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# FINAL EXAMINATION

PRACTICAL EXAM: Routing Fundamentals

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## CCNA 1

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## CCNA EXAM

### PRACTICAL EXAM: Routing Fundamentals

2) Configure hostnames on the routers according to the Lab Topology diagram.

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R
R(config)#
R(config)#
R(config)#hostname R1
R1(config)#
```

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R5
R5(config)#
```

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R5
R5(config)#
R5(config)#
R5(config)#hostname R2
```

Using the  
hostname  
command on each  
router will do the  
job

After that we  
need to enable  
the interfaces

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R3
R3(config)#
```

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname R4
R4(config)#
```

### 3) Configure IP addresses on R1 according to the Lab Topology diagram

```
R1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#interface FastEthernet0/0
R1(config-if)#ip address 10.0.0.1 255.0.0.0
R1(config-if)#ip address 10.0.0.1 255.255.255.0
R1(config-if)#
```

```
R1(config)#interface FastEthernet0/1
R1(config-if)#ip address 10.0.1.1 255.255.255.0
R1(config-if)#
R1(config-if)#exit
```

```
R1(config-if)#interface FastEthernet1/0
R1(config-if)#ip address 10.0.2.1 255.255.255.0
R1(config-if)#
```

```
R1(config-if)#interface FastEthernet1/1
R1(config-if)#ip address 10.0.3.1 255.255.255.0
R1(config-if)#
```

The trick here is that the prefix length is /24 so the first 3 bytes are reserved hence the subnet mask is what we have there.

### 4) Verify routes have been automatically added for the connected and local networks (note that local routes only appear from IOS 15)

```
R1(config)#show ip route
^
% Invalid input detected at '^' marker.

R1(config)#do show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

    10.0.0.0/8 is variably subnetted, 4 subnets, 2 masks
C       10.0.1.0/24 is directly connected, FastEthernet0/1
L       10.0.1.1/32 is directly connected, FastEthernet0/1
C       10.0.2.0/24 is directly connected, FastEthernet1/0
L       10.0.2.1/32 is directly connected, FastEthernet1/0

R1(config)#
```

We can see that we have two local and 2 connected routes from here

### 5) Do you see routes for all networks that R1 is directly connected to? Why or why not?

No

Because the other routers are not yet configured

### 6) Should you be able to ping from PC1 to PC2? Verify this.

(Click on PC1 then 'Desktop' and 'Command Prompt' to access its command line interface.)

```
C:\>ping 10.0.2.10

Pinging 10.0.2.10 with 32 bytes of data:

Request timed out.
Reply from 10.0.2.10: bytes=32 time<1ms TTL=127
Reply from 10.0.2.10: bytes=32 time=23ms TTL=127
Reply from 10.0.2.10: bytes=32 time<1ms TTL=127

Ping statistics for 10.0.2.10:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 23ms, Average = 7ms

C:\>ping 10.0.2.10

Pinging 10.0.2.10 with 32 bytes of data:

Reply from 10.0.2.10: bytes=32 time<1ms TTL=127
Reply from 10.0.2.10: bytes=32 time<1ms TTL=127
Reply from 10.0.2.10: bytes=32 time<1ms TTL=127
Reply from 10.0.2.10: bytes=32 time<1ms TTL=127

Ping statistics for 10.0.2.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>|
```

Yes it should  
be able to  
ping PC2  
since the  
connection  
is  
established.

7) Verify the traffic path from PC1 to PC2. Use the tracert' command.

```
C:\>tracert 10.0.2.10

Tracing route to 10.0.2.10 over a maximum of 30 hops:

  1  0 ms    0 ms    0 ms    10.0.1.1
  2  1 ms    0 ms    0 ms    10.0.2.10

Trace complete.

C:\>
```

The traceroute(tracert  
on Windows) command  
is used to discover the  
routes that packets  
actually take when they  
travel to their destination.

8) Should you be able to ping from PC1 to PC3? Verify this

No

```

C:\>ping 10.1.2.10

Pinging 10.1.2.10 with 32 bytes of data:

Reply from 10.0.1.1: Destination host unreachable.
Reply from 10.0.1.1: Destination host unreachable.
Reply from 10.0.1.1: Destination host unreachable.
Request timed out.

Ping statistics for 10.1.2.10:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>

```

## Activity 2: Static Routes (13 Marks)

9) Configure IP addresses on R2, R3 and R4 according to the Lab Topology diagram. Do not configure the Internet Fast Ethernet 1/1 interface on R4. Do not configure R5.

