

**Міністерство освіти і науки України  
Національний технічний університет України  
"Київський політехнічний інститут імені Ігоря Сікорського"  
Фізико-технічний інститут**

«Безпека комп'ютерних мереж»

**Лабораторна робота №1**

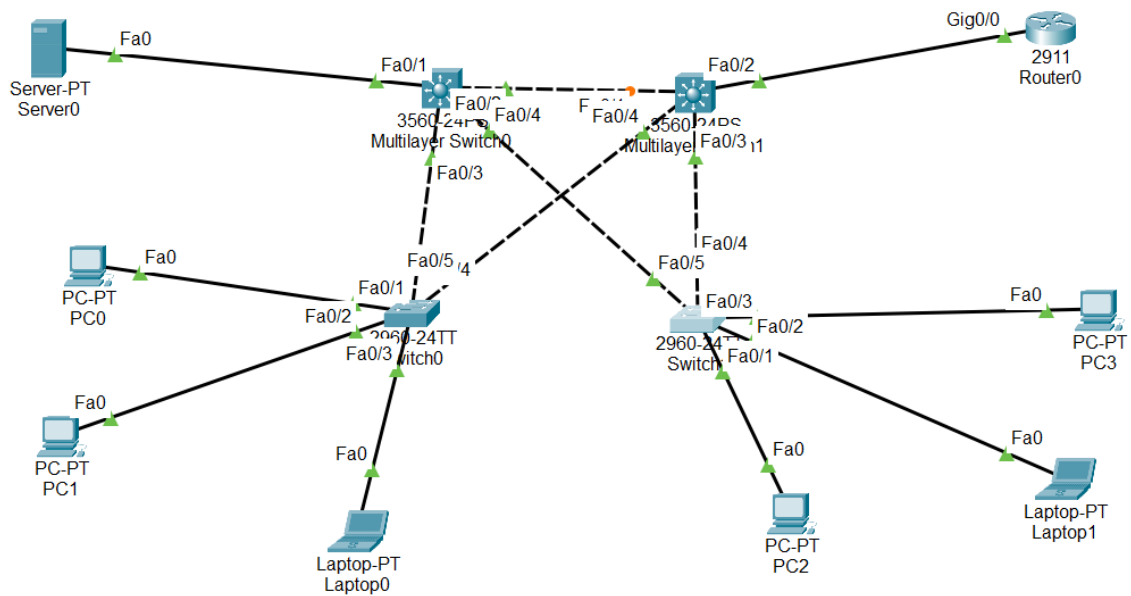
Варіант 5.2

**Виконала:**  
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Гурджия Валерія Вахтангівна

Київ – 2022

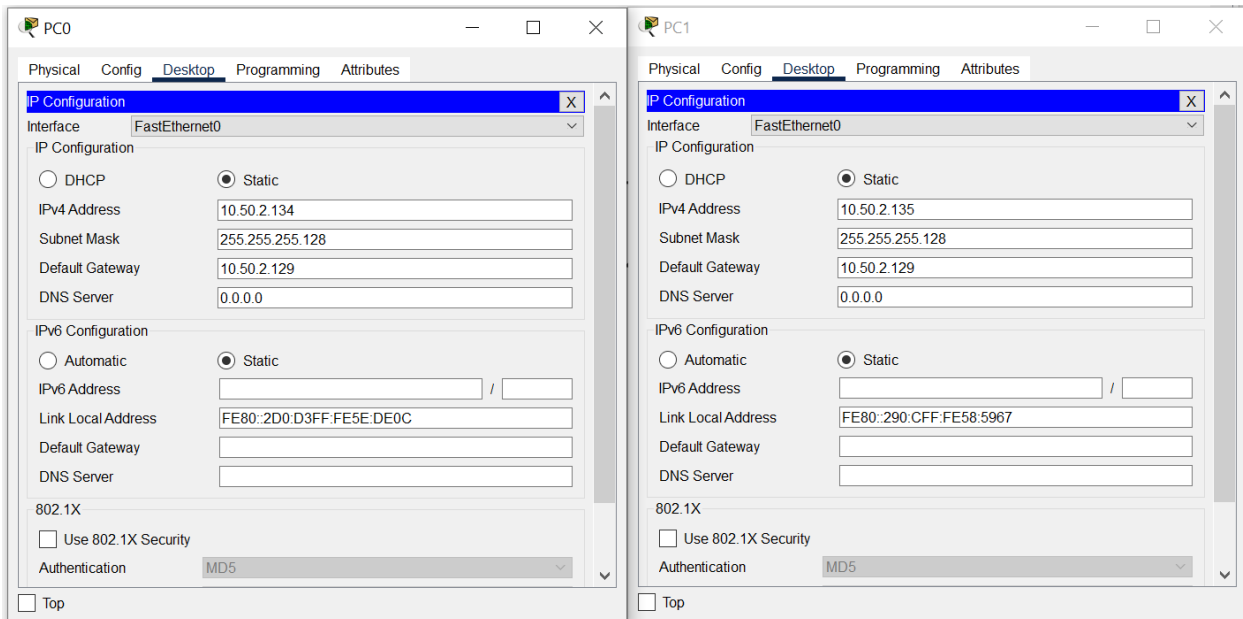
# Лабораторна робота №1.1

## Налаштування локальної мережі



5.2	10.50.2.128/25	10.50.2.48/28
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Встановили ір адреси та маски комп'ютерам



PC2

PhysicalConfigDesktopProgrammingAttributes

IP Configuration

InterfaceFastEthernet0

IP Configuration

DHCP

Static

IPv4 Address10.50.2.136

Subnet Mask255.255.255.128

Default Gateway10.50.2.129

DNS Server0.0.0.0

IPv6 Configuration

Automatic

Static

IPv6 Address /

Link Local AddressFE80::209:7CFF:FE5A:3625

Default Gateway

DNS Server

802.1X

Use 802.1X Security

AuthenticationMD5

Top

PC3

PhysicalConfigDesktopProgrammingAttributes

IP Configuration

InterfaceFastEthernet0

IP Configuration

DHCP

Static

IPv4 Address10.50.2.137

Subnet Mask255.255.255.128

Default Gateway10.50.2.129

DNS Server0.0.0.0

IPv6 Configuration

Automatic

Static

IPv6 Address /

Link Local AddressFE80::2E0:B0FF:FEB0:6062

Default Gateway

DNS Server

802.1X

Use 802.1X Security

AuthenticationMD5

Top

PCO

Physical Config Desktop Programming Attributes

Command Prompt X

```
C:\>ping 10.50.2.135

Pinging 10.50.2.135 with 32 bytes of data:

Reply from 10.50.2.135: bytes=32 time=14ms TTL=128
Reply from 10.50.2.135: bytes=32 time<1ms TTL=128
Reply from 10.50.2.135: bytes=32 time=7ms TTL=128
Reply from 10.50.2.135: bytes=32 time<1ms TTL=128

Ping statistics for 10.50.2.135:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 14ms, Average = 5ms

C:\>ping 10.50.2.136

Pinging 10.50.2.136 with 32 bytes of data:

Reply from 10.50.2.136: bytes=32 time<1ms TTL=128
Reply from 10.50.2.136: bytes=32 time<1ms TTL=128
Reply from 10.50.2.136: bytes=32 time<1ms TTL=128
Reply from 10.50.2.136: bytes=32 time=1ms TTL=128

Ping statistics for 10.50.2.136:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>ping 10.50.2.137

Pinging 10.50.2.137 with 32 bytes of data:

Reply from 10.50.2.137: bytes=32 time<1ms TTL=128
Reply from 10.50.2.137: bytes=32 time<1ms TTL=128
Reply from 10.50.2.137: bytes=32 time<1ms TTL=128
Reply from 10.50.2.137: bytes=32 time<1ms TTL=128

Ping statistics for 10.50.2.137:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>
```

Top

Налаштували DHCP

Server0

Physical Config **Services** Desktop Programming Attributes

SERVICES

HTTP

**DHCP**

DHCPv6

TFTP

DNS

SYSLOG

AAA

NTP

EMAIL

FTP

IoT

VM Management

Radius EAP

DHCP

Interface FastEthernet0 Service ☒ On ☐ Off

Pool Name serverPool

Default Gateway 10.50.2.49

DNS Server 0.0.0.0

Start IP Addr 10 50 2 53

Subnet Mask 255 255 255 240

Maximum Number of Users : 11

TFTP Server: 0.0.0.0

WLC Address: 0.0.0.0

Add Save Remove

Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server	WLC Address
serverPool	10.5...	0.0.0.0	10.5...	255....	11	0.0.0.0	0.0...

