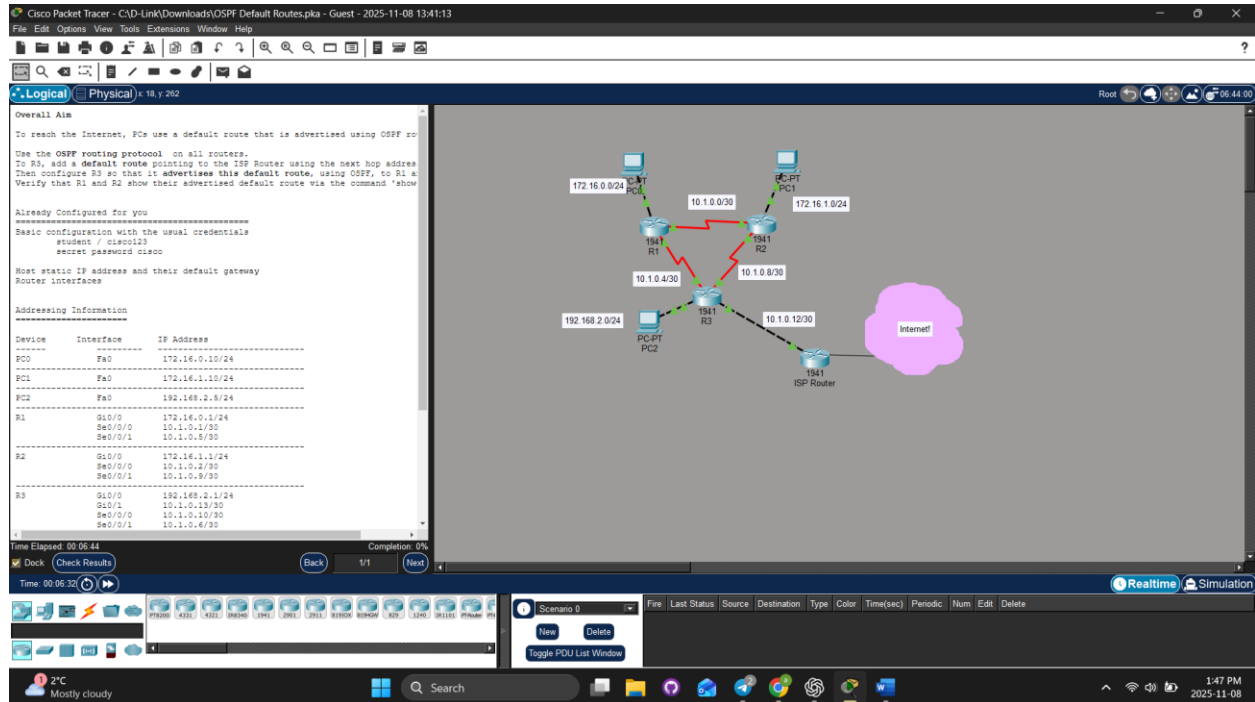


Assignment 11



Instructions

To reach the Internet, PCs use a default route that is advertised using OSPF routing.

- Use the OSPF routing protocol on all routers.
- To R3, add a default route pointing to the ISP Router using the next hop address.
- Then configure R3 so that it advertises this default route, using OSPF, to R1 and R2.
- Verify that R1 and R2 show their advertised default route via the command 'show ip route'.

Already Configured for you:

- Basic configuration with the usual credentials
 - student / cisco123
 - secret password cisco
- Host static IP address and their default gateway
- Router interfaces

Addressing Information:

Device	Interface	IP Address
PC0	Fa0	172.16.0.10/24
PC1	Fa0	172.16.1.10/24
PC2	Fa0	192.168.2.5/24
R1	Gi0/0	172.16.0.1/24
	Se0/0/0	10.1.0.1/30
	Se0/0/1	10.1.0.5/30
R2	Gi0/0	172.16.1.1/24
	Se0/0/0	10.1.0.2/30
	Se0/0/1	10.1.0.9/30
R3	Gi0/0	192.168.2.1/24
	Gi0/1	10.1.0.13/30
	Se0/0/0	10.1.0.10/30
	Se0/0/1	10.1.0.6/30
ISP Router	Gi0/0	10.1.0.14/24

