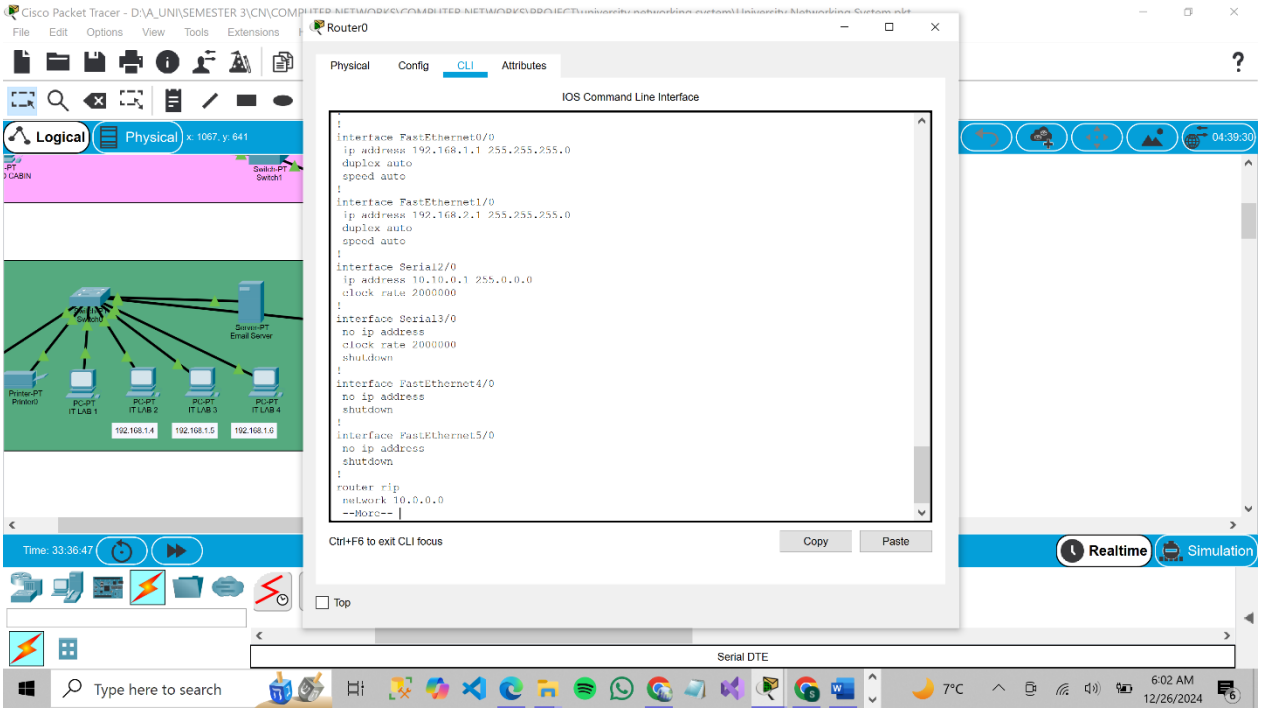

Border Router
Physical
Config
CLI
Attributes
IOS Command Line Interface
Router>enable
Router#show running-config
Building configuration...
Current configuration : 1240 bytes
!
version 12.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname Router
!
!
!
!
ip dhcp excluded-address 10.10.0.1 10.10.0.10
!
ip dhcp pool INTERNAL
network 10.10.0.0 255.255.255.0
default-router 10.10.0.1
dns-server 8.8.8.8
!
!
--More--
Ctrl+F6 to exit CLI focus
Copy
Paste
Top
Logical
Physical
Realtime
Simulation
Serial DTE
Type here to search
6:01 AM
12/26/2024