☐ Top

Server0

Physical **Config** Services Desktop Programming Attributes

GLOBAL

Settings

Algorithm Settings

**INTERFACE**

FastEthernet0

Global Settings

Display Name Server0

Gateway/DNS IPv4

☐ DHCP

☒ Static

Default Gateway 10.50.2.49

DNS Server

Gateway/DNS IPv6

☐ Automatic

☒ Static

Default Gateway

DNS Server

☐ Top

Server0

Physical **Config** Services Desktop Programming Attributes

GLOBAL

Settings

Algorithm Settings

**INTERFACE**

FastEthernet0

FastEthernet0

Port Status ☒ On

Bandwidth ☐ 100 Mbps ☐ 10 Mbps ☒ Auto

Duplex ☐ Half Duplex ☒ Full Duplex ☒ Auto

MAC Address 0002.16C7.B6BB

IP Configuration

☐ DHCP

☒ Static

IPv4 Address 10.50.2.62

Subnet Mask 255.255.255.240

IPv6 Configuration

☐ Automatic

☒ Static

IPv6 Address

Link Local Address: FE80::202:16FF:FEC7:B6BB

☐ Top

Для хостів Laptop0 і Laptop1 активували протокол DHCP.

The image shows two side-by-side windows for configuring network interfaces on two laptops, Laptop0 and Laptop1, within the Cisco Packet Tracer environment. Both windows are titled 'IP Configuration' and show the 'FastEthernet0' interface selected. In both cases, the 'DHCP' radio button is selected under 'IP Configuration', and the 'Static' radio button is selected under 'IPv6 Configuration'. The '802.1X' section is also visible, with 'Use 802.1X Security' unchecked and 'Authentication' set to 'MD5'. The 'Top' button is at the bottom left of each window.

Interface	IP Configuration	Static	IPv6 Configuration	Static	Link Local Address
FastEthernet0	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	FE80::202:17FF:FE36:7C70
FastEthernet0	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	FE80::2E0:A3FF:FE13:882A

The image shows two side-by-side windows for the 'Command Prompt' on Laptop0 and Laptop1. Both windows display the output of the 'ipconfig' command, showing the configuration for the 'FastEthernet0' interface. The output for both laptops is identical, showing the IPv4 address, subnet mask, default gateway, and IPv6 address. The 'Top' button is at the bottom left of each window.

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ipconfig

FastEthernet0 Connection: (default port)

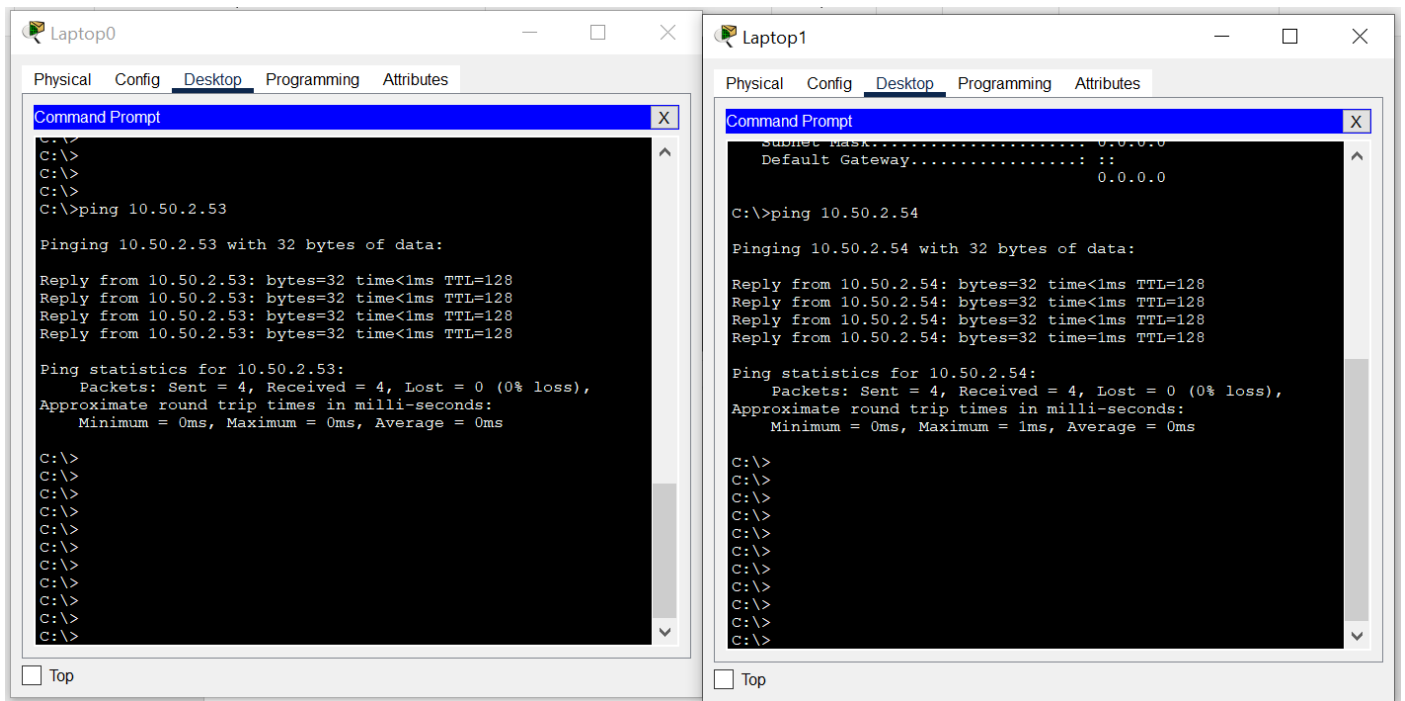
Connection-specific DNS Suffix...:
Link-local IPv6 Address . . . . .: FE80::202:17FF:FE36:7C70
IPv6 Address . . . . .: ::
IPv4 Address . . . . .: 10.50.2.54
Subnet Mask . . . . .: 255.255.255.240
Default Gateway . . . . .: ::
                             10.50.2.49

Bluetooth Connection:

Connection-specific DNS Suffix...:
Link-local IPv6 Address . . . . .: ::
IPv6 Address . . . . .: ::
IPv4 Address . . . . .: 0.0.0.0
Subnet Mask . . . . .: 0.0.0.0
Default Gateway . . . . .: ::
                             0.0.0.0

