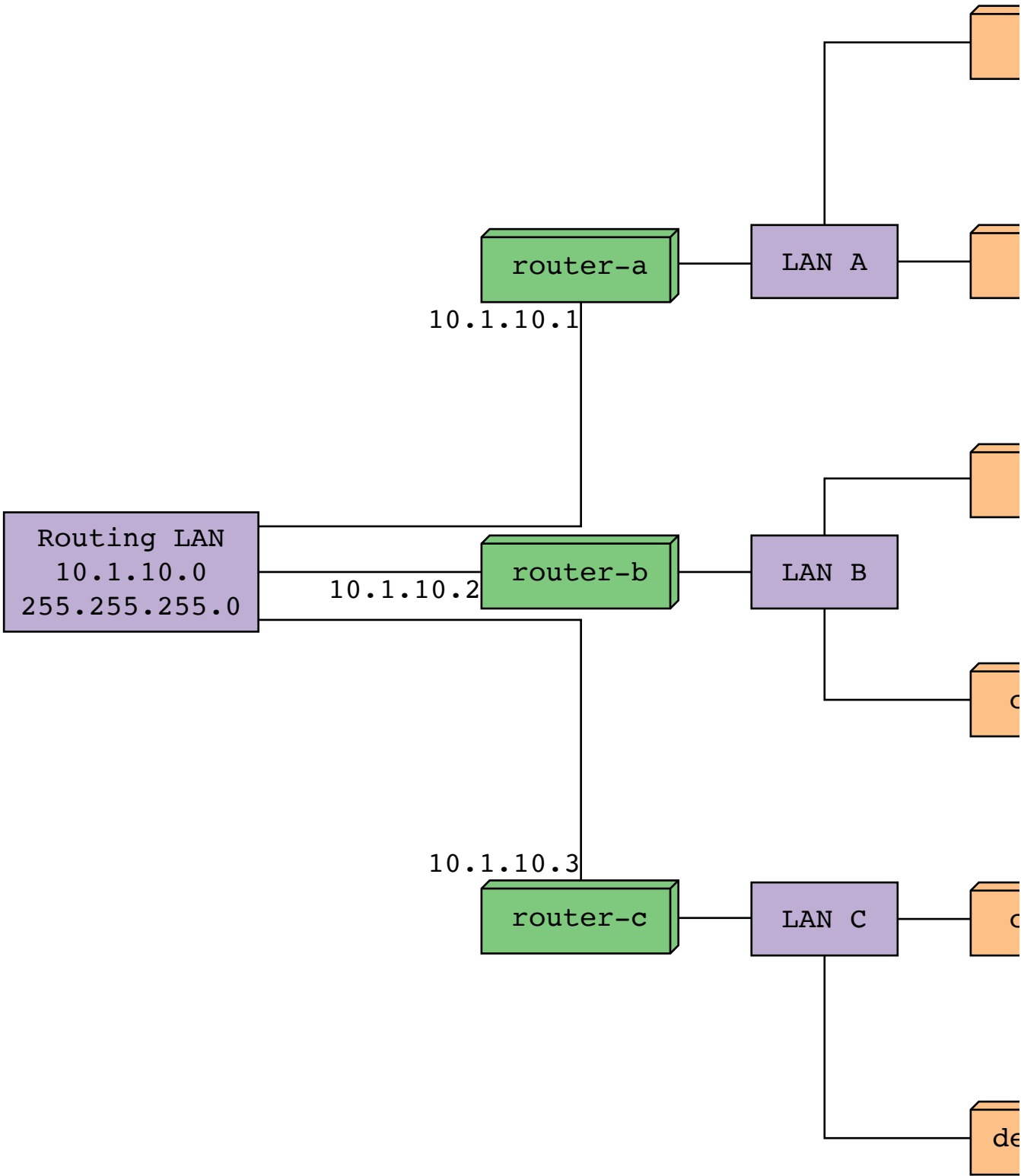


L1.1. Subnet assignments with configuration

Consider the following network of hosts (orange) and routers (green). Your challenge is to design subnets for three LANs, with the following design constraints:

- The available IP address space is the range **10.1.49.0-10.1.49.127**.
- LAN A must be able to support at least **21** hosts.
- LAN B must be able to support at least **9** hosts.
- LAN C must be able to support at least **56** hosts.



Subnet design

For each subnet, you should identify:

- the subnet mask.
- the network address. This will be the bitwise AND of the IP address of any host on the network, and the subnet mask.
- the broadcast address for the subnet. This is the bitwise OR of the network address and the inverse of the subnet mask.
- the smallest IP address that may be assigned to a network interface in the subnet (host number 1). This is the network address, plus 1.
- the highest IP address that may be assigned to a network interface in the subnet. This is the broadcast address, minus 1.

Lab 1

Assessment
overview

Total points: 30/30

Score: 100%

Question

History: 30

Total points: 30 /30

Auto-graded question

Report an error in this
question

Previous question

Next question

Attached files

No attached files

Attach a file

Attach text

There is more than one correct solution - any solution that satisfies the requirements above is acceptable! Once you have made your design decisions, complete the following table:

LAN	Subnet Mask	Network Address	Smallest Address	Highest Address	Broadcast Address
LAN A ≥ 21	<div>25</div> <div>100%</div>	<div>10</div> <div>100%</div>	<div>10.</div> <div>100%</div>	<div>10</div> <div>100%</div>	<div>10..</div> <div>100%</div>
LAN B ≥ 9	<div>25</div> <div>100%</div>	<div>10</div> <div>100%</div>	<div>10.</div> <div>100%</div>	<div>10</div> <div>100%</div>	<div>10..</div> <div>100%</div>
LAN C ≥ 56	<div>25</div> <div>100%</div>	<div>10</div> <div>100%</div>	<div>10.</div> <div>100%</div>	<div>10</div> <div>100%</div>	<div>10..</div> <div>100%</div>

Make sure you get full credit on the first section of this question before you move on to the next parts - the rest of this question isn't even graded if the first part is not fully correct.