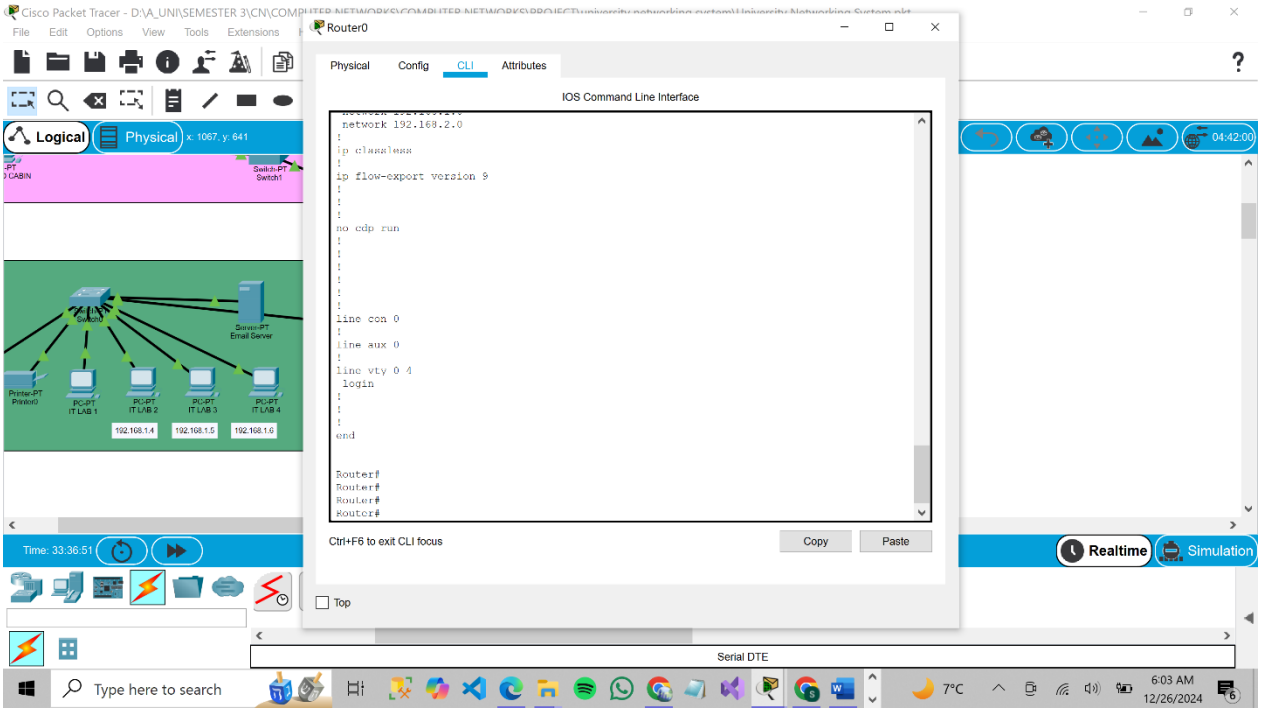

Cisco Packet Tracer - D:\A_UNI\SEMESTER 3\CN\COMPUTER NETWORKS\COMPUTER NETWORKS\PROJECT\university networking system\University Networking System.pkt
File Edit Options View Tools Extensions
Logical Physical x: 1067, y: 211
Border Router
Physical Config CLI Attributes
IOS Command Line Interface
interface FastEthernet0/0
ip address 1.0.0.1 255.0.0.0
ip nat outside
duplex auto
speed auto
!
interface FastEthernet1/0
ip address 192.168.5.1 255.255.255.192
ip nat inside
duplex auto
speed auto
!
interface Serial2/0
ip address 20.20.0.2 255.0.0.0
clock rate 2000000
!
interface Serial3/0
ip address 200.0.0.2 255.255.255.252
ip nat outside
!
interface FastEthernet4/0
no ip address
shutdown
!
interface FastEthernet5/0
no ip address
shutdown
!
router rip
network 1.0.0.0
--More--
Ctrl+F6 to exit CLI focus
Copy
Paste
Top
Floor 1
192.168.5.0
Floor 2
192.168.2.0
Time: 33:35:51
Realtime
Simulation
Serial DTE
Type here to search
7°C
6:01 AM
12/26/2024