```

R2>enable
R2#
R2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#interface FastEthernet0/0
R2(config-if)#ip address 10.0.0.2 255.255.255.0
R2(config-if)#interface FastEthernet0/1
R2(config-if)#ip address 10.1.0.2 255.255.255.0
R2(config-if)#

```

The trick here is that the prefix length is /24 so the first 3 bytes are reserved hence the subnet mask is what we have there.

```

R3>en
R3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#int f0/1
R3(config-if)#ip address 10.1.0.1 255.255.255.0
R3(config-if)#int f0/0
R3(config-if)#ip address 10.1.1.2 255.255.255.0
R3(config-if)#

```

```

R4>en
R4#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R4(config)#int f0/0
R4(config-if)#ip address 10.1.1.1 255.255.255.0
R4(config-if)#int f0/1
R4(config-if)#ip address 10.1.2.1 255.255.255.0
R4(config-if)#int f1/0
R4(config-if)#ip address 10.1.3.1 255.255.255.0
R4(config-if)#

```

10) Verify PC3 can ping its default gateway at 10.1.2.1

```

Cisco Packet Tracer PC Command Line 1.0
C:\>ping 10.1.2.1

Pinging 10.1.2.1 with 32 bytes of data:

Reply from 10.1.2.1: bytes=32 time<1ms TTL=255
Reply from 10.1.2.1: bytes=32 time<1ms TTL=255
Reply from 10.1.2.1: bytes=32 time<1ms TTL=255
Reply from 10.1.2.1: bytes=32 time<1ms TTL=255

Ping statistics for 10.1.2.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>

```

11)Configure static routes on R1, R2, R3 and R4 to allow connectivity between all their subnets. Use /24 prefixes for each network.

```

R1(config)#do show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter are
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

    10.0.0.0/8 is variably subnetted, 9 subnets, 2 masks
C       10.0.0.0/24 is directly connected, FastEthernet0/0
L       10.0.0.1/32 is directly connected, FastEthernet0/0
C       10.0.1.0/24 is directly connected, FastEthernet0/1
L       10.0.1.1/32 is directly connected, FastEthernet0/1
C       10.0.2.0/24 is directly connected, FastEthernet1/0
L       10.0.2.1/32 is directly connected, FastEthernet1/0
S       10.1.0.0/24 is directly connected, FastEthernet0/0
S       10.1.1.0/24 is directly connected, FastEthernet0/0
S       10.1.2.0/24 is directly connected, FastEthernet0/0
S       203.0.113.0/24 is directly connected, FastEthernet0/0

R1(config)#

```

```

R2(config)#do show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

    10.0.0.0/8 is variably subnetted, 8 subnets, 2 masks
C       10.0.0.0/24 is directly connected, FastEthernet0/0
L       10.0.0.2/32 is directly connected, FastEthernet0/0
S       10.0.1.0/24 is directly connected, FastEthernet0/0
S       10.0.2.0/24 is directly connected, FastEthernet0/0
C       10.1.0.0/24 is directly connected, FastEthernet0/1
L       10.1.0.2/32 is directly connected, FastEthernet0/1
S       10.1.1.0/24 is directly connected, FastEthernet0/1
S       10.1.2.0/24 is directly connected, FastEthernet0/1
S       203.0.113.0/24 is directly connected, FastEthernet0/1

R2(config)#

```

```

R3(config)#do show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

    10.0.0.0/8 is variably subnetted, 8 subnets, 2 masks
S       10.0.0.0/24 is directly connected, FastEthernet0/1
S       10.0.1.0/24 is directly connected, FastEthernet0/1
S       10.0.2.0/24 is directly connected, FastEthernet0/1
C       10.1.0.0/24 is directly connected, FastEthernet0/1
L       10.1.0.1/32 is directly connected, FastEthernet0/1
C       10.1.1.0/24 is directly connected, FastEthernet0/0
L       10.1.1.2/32 is directly connected, FastEthernet0/0
S       10.1.2.0/24 is directly connected, FastEthernet0/0
S       203.0.113.0/24 is directly connected, FastEthernet0/0

R3(config)#

```

Same command everywhere :

`ip route add mask next-op`

```

R4(config)#do show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
        D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
        N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
        E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
        i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
        * - candidate default, U - per-user static route, o - ODR
        P - periodic downloaded static route

Gateway of last resort is not set

    10.0.0.0/8 is variably subnetted, 8 subnets, 2 masks
S       10.0.0.0/24 is directly connected, FastEthernet0/0
S       10.0.1.0/24 is directly connected, FastEthernet0/0
S       10.0.2.0/24 is directly connected, FastEthernet0/0
S       10.1.0.0/24 is directly connected, FastEthernet0/0
C       10.1.1.0/24 is directly connected, FastEthernet0/0
L       10.1.1.1/32 is directly connected, FastEthernet0/0
C       10.1.2.0/24 is directly connected, FastEthernet0/1
L       10.1.2.1/32 is directly connected, FastEthernet0/1

R4(config)#

```

## 12) Verify connectivity between PC1, PC2 and PC3.