Notes:

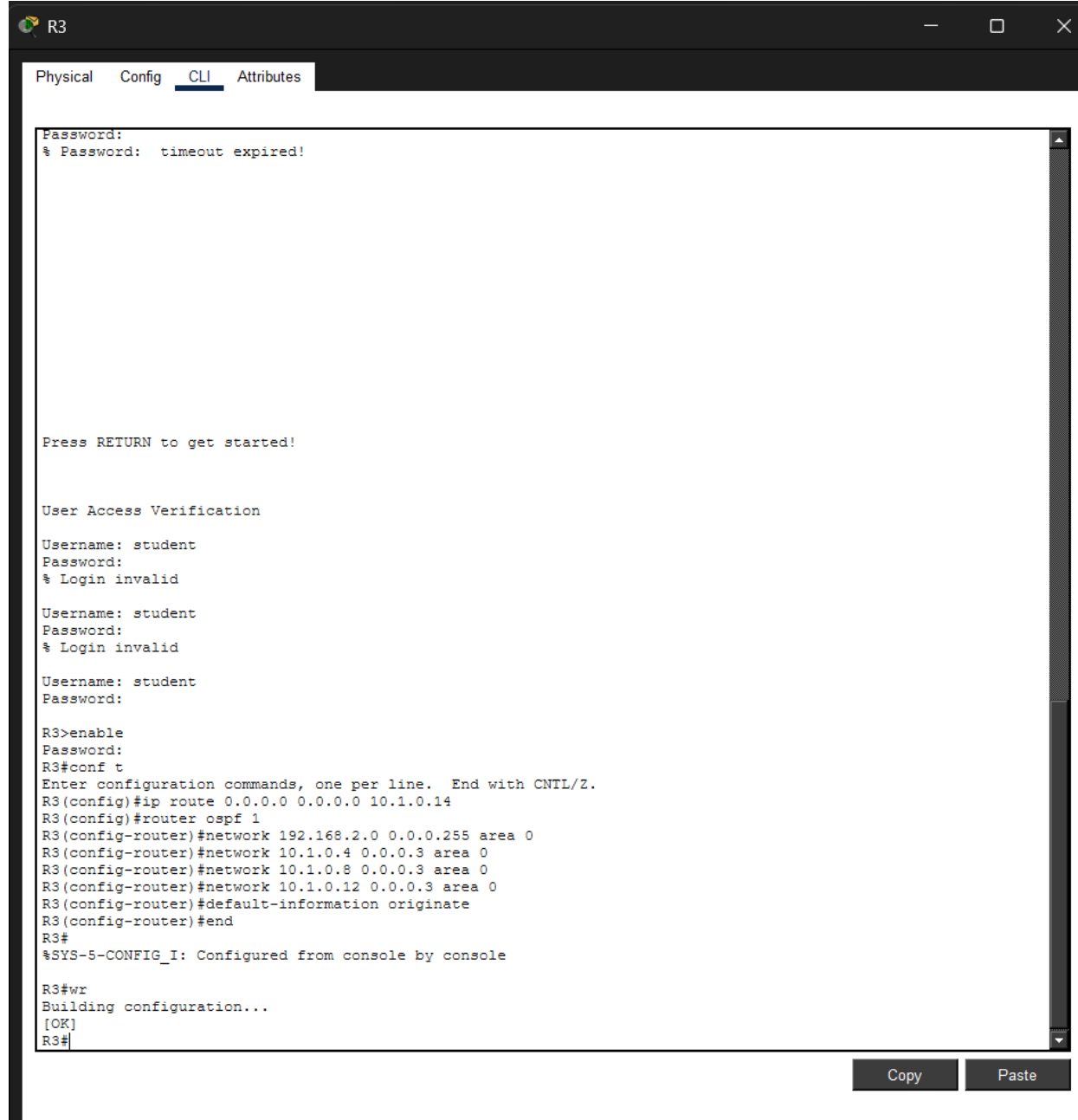
- Use a process ID of 1.
 - R1 - router ID 1.1.1.1
 - R2 - router ID 2.2.2.2
 - R3 - router ID 3.3.3.3

Deliverable

Submit your .pka file.