C:\>
```

Перевірили досяжність між двома даними хостами.



## Налаштовуємо Switch0 та Switch1

.....

Switch0

Physical Config CLI Attributes

IOS Command Line Interface

Switch>en  
Switch#conf t  
Enter configuration commands, one per line. End with CNTL/Z.  
Switch(config)#hostname SW1  
SW1(config)#interface range fa0/1-2  
SW1(config-if-range)#switchport mode access vlan 10  
^  
% Invalid input detected at '^' marker.  
  
SW1(config-if-range)#switchport access vlan 10  
% Access VLAN does not exist. Creating vlan 10  
SW1(config-if-range)#exit  
SW1(config)#  
SW1(config)#interface range fa0/4-5  
SW1(config-if-range)#switchport access vlan 10  
SW1(config-if-range)#switchport mode trunk  
  
SW1(config-if-range)#  
%LINEPROTO-5-UPDOWN: Line protocol on Interface  
FastEthernet0/4, changed state to down  
  
%LINEPROTO-5-UPDOWN: Line protocol on Interface  
FastEthernet0/4, changed state to up  
  
%LINEPROTO-5-UPDOWN: Line protocol on Interface  
FastEthernet0/5, changed state to down  
  
%LINEPROTO-5-UPDOWN: Line protocol on Interface  
FastEthernet0/5, changed state to up  
  
SW1(config-if-range)#no switchport access vlan 10  
SW1(config-if-range)#exit  
SW1(config)#  
SW1#  
%SYS-5-CONFIG\_I: Configured from console by console  
  
SW1#write  
Building configuration...  
[OK]  
SW1#

Ctrl+F6 to exit CLI focus

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Switch1

Physical Config CLI Attributes

IOS Command Line Interface

Switch>en  
Switch#conf t  
Enter configuration commands, one per line. End with CNTL/Z.  
Switch(config)#hostname SW2  
SW2(config)#interface range fa0/1, fa0/3  
SW2(config-if-range)#switchport access vlan 10  
% Access VLAN does not exist. Creating vlan 10  
SW2(config-if-range)#interface range fa0/4-5  
SW2(config-if-range)#switchport mode trunk  
  
SW2(config-if-range)#  
%LINEPROTO-5-UPDOWN: Line protocol on Interface  
FastEthernet0/4, changed state to down  
  
%LINEPROTO-5-UPDOWN: Line protocol on Interface  
FastEthernet0/4, changed state to up  
  
%LINEPROTO-5-UPDOWN: Line protocol on Interface  
FastEthernet0/5, changed state to down  
  
%LINEPROTO-5-UPDOWN: Line protocol on Interface  
FastEthernet0/5, changed state to up  
  
SW2(config-if-range)#exit  
SW2(config)#exit  
SW2#  
%SYS-5-CONFIG\_I: Configured from console by console  
  
SW2#write  
Building configuration...  
[OK]  
SW2#

Ctrl+F6 to exit CLI focus

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## Налаштовуємо MultilayerSwitch0 та MultilayerSwitch1

Multilayer Switch0

Physical Config CLI Attributes

IOS Command Line Interface

Switch>en  
Switch#conf t  
Enter configuration commands, one per line. End with CNTL/Z.  