```

C:\>ping 10.0.2.10

Pinging 10.0.2.10 with 32 bytes of data:

Reply from 10.0.2.10: bytes=32 time<1ms TTL=127
Reply from 10.0.2.10: bytes=32 time=3ms TTL=127
Reply from 10.0.2.10: bytes=32 time<1ms TTL=127
Reply from 10.0.2.10: bytes=32 time<1ms TTL=127

Ping statistics for 10.0.2.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 3ms, Average = 0ms

C:\>

```

From PC1 to PC2

```

C:\>ping 10.1.2.10

Pinging 10.1.2.10 with 32 bytes of data:

Reply from 10.1.2.10: bytes=32 time<1ms TTL=124
Reply from 10.1.2.10: bytes=32 time<1ms TTL=124
Reply from 10.1.2.10: bytes=32 time<1ms TTL=124
Reply from 10.1.2.10: bytes=32 time=10ms TTL=124

Ping statistics for 10.1.2.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 10ms, Average = 2ms

C:\>

```

From PC1 to PC3  
after 3 failures 🙄



```

C:\>ping 10.1.2.10

Pinging 10.1.2.10 with 32 bytes of data:

Reply from 10.1.2.10: bytes=32 time=10ms TTL=124
Reply from 10.1.2.10: bytes=32 time<1ms TTL=124
Reply from 10.1.2.10: bytes=32 time=1ms TTL=124
Reply from 10.1.2.10: bytes=32 time<1ms TTL=124

Ping statistics for 10.1.2.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 10ms, Average = 2ms

C:\>

```

From PC2 to PC3  
after 1 failure 🤖

```

C:\>ping 10.0.1.10

Pinging 10.0.1.10 with 32 bytes of data:

Reply from 10.0.1.10: bytes=32 time<1ms TTL=127
Reply from 10.0.1.10: bytes=32 time<1ms TTL=127
Reply from 10.0.1.10: bytes=32 time=17ms TTL=127
Reply from 10.0.1.10: bytes=32 time<1ms TTL=127

Ping statistics for 10.0.1.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 17ms, Average = 4ms

C:\>

```

PC2 to PC1  
Everything right  
the first time 🚩

### 13) Verify the path traffic takes from PC1 to PC3.

```

C:\>tracert 10.1.2.10

Tracing route to 10.1.2.10 over a maximum of 30 hops:

  1  0 ms    0 ms    0 ms    10.0.1.1
  2  0 ms    0 ms    0 ms    10.0.0.2
  3  0 ms    1 ms    0 ms    10.1.0.1
  4  0 ms    0 ms    0 ms    10.1.1.1
  5  0 ms    0 ms    10 ms   10.1.2.10

Trace complete.

C:\>

```

PC3 to PC3 We can  
see the path taken  
and their  
corresponding IP  
addresses 🚩

## Activity 3: Summary Routes (12 Marks)

### 14) Remove all the static routes on R1

```

    10.0.0.0/8 is variably subnetted, 9 subnets, 2 masks
C    10.0.0.0/24 is directly connected, FastEthernet0/0
L    10.0.0.1/32 is directly connected, FastEthernet0/0
C    10.0.1.0/24 is directly connected, FastEthernet0/1
L    10.0.1.1/32 is directly connected, FastEthernet0/1
C    10.0.2.0/24 is directly connected, FastEthernet1/0
L    10.0.2.1/32 is directly connected, FastEthernet1/0
S    10.1.0.0/24 is directly connected, FastEthernet0/0
S    10.1.1.0/24 is directly connected, FastEthernet0/0
S    10.1.2.0/24 is directly connected, FastEthernet0/0
S    203.0.113.0/24 is directly connected, FastEthernet0/0

R1(config)#no ip route 203.0.113.0 255.255.255.0 f0/0
R1(config)#no ip route 10.1.2.0 255.255.255.0 f0/0
R1(config)#no ip route 10.1.1.0 255.255.255.0 f0/0
R1(config)#no ip route 10.1.0.0 255.255.255.0 f0/0
R1(config)#do show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