SOLUTION:

- 1) R3: create the default route to the ISP and advertise it via OSPF:



```
R3
Physical Config CLI Attributes

Password:
% Password: timeout expired!

Press RETURN to get started!

User Access Verification

Username: student
Password:
% Login invalid

Username: student
Password:
% Login invalid

Username: student
Password:

R3>enable
Password:
R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#ip route 0.0.0.0 0.0.0.0 10.1.0.14
R3(config)#router ospf 1
R3(config-router)#network 192.168.2.0 0.0.0.255 area 0
R3(config-router)#network 10.1.0.4 0.0.0.3 area 0
R3(config-router)#network 10.1.0.8 0.0.0.3 area 0
R3(config-router)#network 10.1.0.12 0.0.0.3 area 0
R3(config-router)#default-information originate
R3(config-router)#end
R3#
%SYS-5-CONFIG_I: Configured from console by console

R3#wr
Building configuration...
[OK]
R3#
```

Copy Paste

2) R1: enable OSPF and set router-ID:



```
export@cisco.com.  
  
Cisco CISC01941/K9 (revision 1.0) with 491520K/32768K bytes of memory.  
Processor board ID FTX152400KS  
2 Gigabit Ethernet interfaces  
2 Low-speed serial(sync/async) network interface(s)  
DRAM configuration is 64 bits wide with parity disabled.  
255K bytes of non-volatile configuration memory.  
249856K bytes of ATA System CompactFlash 0 (Read/Write)  
  
Press RETURN to get started!  
  
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up  
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up  
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up  
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up  
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up  
  
User Access Verification  
Username: student  
Password:  
% Login invalid  
Username: student  
Password:  
  
R1>enable  
Password:  
R1#configure terminal  
Enter configuration commands, one per line. End with CNTL/Z.  
R1(config)#router ospf 1  
R1(config-router)#router-id 1.1.1.1  
R1(config-router)#network 172.16.0.0 0.0.0.255 area 0  
R1(config-router)#network 10.1.0.0 0.0.0.3 area 0  
R1(config-router)#network 10.1.0.4 0.0.0.3 area 0  
R1(config-router)#end  
R1#  
%SYS-5-CONFIG_I: Configured from console by console  
  
R1#wr  
Building configuration...  
[OK]  
R1#  
00:32:48: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.2.1 on Serial0/0/1 from LOADING to FULL, Loading Done  
R1#S
```