Switch(config)#hostname SW3  
SW3(config)#interface range fa0/2-4  
SW3(config-if-range)#switchport mode trunk  
Command rejected: An interface whose trunk encapsulation is "Auto" can not be configured to "trunk" mode.  
Command rejected: An interface whose trunk encapsulation is "Auto" can not be configured to "trunk" mode.  
Command rejected: An interface whose trunk encapsulation is "Auto" can not be configured to "trunk" mode.  
SW3(config-if-range)#switchport trunk encapsulation dot1q  
SW3(config-if-range)#switchport mode trunk  
  
SW3(config-if-range)#  
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to down  
  
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to up  
  
SW3(config-if-range)#in  
SW3(config-if-range)#exit  
SW3(config)#vlan 10  
SW3(config-vlan)#exit  
SW3(config)#swit  
SW3(config)#switchport access  
SW3(config)#  
^  
% Invalid input detected at '^' marker.  
  
SW3(config)#interface fa0/1  
SW3(config-if)#switch  
SW3(config-if)#switchport mode access  
SW3(config-if)#exit  
SW3(config)#  
SW3#  
%SYS-5-CONFIG\_I: Configured from console by console

Ctrl+F6 to exit CLI focus

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☐ Top

Multilayer Switch1

Physical Config CLI Attributes

IOS Command Line Interface

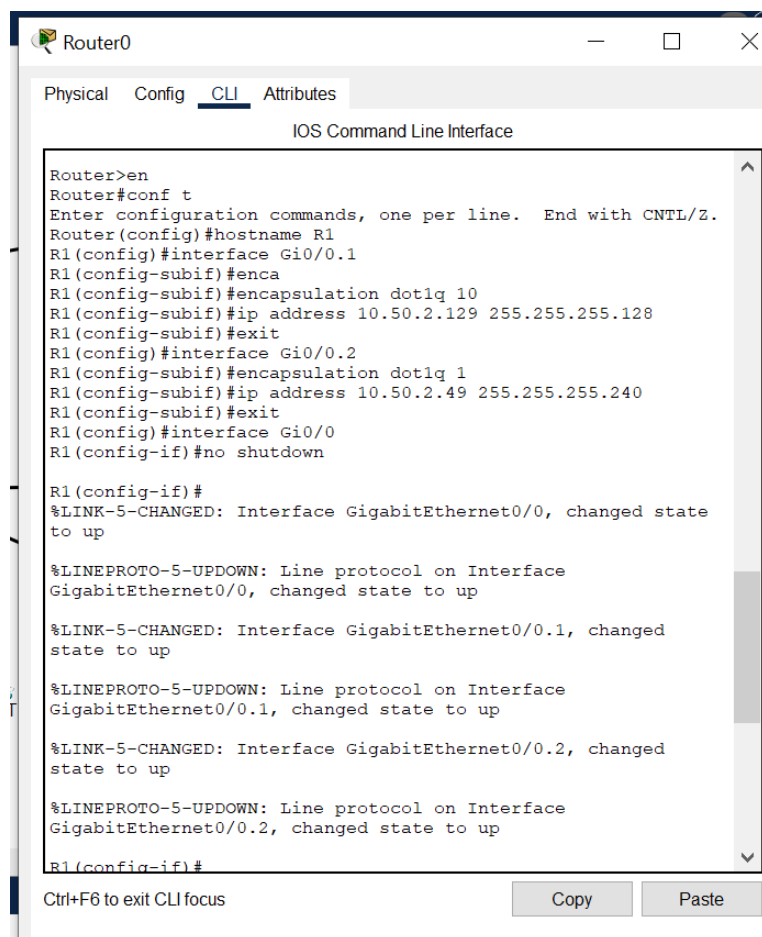
Press RETURN to get started!  
  
Switch>  
Switch>en  
Switch#conf t  
Enter configuration commands, one per line. End with CNTL/Z.  
Switch(config)#hostname SW4  
SW4(config)#interface range fa0/1-4  
SW4(config-if-range)#switchport tr  
SW4(config-if-range)#switchport trunk en  
SW4(config-if-range)#switchport trunk encapsulation dot1q  
SW4(config-if-range)#switchport mode trunk  
SW4(config-if-range)#exit  
SW4(config)#vlan 10  
SW4(config-vlan)#exit  
SW4(config)#exit  
SW4#  
%SYS-5-CONFIG\_I: Configured from console by console  
  
SW4#write  
Building configuration...  
[OK]  
SW4#  
%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to up  
  
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to up

Ctrl+F6 to exit CLI focus

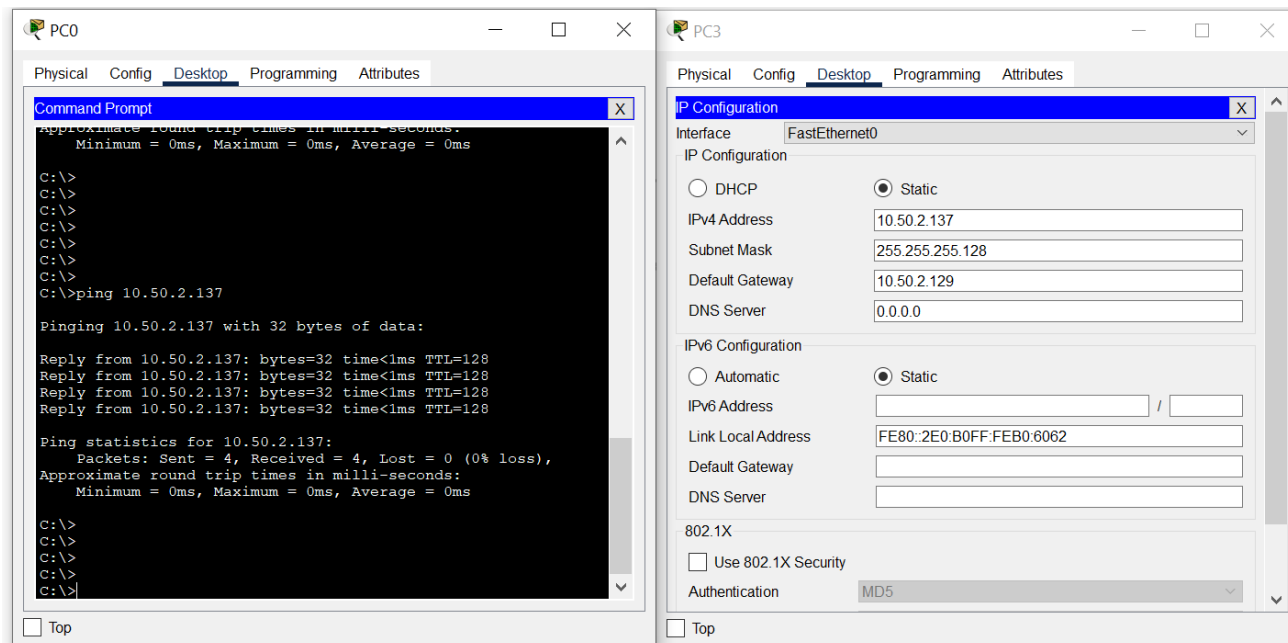
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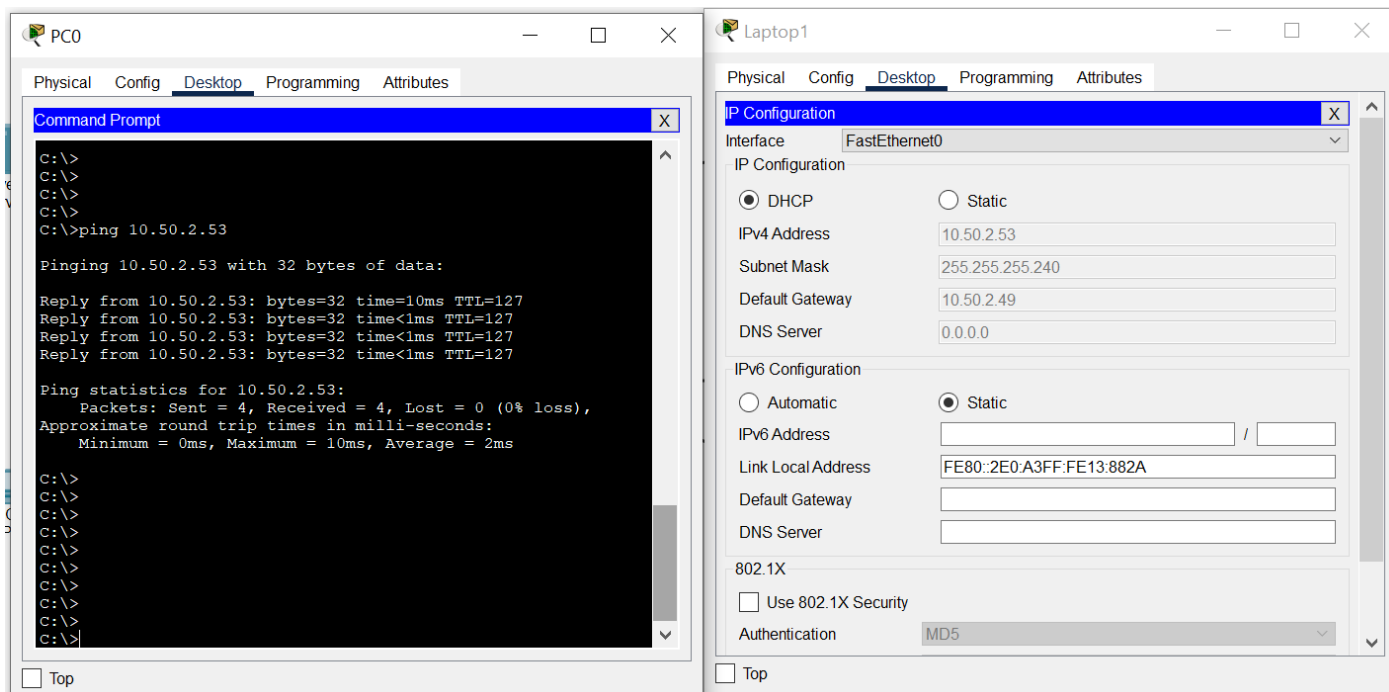
☐ Top

## Налаштування маршрутизатора

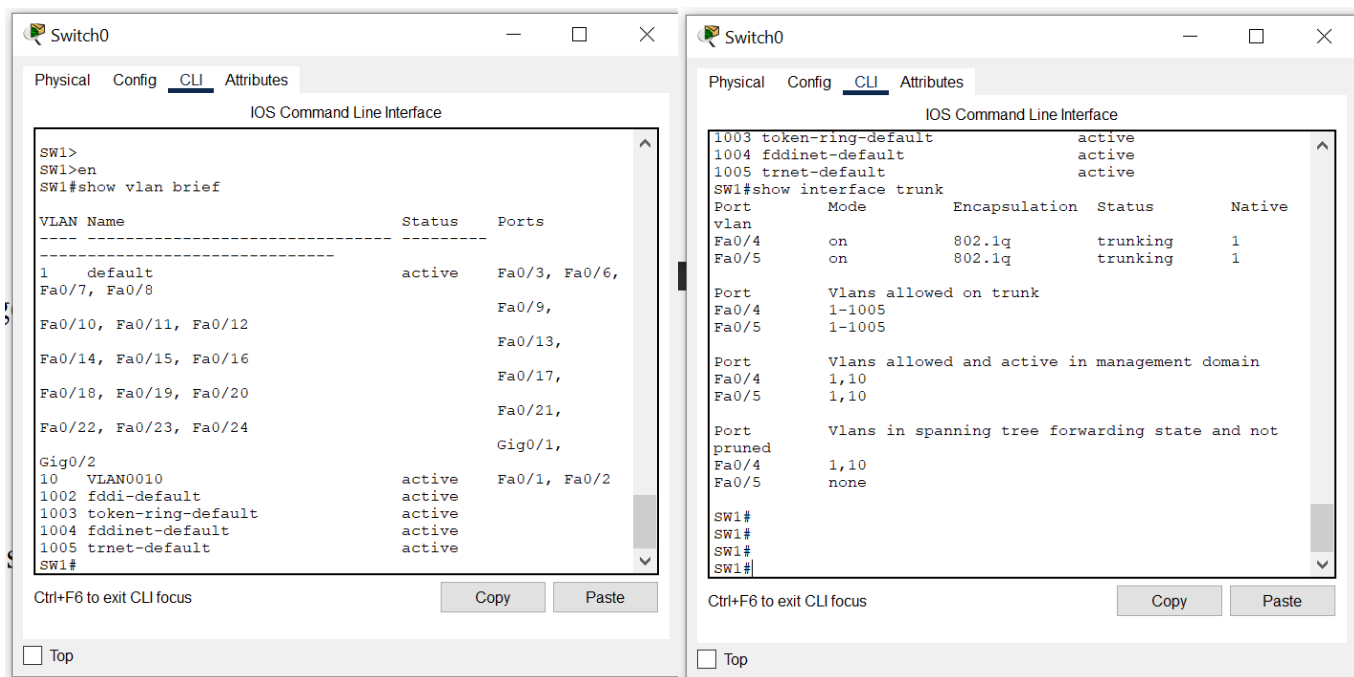


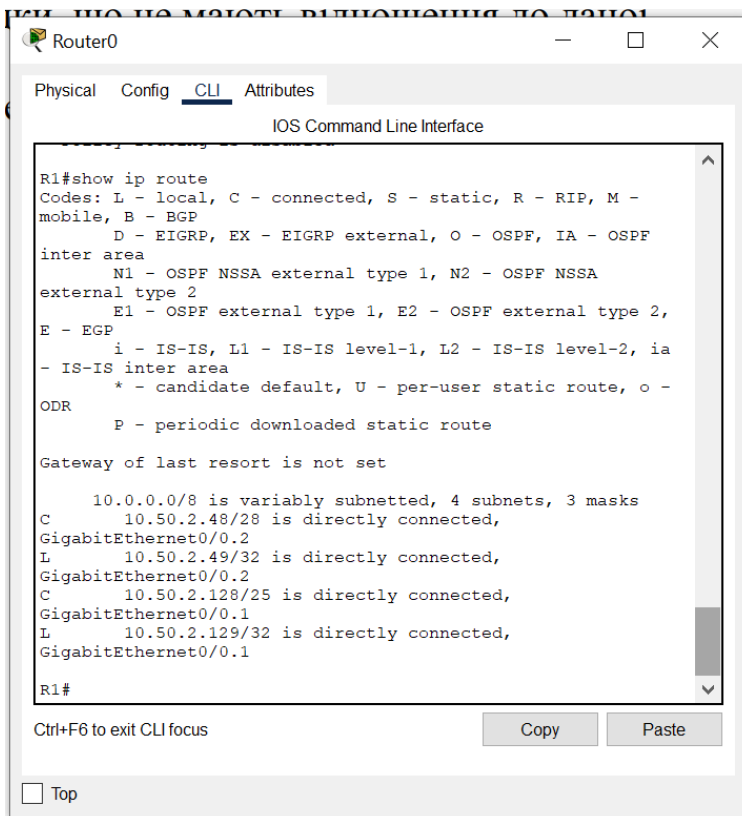
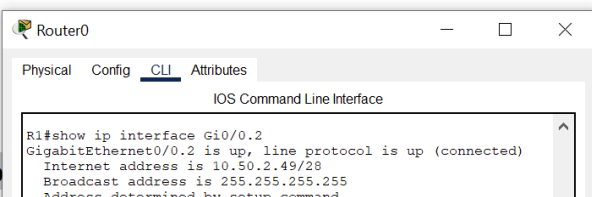
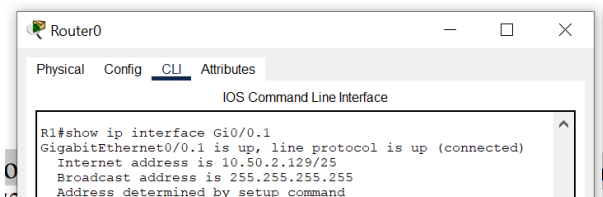
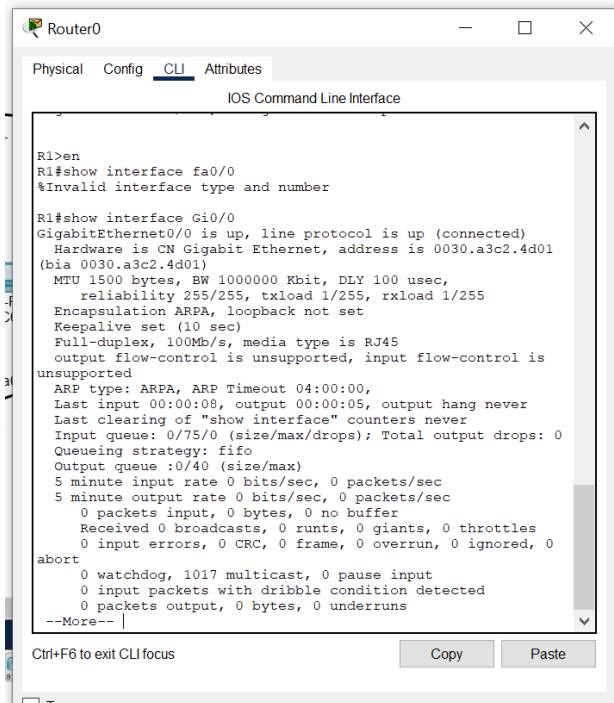
## Перевіряємо досяжність між хостами в різних VLAN





...





## Перевіряєм налаштування маршрутизаторів і комутаторів

Switch0

Physical Config CLI Attributes

IOS Command Line Interface