    10.0.0.0/8 is variably subnetted, 6 subnets, 2 masks
C    10.0.0.0/24 is directly connected, FastEthernet0/0
L    10.0.0.1/32 is directly connected, FastEthernet0/0
C    10.0.1.0/24 is directly connected, FastEthernet0/1
L    10.0.1.1/32 is directly connected, FastEthernet0/1
C    10.0.2.0/24 is directly connected, FastEthernet1/0
L    10.0.2.1/32 is directly connected, FastEthernet1/0

R1(config)#

```

### 15) Verify that PC1 loses connectivity to PC3

```

C:\>tracert 10.1.2.10

Tracing route to 10.1.2.10 over a maximum of 30 hops:

  0  0 ms    0 ms    0 ms    10.0.1.1
  1  1 ms    *        0 ms    10.0.1.1
  2  *        0 ms    *        Request timed out.
  3  0 ms    *        1 ms    10.0.1.1
  4  *        0 ms    *        Request timed out.
  5  1 ms    *        0 ms    10.0.1.1
  6  *        0 ms    *        Request timed out.
  7  *        0 ms    *        Request timed out.

Control-C
^C
C:\>ping 10.1.2.10

Pinging 10.1.2.10 with 32 bytes of data:

Reply from 10.0.1.1: Destination host unreachable.
Reply from 10.0.1.1: Destination host unreachable.
Request timed out.
Reply from 10.0.1.1: Destination host unreachable.

Ping statistics for 10.1.2.10:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>

```

### 16) Restore connectivity to all subnets with a single command on R1.

```

R1(config)#ip route 0.0.0.0 0.0.0.0 10.0.0.2
R1(config)#do show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is 10.0.0.2 to network 0.0.0.0

    10.0.0.0/8 is variably subnetted, 6 subnets, 2 masks
C       10.0.0.0/24 is directly connected, FastEthernet0/0
L       10.0.0.1/32 is directly connected, FastEthernet0/0
C       10.0.1.0/24 is directly connected, FastEthernet0/1
L       10.0.1.1/32 is directly connected, FastEthernet0/1
C       10.0.2.0/24 is directly connected, FastEthernet1/0
L       10.0.2.1/32 is directly connected, FastEthernet1/0
S*    0.0.0.0/0 [1/0] via 10.0.0.2

R1(config)#

```

17) Verify the routing table on R1 does not contain /24 routes to remote subnets.

```

    10.0.0.0/8 is variably subnetted, 6 subnets, 2 masks
C       10.0.0.0/24 is directly connected, FastEthernet0/0
L       10.0.0.1/32 is directly connected, FastEthernet0/0
C       10.0.1.0/24 is directly connected, FastEthernet0/1
L       10.0.1.1/32 is directly connected, FastEthernet0/1
C       10.0.2.0/24 is directly connected, FastEthernet1/0
L       10.0.2.1/32 is directly connected, FastEthernet1/0
S*    0.0.0.0/0 [1/0] via 10.0.0.2

```

18) Ensure that connectivity is restored between PC1 and PC3.

```

C:\>ping 10.1.2.10

Pinging 10.1.2.10 with 32 bytes of data:

Reply from 10.1.2.10: bytes=32 time=17ms TTL=124
Reply from 10.1.2.10: bytes=32 time<1ms TTL=124
Reply from 10.1.2.10: bytes=32 time<1ms TTL=124
Reply from 10.1.2.10: bytes=32 time<1ms TTL=124

Ping statistics for 10.1.2.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 17ms, Average = 4ms

C:\>

```

### Activity 4: Longest Prefix Match (15 Marks)

19) Configure IP addresses on R5 according to the Lab Topology diagram

```
R5>enable
R5#
R5#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R5(config)#interface FastEthernet0/0
R5(config-if)#ip address 10.1.3.2 255.0.0.0
R5(config-if)#ip address 10.1.3.2 255.255.255.0
R5(config-if)#ip address 10.1.3.2 255.255.255.0
R5(config-if)#
R5(config-if)#exit
R5(config)#interface FastEthernet0/1
R5(config-if)#ip address 10.0.3.2 255.255.255.0
R5(config-if)#
```

20) Do not add any additional routes. Does PC1 have reachability to the FastEthernet 0/0 interface on R5? If so, which path will the traffic take?