Copy Paste

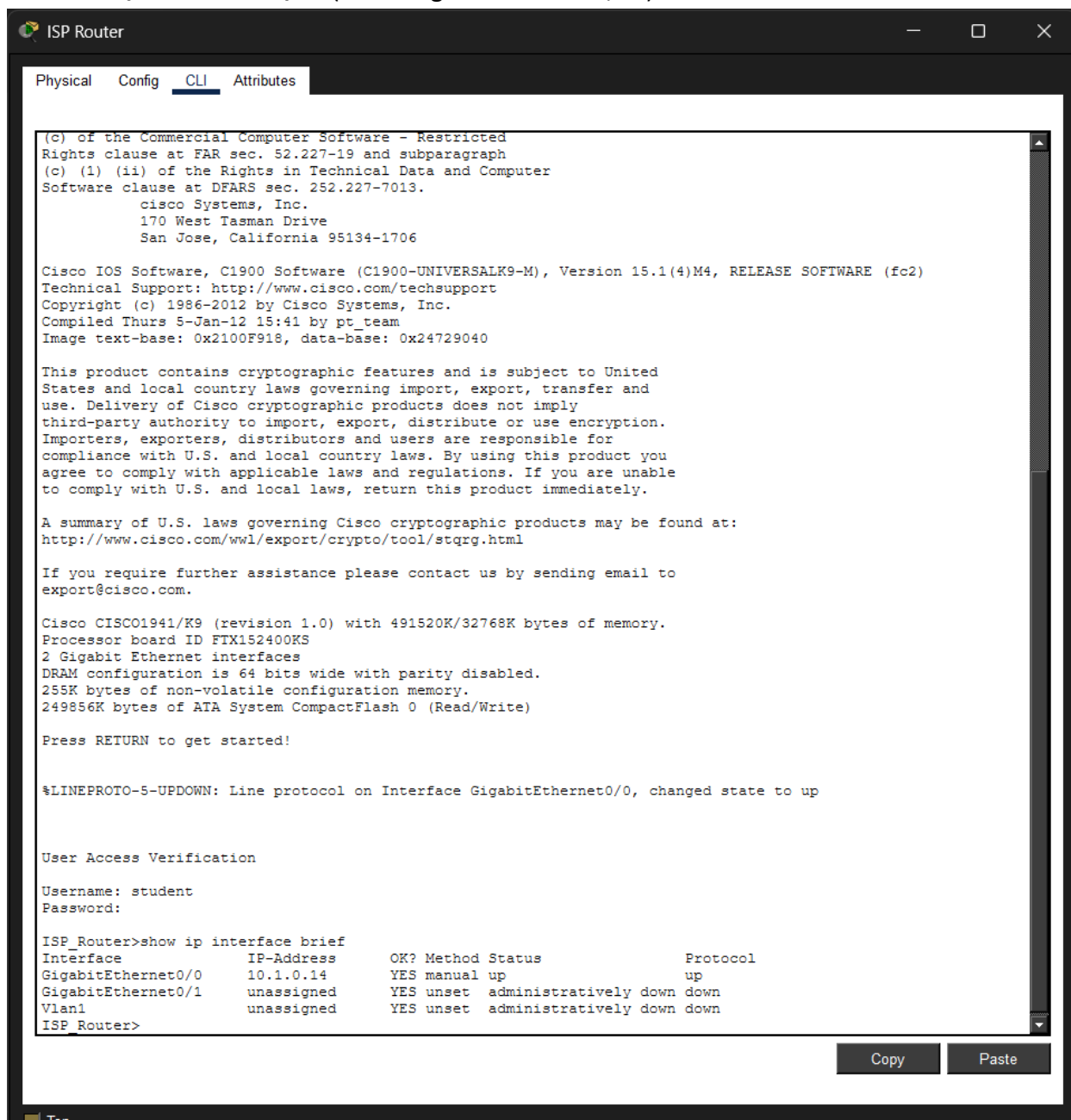
3) R2: enable OSPF and set router-ID:



```
export@cisco.com.  
  
Cisco CISCO1941/K9 (revision 1.0) with 491520K/32768K bytes of memory.  
Processor board ID FTX152400KS  
2 Gigabit Ethernet interfaces  
2 Low-speed serial(sync/async) network interface(s)  
DRAM configuration is 64 bits wide with parity disabled.  
255K bytes of non-volatile configuration memory.  
249856K bytes of ATA System CompactFlash 0 (Read/Write)  
  
Press RETURN to get started!  
  
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up  
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up  
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up  
  
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up  
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up  
  
User Access Verification  
Username: student  
Password:  
  
R2>enable  
Password:  
R2#configure terminal  
Enter configuration commands, one per line. End with CNTL/Z.  
R2(config)#router ospf 1  
R2(config-router)#router-id 2.2.2.2  
R2(config-router)#network 172.16.1.0 0.0.0.255 area 0  
R2(config-router)#network 10.1.0.0 0.0.0.3 area 0  
R2(config-router)#  
00:35:32: %OSPF-5-ADJCHG: Process 1, Nbr 1.1.1.1 on Serial0/0/0 from LOADING to FULL, Loading Done  
  
R2(config-router)#network 10.1.0.8 0.0.0.3 area 0  
R2(config-router)#  
R2(config-router)#  
00:36:24: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.2.1 on Serial0/0/1 from LOADING to FULL, Loading Done  
  
R2(config-router)#  
R2(config-router)#end  
R2#  
%SYS-5-CONFIG_I: Configured from console by console  
R2#
```