```
SW1#sh run
Building configuration...

Current configuration : 1177 bytes
!
version 15.0
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname SW1
!
!
!
!
!
!
spanning-tree mode pvst
spanning-tree extend system-id
!
interface FastEthernet0/1
 switchport access vlan 10
!
interface FastEthernet0/2
 switchport access vlan 10
!
interface FastEthernet0/3
!
interface FastEthernet0/4
 switchport mode trunk
!
interface FastEthernet0/5
 switchport mode trunk
!
interface FastEthernet0/6
!
interface FastEthernet0/7
!
interface FastEthernet0/8
!
interface FastEthernet0/9
!
interface FastEthernet0/10
!
interface FastEthernet0/11
!
--More--
```

Ctrl+F6 to exit CLI focus

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Switch1

Physical Config CLI Attributes

IOS Command Line Interface

```
SW2#sh run
Building configuration...

Current configuration : 1177 bytes
!
version 15.0
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname SW2
!
!
!
!
!
!
spanning-tree mode pvst
spanning-tree extend system-id
!
interface FastEthernet0/1
 switchport access vlan 10
!
interface FastEthernet0/2
!
interface FastEthernet0/3
 switchport access vlan 10
!
interface FastEthernet0/4
 switchport mode trunk
!
interface FastEthernet0/5
 switchport mode trunk
!
interface FastEthernet0/6
!
interface FastEthernet0/7
!
interface FastEthernet0/8
!
interface FastEthernet0/9
!
interface FastEthernet0/10
!
interface FastEthernet0/11
!
--More--
```

Ctrl+F6 to exit CLI focus

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## Лабораторна робота №1.2

### Налаштування протоколу STP та резервування маршрутизатора

Simulation Panel

Event List

Vis.	Time(sec)	Last Device	At Device	Type
	0.961	--	Multilayer Switch1	STP
	0.962	--	Switch0	STP
	0.962	Multilayer Switch1	Switch0	STP
	0.962	Multilayer Switch0	Multilayer Switch1	STP
	0.962	Multilayer Switch1	Router0	STP
	0.962	--	Multilayer Switch1	STP
	0.963	Switch0	Laptop0	STP
	0.963	Multilayer Switch1	Switch0	STP
	0.964	--	Switch1	STP
	0.965	Switch1	PC2	STP
	0.965	Switch1	Multilayer Switch0	STP
	0.965	Switch1	Multilayer Switch1	STP
	0.965	Switch1	PC3	STP
	0.966	--	Multilayer Switch0	STP
	0.966	Multilayer Switch0	Multilayer Switch1	STP
	0.966	Multilayer Switch0	Switch0	STP
	0.966	Multilayer Switch1	Switch0	STP
	0.966	Multilayer Switch1	Router0	STP
	0.966	--	Multilayer Switch0	STP
	0.967	Multilayer Switch0	Switch0	STP
	0.967	Switch0	PC0	STP
	0.967	Switch0	PC1	STP
	0.967	--	Multilayer Switch0	STP
	0.968	Multilayer Switch0	Switch0	STP
	1.018	--	PC0	ICMP
	1.019	PC0	Switch0	ICMP
	1.020	Switch0	Multilayer Switch0	ICMP
Visible	1.021	Multilayer Switch0	Switch1	ICMP

Reset Simulation ☒ Constant Delay Capture 1.0

Play Controls

Перевірка роботи протокола STP

Switch0

Physical Config CLI Attributes

IOS Command Line Interface

SW1#show spanning-tree

VLAN0001

Spanning tree enabled protocol ieee

Root ID Priority 32769

Address 000C.CFDA.8632

Cost 38

Port 4(FastEthernet0/4)

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 32769 (priority 32768 sys-id-ext 1)

Address 0060.2F79.ED61

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Aging Time 20

Interface Role Sts Cost Prio.Nbr Type

Fa0/3 Desg FWD 19 128.3 P2p

Fa0/4 Root FWD 19 128.4 P2p

Fa0/5 Altn BLK 19 128.5 P2p

VLAN0010

Spanning tree enabled protocol ieee

Root ID Priority 32778

Address 000C.CFDA.8632

Cost 38

Port 4(FastEthernet0/4)

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 32778 (priority 32768 sys-id-ext 10)

Address 0060.2F79.ED61

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Aging Time 20

Interface Role Sts Cost Prio.Nbr Type

Fa0/4 Root FWD 19 128.4 P2p

Fa0/5 Altn BLK 19 128.5 P2p

Fa0/1 Desg FWD 19 128.1 P2p

Fa0/2 Desg FWD 19 128.2 P2p

Ctrl+F6 to exit CLI focus

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☐ Top

Switch1

Physical Config CLI Attributes

IOS Command Line Interface

SW2#show spanning-tree

VLAN0001

Spanning tree enabled protocol ieee

Root ID Priority 32769

Address 000C.CFDA.8632

This bridge is the root

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 32769 (priority 32768 sys-id-ext 1)

Address 000C.CFDA.8632

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Aging Time 20

Interface Role Sts Cost Prio.Nbr Type

Fa0/5 Desg FWD 19 128.5 P2p

Fa0/2 Desg FWD 19 128.2 P2p

Fa0/4 Desg FWD 19 128.4 P2p

VLAN0010

Spanning tree enabled protocol ieee

Root ID Priority 32778

Address 000C.CFDA.8632

This bridge is the root

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 32778 (priority 32768 sys-id-ext 10)

Address 000C.CFDA.8632

Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Aging Time 20

Interface Role Sts Cost Prio.Nbr Type

Fa0/1 Desg FWD 19 128.1 P2p

Fa0/5 Desg FWD 19 128.5 P2p

Fa0/4 Desg FWD 19 128.4 P2p

Fa0/3 Desg FWD 19 128.3 P2p

SW2#

SW2#

Ctrl+F6 to exit CLI focus

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☐ Top



## IOS Command Line Interface

```
SW3#show spanning-tree
VLAN0001
  Spanning tree enabled protocol ieee
  Root ID    Priority    32769
            Address    000C.CFDA.8632
            Cost       19
            Port       4(FastEthernet0/4)
            Hello Time 2 sec  Max Age 20 sec  Forward Delay
15 sec

  Bridge ID  Priority    32769 (priority 32768 sys-id-ext 1)
            Address    0090.0C1D.852B
            Hello Time 2 sec  Max Age 20 sec  Forward Delay
15 sec
            Aging Time 20

Interface Role Sts Cost Prio.Nbr Type
-----
Fa0/1     Desg FWD 19    128.1 P2p
Fa0/2     Desg FWD 19    128.2 P2p
Fa0/3     Desg FWD 19    128.3 P2p
Fa0/4     Root FWD 19    128.4 P2p

VLAN0010
  Spanning tree enabled protocol ieee
  Root ID    Priority    32778
            Address    000C.CFDA.8632
            Cost       19
            Port       4(FastEthernet0/4)
            Hello Time 2 sec  Max Age 20 sec  Forward Delay
15 sec

  Bridge ID  Priority    32778 (priority 32768 sys-id-ext
10)
            Address    0090.0C1D.852B
            Hello Time 2 sec  Max Age 20 sec  Forward Delay
15 sec
            Aging Time 20

Interface Role Sts Cost Prio.Nbr Type
-----
Fa0/2     Desg FWD 19    128.2 P2p
Fa0/3     Desg FWD 19    128.3 P2p
Fa0/4     Root FWD 19    128.4 P2p
```

Ctrl+F6 to exit CLI focus

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☐ Top

## IOS Command Line Interface

```
SW4#show spanning-tree
VLAN0001
  Spanning tree enabled protocol ieee
  Root ID    Priority    32769
            Address    000C.CFDA.8632
            Cost       19
            Port       3(FastEthernet0/3)
            Hello Time 2 sec  Max Age 20 sec  Forward Delay
15 sec

  Bridge ID  Priority    32769 (priority 32768 sys-id-ext 1)
            Address    00D0.D3EA.ABE1
            Hello Time 2 sec  Max Age 20 sec  Forward Delay
15 sec
            Aging Time 20

Interface Role Sts Cost Prio.Nbr Type
-----
Fa0/4     Desg FWD 19    128.4 P2p
Fa0/3     Root FWD 19    128.3 P2p
Fa0/1     Altn BLK 19    128.1 P2p
Fa0/2     Desg FWD 19    128.2 P2p

VLAN0010
  Spanning tree enabled protocol ieee
  Root ID    Priority    32778
            Address    000C.CFDA.8632
            Cost       19
            Port       3(FastEthernet0/3)
            Hello Time 2 sec  Max Age 20 sec  Forward Delay
15 sec

  Bridge ID  Priority    32778 (priority 32768 sys-id-ext
10)
            Address    00D0.D3EA.ABE1
            Hello Time 2 sec  Max Age 20 sec  Forward Delay
15 sec
            Aging Time 20

Interface Role Sts Cost Prio.Nbr Type
-----
Fa0/4     Desg FWD 19    128.4 P2p
Fa0/3     Root FWD 19    128.3 P2p
Fa0/1     Altn BLK 19    128.1 P2p
Fa0/2     Desg FWD 19    128.2 P2p
```


Ctrl+F6 to exit CLI focus

Copy

Paste

☐ Top

## Резервування шлюзу за замовчуванням

 Router0

Physical Config CLI Attributes

IOS Command Line Interface

```
R1>en
R1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#interface Gi0/0.1
R1(config-subif)#no ip address
R1(config-subif)#ip address 10.50.2.130
% Incomplete command.
R1(config-subif)#ip address 10.50.2.130 255.255.255.128
R1(config-subif)#no ip address
R1(config-subif)#ip address 10.50.2.131 255.255.255.128
R1(config-subif)#standby 110 ip 10.50.2.129
R1(config-subif)#standby 110 preempt
R1(config-subif)#exit
%HSRP-6-STATECHANGE: GigabitEthernet0/0.1 Grp 110 state Speak
-> Standby

%HSRP-6-STATECHANGE: GigabitEthernet0/0.1 Grp 110 state
Standby -> Active

R1(config)#interface Gi0/0.2
R1(config-subif)#no ip address
R1(config-subif)#ip address 10.50.2.51 255.255.255.240
R1(config-subif)#standby 101 ip 10.50.2.49
R1(config-subif)#standby 101 priority 1
%HSRP-6-STATECHANGE: GigabitEthernet0/0.2 Grp 101 state Speak
-> Standby

%HSRP-6-STATECHANGE: GigabitEthernet0/0.2 Grp 101 st
R1(config-subif)#standby 101 ip 10.50.2.49
R1(config-subif)#standby 101 ip priority 150
^
% Invalid input detected at '^' marker.