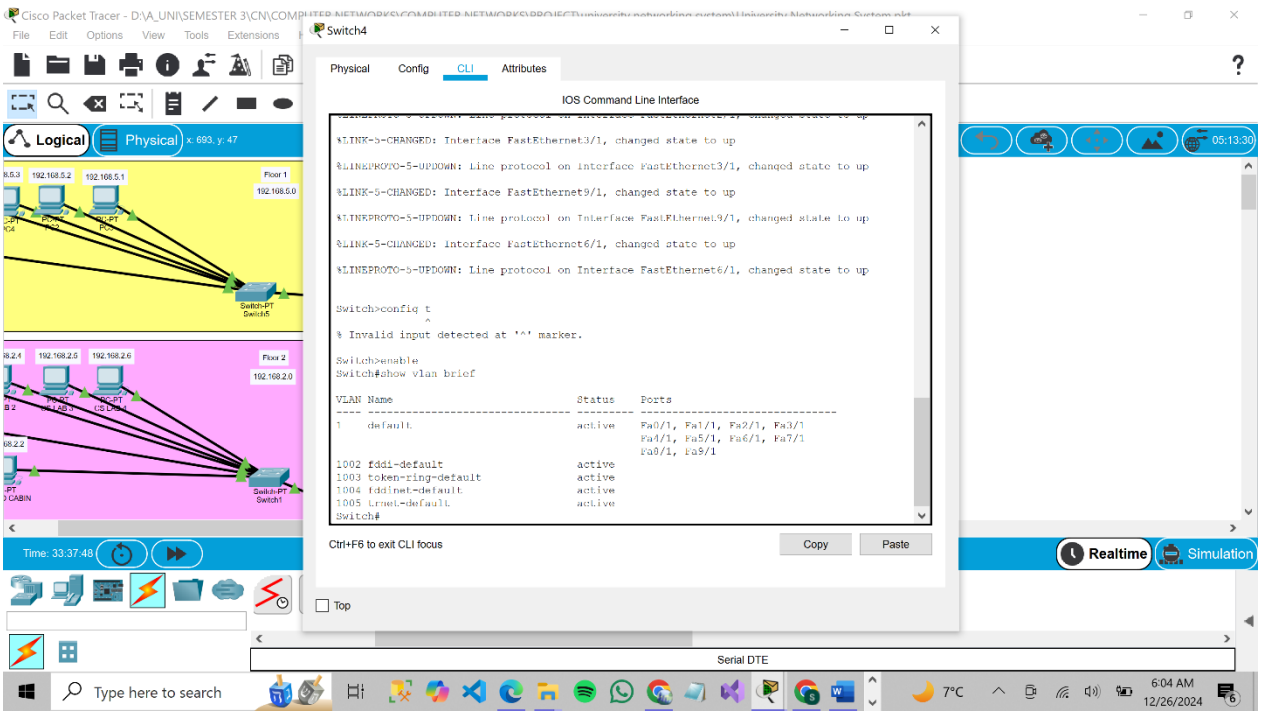

Cisco Packet Tracer - D:\A_UNI\SEMESTER 3\CN\COMPUTER NETWORKS\COMPUTER NETWORKS\PROJECT\university networking system\University Networking System.pkt
File Edit Options View Tools Extensions
Logical Physical x: 1067, y: 211
Border Router
Physical Config CLI Attributes
IOS Command Line Interface
router rip
network 1.0.0.0
network 20.0.0.0
network 128.168.0.0
!
ip nat inside source list 1 interface Serial3/0 overload
ip nat inside source list 10 interface Serial3/0 overload
ip classless
ip route 0.0.0.0 0.0.0.0 FastEthernet0/0
ip route 0.0.0.0 0.0.0.0 200.0.0.1
!
ip flow-export version 9
!
!
access-list 10 permit 192.168.0.0 0.0.255.255
!
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
login
!
!
!
--More--
Ctrl+F6 to exit CLI focus
Copy
Paste
Top
Floor 1
192.168.5.0
Floor 2
192.168.2.0
Time: 33:36:00
Realtime
Simulation
Serial DTE
Type here to search
7°C
6:02 AM
12/26/2024