4) ISP router

Ensure **Gi0/0 = 10.1.0.14/30** (matching R3's 10.1.0.13/30). No OSPF needed.



The screenshot shows a Cisco IOS CLI window titled "ISP Router". The window has tabs for "Physical", "Config", "CLI", and "Attributes", with "CLI" selected. The main text area displays the following output:

```
(c) of the Commercial Computer Software - Restricted
Rights clause at FAR sec. 52.227-19 and subparagraph
(c) (1) (ii) of the Rights in Technical Data and Computer
Software clause at DFARS sec. 252.227-7013.
    cisco Systems, Inc.
    170 West Tasman Drive
    San Jose, California 95134-1706

Cisco IOS Software, C1900 Software (C1900-UNIVERSALK9-M), Version 15.1(4)M4, RELEASE SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2012 by Cisco Systems, Inc.
Compiled Thurs 5-Jan-12 15:41 by pt_team
Image text-base: 0x2100F918, data-base: 0x24729040

This product contains cryptographic features and is subject to United
States and local country laws governing import, export, transfer and
use. Delivery of Cisco cryptographic products does not imply
third-party authority to import, export, distribute or use encryption.
Importers, exporters, distributors and users are responsible for
compliance with U.S. and local country laws. By using this product you
agree to comply with applicable laws and regulations. If you are unable
to comply with U.S. and local laws, return this product immediately.

A summary of U.S. laws governing Cisco cryptographic products may be found at:
http://www.cisco.com/wvl/export/crypto/tool/stqrg.html

If you require further assistance please contact us by sending email to
export@cisco.com.

Cisco CISCO1941/K9 (revision 1.0) with 491520K/32768K bytes of memory.
Processor board ID FTX152400KS
2 Gigabit Ethernet interfaces
DRAM configuration is 64 bits wide with parity disabled.
255K bytes of non-volatile configuration memory.
249856K bytes of ATA System CompactFlash 0 (Read/Write)

Press RETURN to get started!

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up

User Access Verification

Username: student
Password:

ISP_Router>show ip interface brief
Interface      IP-Address      OK? Method Status      Protocol
GigabitEthernet0/0  10.1.0.14      YES manual up          up
GigabitEthernet0/1  unassigned     YES unset  administratively down down
Vlan1          unassigned     YES unset  administratively down down
ISP_Router>
```

At the bottom right of the window, there are "Copy" and "Paste" buttons. A "Top" button is visible at the bottom left of the window frame.

VERIFICATIONS:

R1:



```
249300K Bytes of Main System CompactFlash 0 (Read/Write)
Press RETURN to get started!

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up

User Access Verification
Username: student
Password:
% Login invalid
Username: student
Password:

R1>enable
Password:
R1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#router ospf 1
R1(config-router)#router-id 1.1.1.1
R1(config-router)#network 172.16.0.0 0.0.0.255 area 0
R1(config-router)#network 10.1.0.0 0.0.0.3 area 0
R1(config-router)#network 10.1.0.4 0.0.0.3 area 0
R1(config-router)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#wr
Building configuration...
[OK]
R1#
00:32:48: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.2.1 on Serial0/0/1 from LOADING to FULL, Loading Done

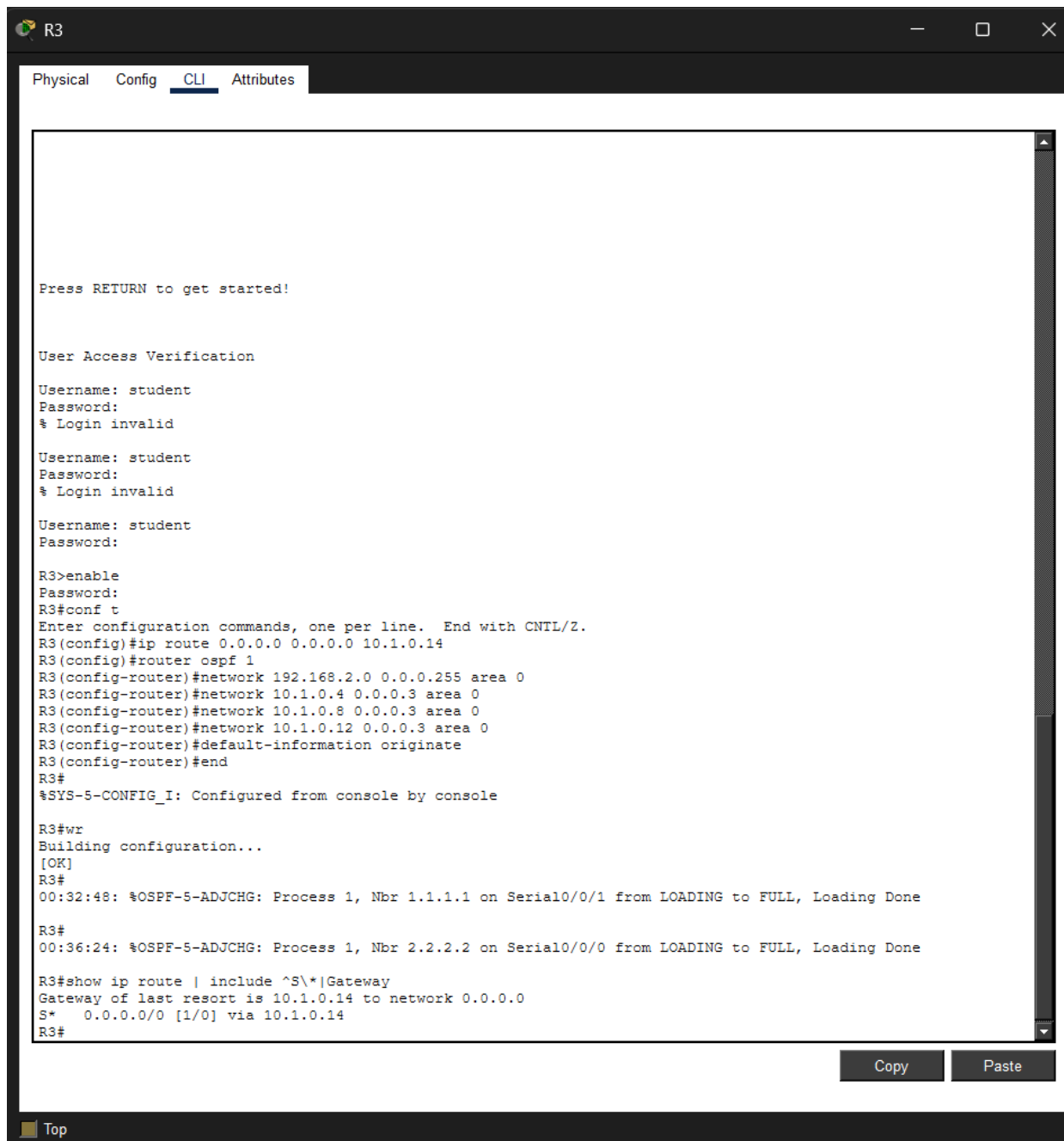
R1#S
00:35:32: %OSPF-5-ADJCHG: Process 1, Nbr 2.2.2.2 on Serial0/0/0 from LOADING to FULL, Loading Done

R1#
R1#show ip route | include 0.0.0.0
Gateway of last resort is 10.1.0.6 to network 0.0.0.0
    10.0.0.0/8 is variably subnetted, 6 subnets, 2 masks
O*E2 0.0.0.0/0 [110/1] via 10.1.0.6, 00:11:56, Serial0/0/1
R1#
```