R1(config-subif)#standby 101 ip priority 150
%HSRP-6-STATECHANGE: GigabitEthernet0/0.2 Grp 101 state Speak
-> Standby

%HSRP-6-STATECHANGE: GigabitEthernet0/0.2 Grp 101 state
Standby -> Active

^
% Invalid input detected at '^' marker.

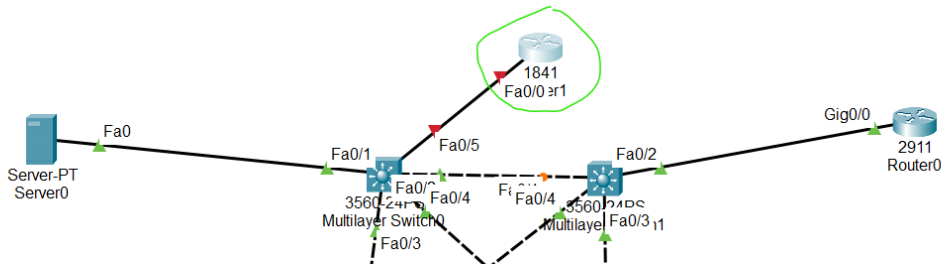
R1(config-subif)#standby 101 priority 150
R1(config-subif)#standby 110 preempt
R1(config-subif)#exit
R1(config)#
```

Ctrl+F6 to exit CLI focus

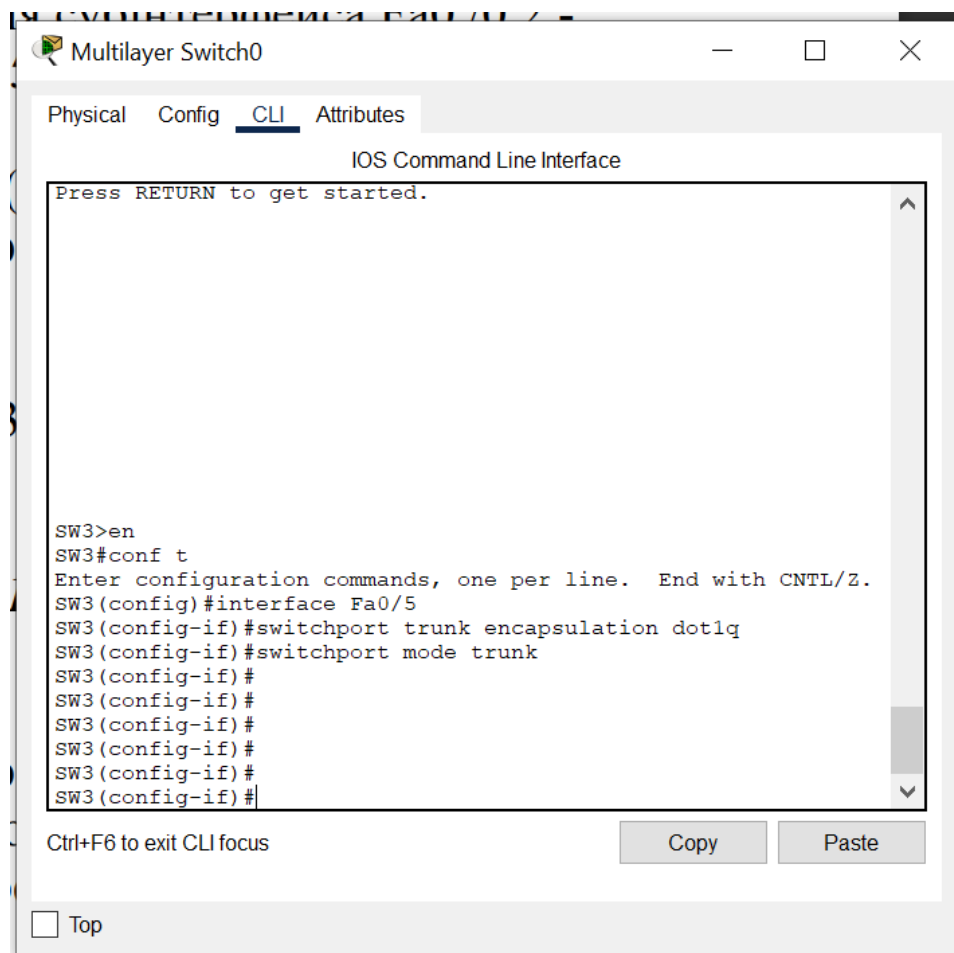
Copy Paste

☐ Top

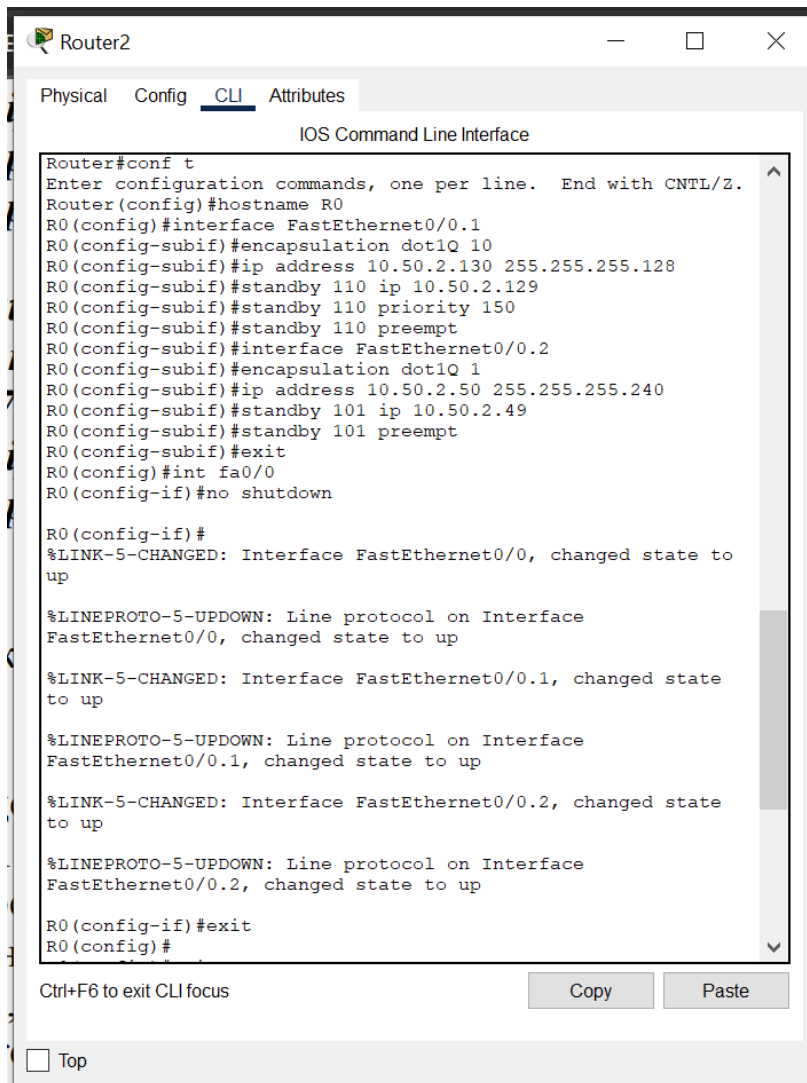
Додамо в топологію маршрутизатор Router2 (модель C1841) і з'єднаємо інтерфейс Fa0/0 нового маршрутизатора з інтерфейсом Fa0/5 комутатора Switch3.



Налаштуємо інтерфейс Fa0/5 комутатора Switch3 як транковий



## Налаштуємо маршрутизатор Router0



The screenshot shows a window titled "Router2" with tabs for "Physical", "Config", "CLI", and "Attributes". The "CLI" tab is active, displaying the "IOS Command Line Interface". The interface shows the following commands and their outputs:

```
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R0
R0(config)#interface FastEthernet0/0.1
R0(config-subif)#encapsulation dot1Q 10
R0(config-subif)#ip address 10.50.2.130 255.255.255.128
R0(config-subif)#standby 110 ip 10.50.2.129
R0(config-subif)#standby 110 priority 150
R0(config-subif)#standby 110 preempt
R0(config-subif)#interface FastEthernet0/0.2
R0(config-subif)#encapsulation dot1Q 1
R0(config-subif)#ip address 10.50.2.50 255.255.255.240
R0(config-subif)#standby 101 ip 10.50.2.49
R0(config-subif)#standby 101 preempt
R0(config-subif)#exit
R0(config)#int fa0/0
R0(config-if)#no shutdown

R0(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to
up

%LINEPROTO-5-UPDOWN: Line protocol on Interface
FastEthernet0/0, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/0.1, changed state
to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface
FastEthernet0/0.1, changed state to up

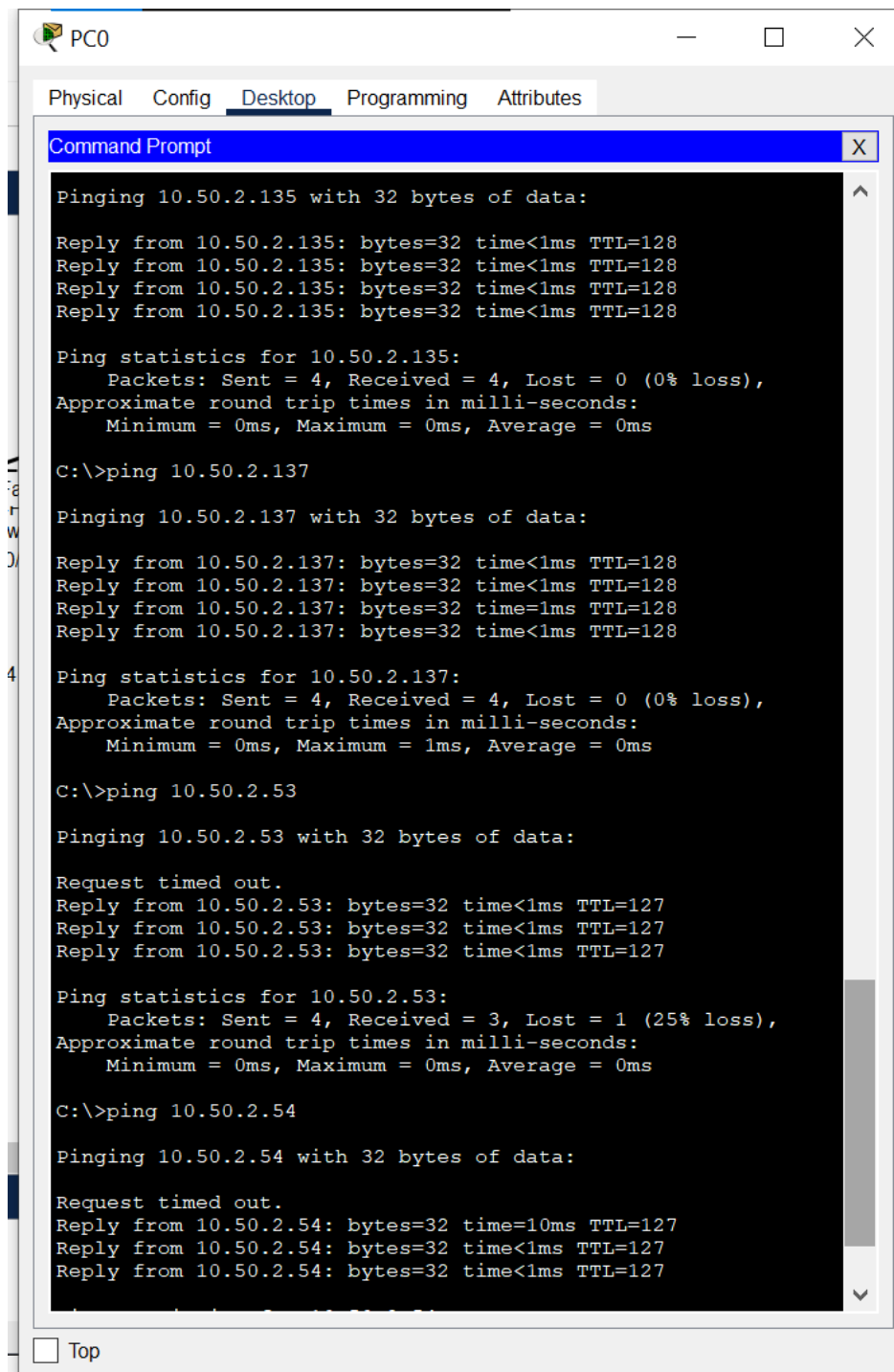
%LINK-5-CHANGED: Interface FastEthernet0/0.2, changed state
to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface
FastEthernet0/0.2, changed state to up

R0(config-if)#exit
R0(config)#
```

At the bottom of the CLI window, there is a status bar with the text "Ctrl+F6 to exit CLI focus" and two buttons: "Copy" and "Paste". Below the CLI window, there is a checkbox labeled "Top".

## Перевіряємо досяжність між усіма хостами мережі



```
PC0
Physical Config Desktop Programming Attributes
Command Prompt X

Pinging 10.50.2.135 with 32 bytes of data:

Reply from 10.50.2.135: bytes=32 time<1ms TTL=128
Reply from 10.50.2.135: bytes=32 time<1ms TTL=128
Reply from 10.50.2.135: bytes=32 time<1ms TTL=128
Reply from 10.50.2.135: bytes=32 time<1ms TTL=128

Ping statistics for 10.50.2.135:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 10.50.2.137

Pinging 10.50.2.137 with 32 bytes of data:

Reply from 10.50.2.137: bytes=32 time<1ms TTL=128
Reply from 10.50.2.137: bytes=32 time<1ms TTL=128
Reply from 10.50.2.137: bytes=32 time=1ms TTL=128
Reply from 10.50.2.137: bytes=32 time<1ms TTL=128

Ping statistics for 10.50.2.137:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>ping 10.50.2.53

Pinging 10.50.2.53 with 32 bytes of data:

Request timed out.
Reply from 10.50.2.53: bytes=32 time<1ms TTL=127
Reply from 10.50.2.53: bytes=32 time<1ms TTL=127
Reply from 10.50.2.53: bytes=32 time<1ms TTL=127

Ping statistics for 10.50.2.53:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms


C:\>ping 10.50.2.54

Pinging 10.50.2.54 with 32 bytes of data:

Request timed out.
Reply from 10.50.2.54: bytes=32 time=10ms TTL=127
Reply from 10.50.2.54: bytes=32 time<1ms TTL=127
Reply from 10.50.2.54: bytes=32 time<1ms TTL=127
```

☐ Top

## Перевірка статусу HSRP маршрутизаторів

 Router2

— □ ×

Physical Config CLI Attributes

IOS Command Line Interface

```
R0>en
R0#show standby
FastEthernet0/0.1 - Group 110
  State is Active
    5 state changes, last state change 00:05:31
  Virtual IP address is 10.50.2.129
  Active virtual MAC address is 0000.0C07.AC6E
    Local virtual MAC address is 0000.0C07.AC6E (v1 default)
  Hello time 3 sec, hold time 10 sec
    Next hello sent in 1.647 secs
  Preemption enabled
  Active router is local
  Standby router is 10.50.2.131, priority 100 (expires in 9
sec)
  Priority 150 (configured 150)
  Group name is hsrp-Fa-110 (default)
FastEthernet0/0.2 - Group 101
  State is Standby
    10 state changes, last state change 00:16:46
  Virtual IP address is 10.50.2.49
  Active virtual MAC address is 0000.0C07.AC65
    Local virtual MAC address is 0000.0C07.AC65 (v1 default)
  Hello time 3 sec, hold time 10 sec
    Next hello sent in 0.407 secs
  Preemption enabled
  Active router is 10.50.2.51, priority 150 (expires in 8
sec)
  MAC address is 0000.0C07.AC65
  Standby router is local
  Priority 100 (default 100)
  Group name is hsrp-Fa-101 (default)
R0#
R0#
R0#
R0#
R0#
R0#
```

Ctrl+F6 to exit CLI focus

Copy Paste

☐ Top

## IOS Command Line Interface