```
C:\>ping 10.1.3.2

Pinging 10.1.3.2 with 32 bytes of data:

Reply from 10.0.0.2: Destination host unreachable.
Reply from 10.0.0.2: Destination host unreachable.
Reply from 10.0.0.2: Destination host unreachable.
Request timed out.

Ping statistics for 10.1.3.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

No, C:\>

21) Ensure reachability over the shortest possible path from R5 to all directly connected networks on R1. Achieve this with a single command.

```
R5>en
R5#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R5(config)#ip route 0.0.0.0 0.0.0.0 10.0.3.1
R5(config)#do show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is 0.0.0.0 to network 0.0.0.0

    10.0.0.0/8 is variably subnetted, 4 subnets, 2 masks
C       10.0.3.0/24 is directly connected, FastEthernet0/1
L       10.0.3.2/32 is directly connected, FastEthernet0/1
C       10.1.3.0/24 is directly connected, FastEthernet0/0
L       10.1.3.2/32 is directly connected, FastEthernet0/0
S*     0.0.0.0/0 is directly connected, FastEthernet0/0
        [1/0] via 10.0.3.1

R5(config)#
```

22) Verify the path traffic takes from PC1 to the FastEthernet 0/0 interface on R5.

```
C:\>tracert 10.1.3.2

Tracing route to 10.1.3.2 over a maximum of 30 hops:

  1  0 ms    0 ms    0 ms    10.0.1.1
  2  0 ms    0 ms    0 ms    10.1.3.2

Trace complete.

C:\>
```

23) Verify the path the return traffic takes from R5 to PC1.

```
R5#traceroute 10.0.3.1
Type escape sequence to abort.
Tracing the route to 10.0.3.1

 1  10.0.3.1      0 msec    0 msec    0 msec
R5#
```

24) Ensure that traffic between PC1 and the FastEthernet 0/0 interface on R5 takes the most direct path in both directions.

```
C:\>tracert 10.1.3.2

Tracing route to 10.1.3.2 over a maximum of 30 hops:

 1  0 ms    0 ms    0 ms    10.0.1.1
 2  0 ms    0 ms    7 ms    10.1.3.2

Trace complete.

C:\>
```

```
R5(config)#do traceroute 10.0.1.10
Type escape sequence to abort.
Tracing the route to 10.0.1.10

 1  10.0.3.1      0 msec    0 msec    0 msec
 2  10.0.1.10     0 msec    0 msec    0 msec
R5(config)#
```

To ensure that  
,we just need to  
check the routing  
table of R5 and  
see if the IP  
address of PC1 is  
there.

25) Verify that traffic between PC1 and the FastEthernet 0/0 interface on R5 takes the most direct path in both directions.

```
C:\>tracert 10.1.3.2

Tracing route to 10.1.3.2 over a maximum of 30 hops:

  1  0 ms      0 ms      0 ms      10.0.1.1
  2  0 ms      0 ms      7 ms      10.1.3.2

Trace complete.

C:\>|
```

From PC1 to  
R5

```
R5(config)#do traceroute 10.0.1.10
Type escape sequence to abort.
Tracing the route to 10.0.1.10

 1  10.0.3.1      0 msec    0 msec    0 msec
 2  10.0.1.10     0 msec    0 msec    0 msec
R5(config)#
```

From R5to  
PC1

### Activity 5: Default Route and Load Balancing (10 Marks)

26) Configure an IP address on the Internet FastEthernet 1/1 interface on R4 according to the lab topology diagram.

```
R4>enable
R4#
R4#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R4(config)#interface FastEthernet1/1
R4(config-if)#ip address 203.0.113.1 255.255.255.0
```

27) Ensure that all PCs have a route out to the internet through the Internet Service Provider connection on R4. (Note that the lab does not actually have Internet connectivity.)

```
C:\>tracert 203.0.113.2

Tracing route to 203.0.113.2 over a maximum of 30 hops:

 1  0 ms      0 ms      0 ms      10.0.1.1
 2  0 ms      0 ms      0 ms      10.0.0.2
 3  0 ms      0 ms      0 ms      10.1.0.1
 4  0 ms      1 ms      0 ms      10.1.1.1
 5  *          *          *          Request timed out.
 6  *          *          *          Request timed out.
```

To do this, we will configure the remaining routes on each router if necessary like that the PCs will be able to access the internet through

From the image we can see that everything is Okay till router 4 where the internet needs to reply with a message but can't in our case

28) Traffic from PC1 and PC2 going to the internet should be load balanced over R2 and R5.