Copy Paste

Top

R3:



```
R3
Physical Config CLI Attributes

Press RETURN to get started!

User Access Verification
Username: student
Password:
% Login invalid
Username: student
Password:
% Login invalid
Username: student
Password:

R3>enable
Password:
R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#ip route 0.0.0.0 0.0.0.0 10.1.0.14
R3(config)#router ospf 1
R3(config-router)#network 192.168.2.0 0.0.0.255 area 0
R3(config-router)#network 10.1.0.4 0.0.0.3 area 0
R3(config-router)#network 10.1.0.8 0.0.0.3 area 0
R3(config-router)#network 10.1.0.12 0.0.0.3 area 0
R3(config-router)#default-information originate
R3(config-router)#end
R3#
%SYS-5-CONFIG_I: Configured from console by console

R3#wr
Building configuration...
[OK]
R3#
00:32:48: %OSPF-5-ADJCHG: Process 1, Nbr 1.1.1.1 on Serial0/0/1 from LOADING to FULL, Loading Done

R3#
00:36:24: %OSPF-5-ADJCHG: Process 1, Nbr 2.2.2.2 on Serial0/0/0 from LOADING to FULL, Loading Done

R3#show ip route | include ^S\*|Gateway
Gateway of last resort is 10.1.0.14 to network 0.0.0.0
S* 0.0.0.0/0 [1/0] via 10.1.0.14
R3#
```

Copy Paste

Top

R2:

R2

Physical

Config

CLI

Attributes

Press RETURN to get started!

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up

User Access Verification

Username: student

Password:

R2>enable

Password:

R2#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

R2(config)#router ospf 1

R2(config-router)#router-id 2.2.2.2

R2(config-router)#network 172.16.1.0 0.0.0.255 area 0

R2(config-router)#network 10.1.0.0 0.0.0.3 area 0

R2(config-router)#

00:35:32: %OSPF-5-ADJCHG: Process 1, Nbr 1.1.1.1 on Serial0/0/0 from LOADING to FULL, Loading Done

R2(config-router)#network 10.1.0.8 0.0.0.3 area 0

R2(config-router)#

R2(config-router)#

00:36:24: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.2.1 on Serial0/0/1 from LOADING to FULL, Loading Done

R2(config-router)#

R2(config-router)#end

R2#

%SYS-5-CONFIG_I: Configured from console by console

R2#show ip route | include 0.0.0.0

Gateway of last resort is 10.1.0.10 to network 0.0.0.0

10.0.0.0/8 is variably subnetted, 6 subnets, 2 masks

O*E2 0.0.0.0/0 [110/1] via 10.1.0.10, 00:12:42, Serial0/0/1

R2#show ip ospf neighbor

Neighbor ID	Pri	State	Dead Time	Address	Interface	
192.168.2.1	0	FULL/	-	00:00:30	10.1.0.10	Serial0/0/1
1.1.1.1	0	FULL/	-	00:00:38	10.1.0.1	Serial0/0/0

R2#

Copy

Paste

Top

End-to-end test (from PCs):

- PC0: ping ISP 10.1.0.14

The screenshot shows a virtual machine interface titled "PC0". At the top, there are tabs for "Physical", "Config", "Desktop", "Programming", and "Attributes", with "Desktop" currently selected. Below the tabs is a "Command Prompt" window. The command prompt has a title bar with a close button ("X"). The main area of the command prompt displays the following text:

```
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>  
C:\>pingn 10.1.0.14  
Invalid Command.  
  
C:\>ping 10.1.0.14  
  
Pinging 10.1.0.14 with 32 bytes of data:  
  
Reply from 10.1.0.14: bytes=32 time=1ms TTL=253  
Reply from 10.1.0.14: bytes=32 time=1ms TTL=253  
Reply from 10.1.0.14: bytes=32 time=3ms TTL=253  
Reply from 10.1.0.14: bytes=32 time=1ms TTL=253  
  
Ping statistics for 10.1.0.14:  
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
Approximate round trip times in milli-seconds:  
    Minimum = 1ms, Maximum = 3ms, Average = 1ms  
  
C:\>
```

At the bottom left of the window, there is a "Top" link.