Cisco Packet Tracer - D:\A_UNI\SEMESTER 3\CN\COMPUTER NETWORKS\COMPUTER NETWORKS\PROJECT\university networking system\University Networking System.pkt
File Edit Options View Tools Extensions
Logical Physical x: 1070, y: 427
Router1
Physical Config CLI Attributes
IOS Command Line Interface
!
interface FastEthernet0/0
 ip address 192.168.3.1 255.255.255.0
 duplex auto
 speed auto
!
interface FastEthernet1/0
 ip address 192.168.4.1 255.255.255.0
 duplex auto
 speed auto
!
interface Serial2/0
 ip address 10.10.0.2 255.0.0.0
!
interface Serial3/0
 ip address 20.20.0.1 255.0.0.0
!
interface FastEthernet4/0
 no ip address
 shutdown
!
interface FastEthernet5/0
 no ip address
 shutdown
!
router rip
 network 10.0.0.0
 network 20.0.0.0
 network 192.168.3.0
 network 192.168.4.0
 --More--
Ctrl+F6 to exit CLI focus
Copy
Paste
Top
Floor 2
192.168.2.0
Switch-PT Switch1
Switch-PT Switch5
Time: 33:36:20
Realtime
Simulation
Serial DTE
Type here to search
7°C
6:02 AM
12/26/2024


Cisco Packet Tracer - D:\A_UNI\SEMESTER 3\CN\COMPUTER NETWORKS\COMPUTER NETWORKS\PROJECT\university networking system\University Networking System.pkt
File Edit Options View Tools Extensions
Logical Physical x: 1070, y: 427
Router1
Physical Config CLI Attributes
IOS Command Line Interface
!
ip classless
!
ip flow-export version 9
!
!
!
no cdp run
!
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
 login
!
!
!
end
Router#
Router#
Router#
Router#
Router#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top
Floor 2
192.168.2.0
Switch-PT Switch1
Switch-PT Switch5
Time: 33:36:26
Realtime
Simulation
Serial DTE
Type here to search
7°C
6:02 AM
12/26/2024


Router0
Physical
Config
CLI
Attributes
IOS Command Line Interface
!
interface FastEthernet0/0
 ip address 192.168.1.1 255.255.255.0
 duplex auto
 speed auto
!
interface FastEthernet1/0
 ip address 192.168.2.1 255.255.255.0
 duplex auto
 speed auto
!
interface Serial2/0
 ip address 10.10.0.1 255.0.0.0
 clock rate 2000000
!
interface Serial3/0
 no ip address
 clock rate 2000000
 shutdown
!
interface FastEthernet4/0
 no ip address
 shutdown
!
interface FastEthernet5/0
 no ip address
 shutdown
!
router rip
 network 10.0.0.0
 --More--
Ctrl+F6 to exit CLI focus
Copy
Paste
Top
Logical
Physical
Realtime
Simulation
Serial DTE
Type here to search
6:02 AM
12/26/2024


Router0
Physical
Config
CLI
Attributes
IOS Command Line Interface
 network 192.168.2.0
!
ip classless
!
ip flow-export version 9
!
!
!
no cdp run
!
!
!
!
!
!
line con 0
!
line aux 0
!
line vty 0 4
 login
!
!
!
end
Router#
Router#
Router#
Router#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top
Logical
Physical
Realtime
Simulation
Serial DTE
Type here to search
6:03 AM
12/26/2024



4. **Simulations**
    a. **Test 1: Communication b/w the Units**
        i. **Unit 6 communication with All Units.**
        ii. **Unit 1 communication with Unit 1,2,3,4,6.**
        iii. **Unit 2 communication with Unit 1,2,3,4,6.**
        iv. **Unit 3 communication with Unit 1,2,3,4,6.**
        v. **Unit 4 communication with Unit 1,2,3,4,6.**
        vi. **Unit 5 communication with Unit 6 only.**
    b. **Test 2: Server Accesses**
        i. **Unit 6 has access to all servers.**
        ii. **Rest of the units have email and web server.**
        iii. **Unit 5 and 2 have DHCP.**
        iv. **Unit 3 has FTP.**