```
R1>en
R1#show standby
GigabitEthernet0/0.1 - Group 110
  State is Standby
    10 state changes, last state change 03:38:43
  Virtual IP address is 10.50.2.129
  Active virtual MAC address is 0000.0C07.AC6E
    Local virtual MAC address is 0000.0C07.AC6E (v1 default)
  Hello time 3 sec, hold time 10 sec
    Next hello sent in 1.954 secs
  Preemption enabled
  Active router is 10.50.2.130, priority 150 (expires in 7
sec)
  MAC address is 0000.0C07.AC6E
  Standby router is local
  Priority 100 (default 100)
  Group name is hsrp-Gig-110 (default)
GigabitEthernet0/0.2 - Group 101
  State is Active
    12 state changes, last state change 02:33:05
  Virtual IP address is 10.50.2.49
  Active virtual MAC address is 0000.0C07.AC65
    Local virtual MAC address is 0000.0C07.AC65 (v1 default)
  Hello time 3 sec, hold time 10 sec
    Next hello sent in 0.612 secs
  Preemption disabled
  Active router is local
  Standby router is 10.50.2.50, priority 100 (expires in 8
sec)
  Priority 150 (configured 150)
  Group name is hsrp-Gig-101 (default)
R1#
R1#
R1#
```

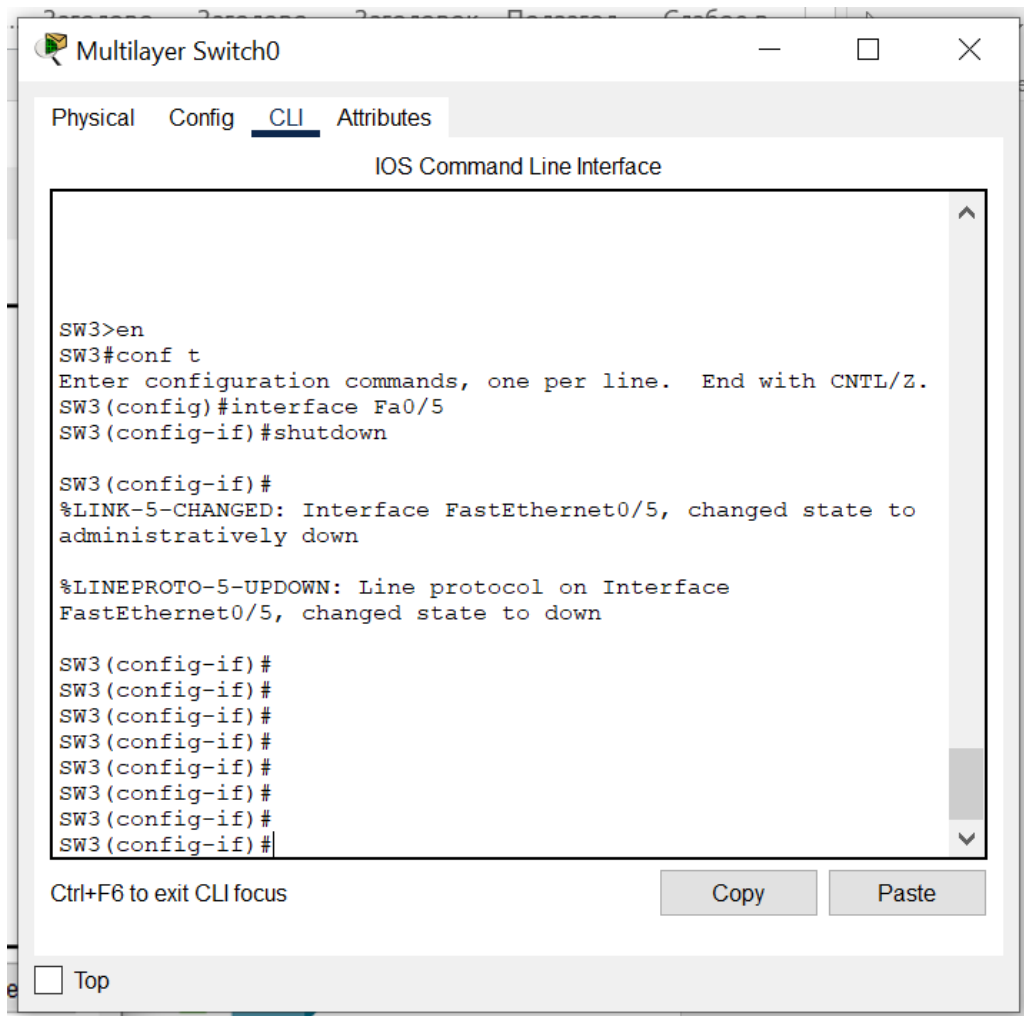
Ctrl+F6 to exit CLI focus

Copy

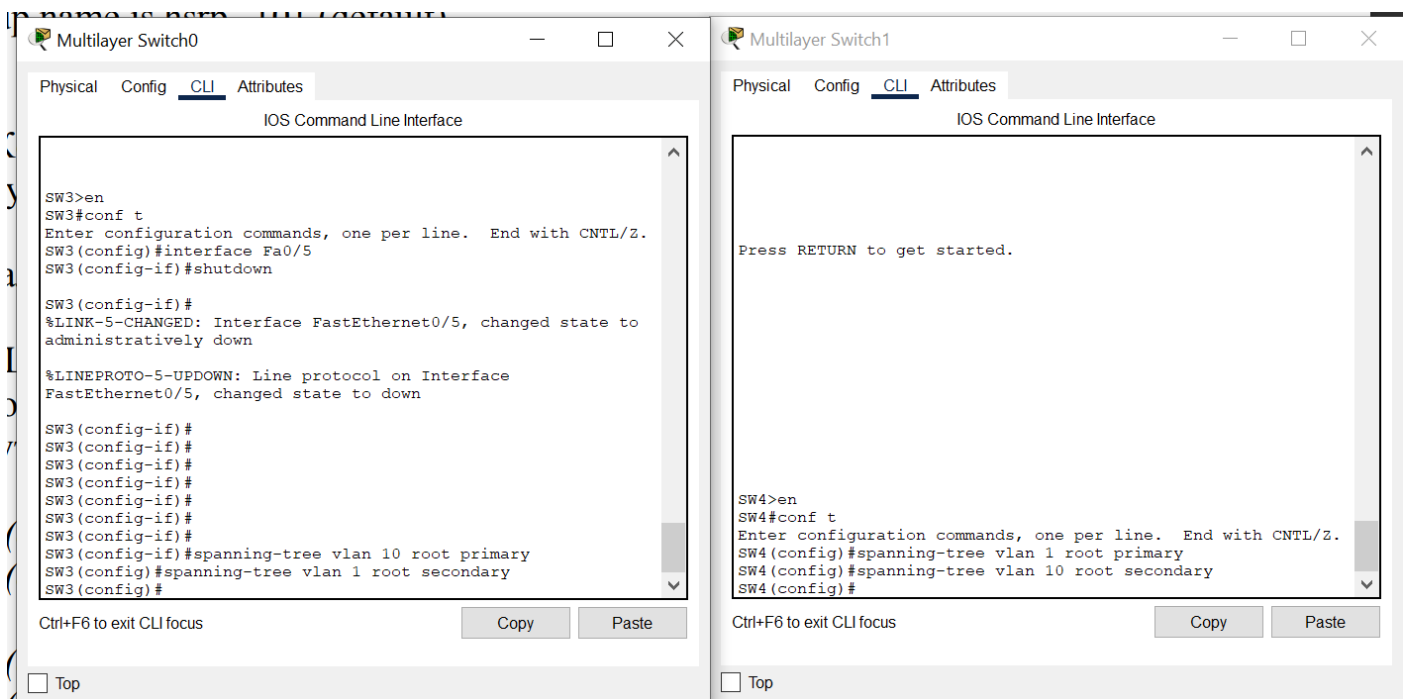
Paste

☐ Top

Командою shutdown відключаємо один із транкових інтерфейсів комутаторів



## Налаштування протоколу STP





# Перевірка

Switch0

Physical Config CLI Attributes

IOS Command Line Interface

```
SW1>en
SW1#show running-config
Building configuration...

Current configuration : 1177 bytes
!
version 15.0
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname SW1
!
!
!
!
!
!
spanning-tree mode pvst
spanning-tree extend system-id
!
interface FastEthernet0/1
 switchport access vlan 10
!
interface FastEthernet0/2
 switchport access vlan 10
!
interface FastEthernet0/3
!
interface FastEthernet0/4
 switchport mode trunk
!
interface FastEthernet0/5
 switchport mode trunk
!
interface FastEthernet0/6
!
interface FastEthernet0/7
!
interface FastEthernet0/8
!
interface FastEthernet0/9
!
interface FastEthernet0/10
!
interface FastEthernet0/11
!
```

Ctrl+F6 to exit CLI focus

Copy Paste

Switch0

Physical Config CLI Attributes

IOS Command Line Interface

```
interface FastEthernet0/7
!
interface FastEthernet0/8
!
interface FastEthernet0/9
!
interface FastEthernet0/10
!
interface FastEthernet0/11
!
interface FastEthernet0/12
!
interface FastEthernet0/13
!
interface FastEthernet0/14
!
interface FastEthernet0/15
!
interface FastEthernet0/16
!
interface FastEthernet0/17
!
interface FastEthernet0/18
!
interface FastEthernet0/19
!
interface FastEthernet0/20
!
interface FastEthernet0/21
!
interface FastEthernet0/22
!
interface FastEthernet0/23
!
interface FastEthernet0/24
!
interface GigabitEthernet0/1
!
interface GigabitEthernet0/2
!
interface Vlan1
 no ip address
 shutdown
!
!
!
--More--
```

Ctrl+F6 to exit CLI focus

Copy Paste

☐ Top