100@ pka:

Cisco Packet Tracer - C:\Users\Admin\OneDrive\Desktop\Cybersecurity certifications\NAS\OSPF Default Routes.pka - Guest - 2025-11-08 13:41:13

File Edit Options View Tools Extensions Window Help

Logical Physical x 22, y 284

Overall Aim

To reach the Internet, PCs use a default route that is advertised using OSPF to

Use the OSPF routing protocol on all routers.

To R3, add a default route pointing to the ISP Router using the next hop address

Then configure R3 so that it advertises this default route, using OSPF, to R1 & R2

Verify that R1 and R2 show their advertised default route via the command 'show

Already Configured for you

```
=====
Basic configuration with the usual credentials
student / class013
secret password class0

Host static IP address and their default gateway
Router interfaces
=====
```

Addressing Information

Device	Interface	IP Address
PC0	FastEthernet0/0	172.16.0.10/24
PC1	FastEthernet0/0	172.16.1.10/24
PC2	FastEthernet0/0	192.168.2.5/24
R1	GigabitEthernet0/0	172.16.0.1/24
	Serial0/0/0	10.1.0.1/30
	Serial0/0/1	10.1.0.9/30
R2	GigabitEthernet0/0	172.16.1.1/24
	Serial0/0/0	10.1.0.2/30
	Serial0/0/1	10.1.0.9/30
R3	GigabitEthernet0/0	192.168.2.1/24
	Serial0/0/0	10.1.0.13/30
	Serial0/0/1	10.1.0.6/30

Time Elapsed: 01:02:25

Completion: 100%

Back Check Results Next

Time: 01:00:41

Realtime Simulation

Cisco Packet Tracer - C:\Users\Admin\OneDrive\Desktop\Cybersecurity certifications\NAS\OSPF Default Routes.pka - Guest - 2025-11-08 13:41:13

File Edit Options View Tools Extensions Window Help

Activity Results

Time Elapsed: 01:03:09

Congratulations Guest! You completed the activity.

Overall Feedback Assessment Items Connectivity Tests

Expand/Collapse All Show Incorrect Items

Assessment Items	Status	Points	Component(s)	Feedback
Network				
- R1				
- OSPF				
- Process ID 1		0	Routing	
- Area 0		1	Routing	
- Area Status	Correct	1	Routing	
- Default Information	Correct	1	Routing	
- Networks				
- Route0	Correct	1	Routing	
- Route1	Correct	1	Routing	
- Route2	Correct	1	Routing	
- Router ID	Correct	1	Routing	
- R2				
- OSPF				
- Process ID 1		0	Routing	
- Area 0		1	Routing	
- Area Status	Correct	1	Routing	
- Default Information	Correct	1	Routing	
- Networks				
- Route0	Correct	1	Routing	
- Route1	Correct	1	Routing	
- Route2	Correct	1	Routing	
- Router ID	Correct	1	Routing	
- R3				
- OSPF				
- Process ID 1		0	Routing	
- Area 0		1	Routing	
- Area Status	Correct	1	Routing	
- Default Information	Correct	1	Routing	
- Networks				
- Route0	Correct	1	Routing	
- Route1	Correct	1	Routing	
- Route2	Correct	1	Routing	
- Route3	Correct	1	Routing	
- Router ID	Correct	1	Routing	
- Routes				
- Static Routes		0	Other	
- Route0	Correct	1	Routing	