Configure LAN interface on each router

Next, you will configure the LAN-facing interface on each router. First, run `ifconfig` on each router and find the name of the interface that does **not** have any address assigned yet - this is the LAN interface. (You'll need to be careful not to accidentally change the configuration on the Routing LAN interface.) In the template below, the interface name is given as `ethX`, but you'll need to replace that with the *actual* name of the LAN interface on each router.

You will assign the lowest IP address in the subnet (host number 1) to the LAN-facing interface of the router (this is a common convention).

On **router-a**:

```
sudo ifconfig ethX 

10.1.49.65



100%

 netmask 

255.255.255.2



100%


```

On **router-b**:

```
sudo ifconfig ethX 

10.1.49.97



100%

 netmask 

255.255.255.2



100%


```

On **router-c**:

```
sudo ifconfig ethX 

10.1.49.1



100%

 netmask 

255.255.255.1



100%


```

Configure LAN interface on each host

Now you will configure the LAN-facing interface on each host. (This will be easier, because the interface name is `eth1` on every host).

Assign the highest IP address in the subnet to one host in each LAN, and any other unused IP address in the subnet to the other host.

On **romeo**:

```
sudo ifconfig eth1 10.1.49.94 100% netmask 255.255.255.2 100%
```

On **juliet**:

```
sudo ifconfig eth1 10.1.49.93 100% netmask 255.255.255.2 100%
```

On **hamlet**:

```
sudo ifconfig eth1 10.1.49.110 100% netmask 255.255.255.2 100%
```

On **ophelia**:

```
sudo ifconfig eth1 10.1.49.109 100% netmask 255.255.255.2 100%
```

On **othello**:

```
sudo ifconfig eth1 10.1.49.62 100% netmask 255.255.255.1 100%
```

On **desdemona**:

```
sudo ifconfig eth1 10.1.49.61 100% netmask 255.255.255.1 100%
```

Configure routes on each router

After configuring each router's network interface, it will have a route for the directly connected LAN and a route for the Routing LAN. But you'll need to add routes on each router for the LANs that are *not* directly connected.

On **router-a**, add a route to LAN B:

```
sudo ip route add 10.1.49.96 100% / 28 100% via 10.1.10.2 100%
```

On **router-a**, add a route to LAN C:

```
sudo ip route add 10.1.49.0 100% / 26 100% via 10.1.10.3 100%
```

On **router-b**, add a route to LAN A:

```
sudo ip route add 10.1.49.64 100% / 27 100% via 10.1.10.1 100%
```

On **router-b**, add a route to LAN C:

```
sudo ip route add 10.1.49.0 100% / 26 100% via 10.1.10.3 100%
```

On **router-c**, add a route to LAN A:

`sudo ip route add` / via

On **router-c**, add a route to LAN B:

`sudo ip route add` / via

Configure routes on each host

After configuring each host's network interface, it will have a route for the directly connected LAN. But it won't have a rule that applies to the rest of the network. Add a route using longest prefix matching so that we only need to add *one* route on each host, that will allow it to reach every not-directly-connected LAN.

Your route should apply to your allocated address space **10.1.49.0-10.1.49.127**, but should not match addresses outside that range.

On **romeo**:

`sudo ip route add` / via

On **juliet**:

`sudo ip route add` / via

On **hamlet**:

`sudo ip route add` / via

On **ophelia**:

`sudo ip route add` / via

On **othello**:

`sudo ip route add` / via

On **desdemona**:

`sudo ip route add` / via

Save & Grade *Unlimited attempts*

Save only

Correct answer

Subnet design

There is more than one correct solution - any solution that satisfies the requirements above is acceptable! Once you have made your design decisions, complete the following table:

LAN	Subnet Mask	Network Address	Smallest Address	Highest Address	Broadcast Address
LAN A ≥ 21	255.255.255.224	10.1.49.64	10.1.49.65	10.1.49.94	10.1.49.95
LAN B ≥ 9	255.255.255.240	10.1.49.96	10.1.49.97	10.1.49.110	10.1.49.111
LAN C ≥ 56	255.255.255.192	10.1.49.0	10.1.49.1	10.1.49.62	10.1.49.63

Configure LAN interface on each router

On **router-a**:

```
sudo ifconfig ethX 10.1.49.65 netmask 255.255.255.224
```

On **router-b**:

```
sudo ifconfig ethX 10.1.49.97 netmask 255.255.255.240
```

On **router-c**:

```
sudo ifconfig ethX 10.1.49.97 netmask 255.255.255.192
```

Configure LAN interface on each host

On **romeo**:

```
sudo ifconfig eth1 10.1.49.94 netmask 255.255.255.224
```

On **juliet**:

```
sudo ifconfig eth1 10.1.49.82 netmask 255.255.255.224
```

On **hamlet**:

```
sudo ifconfig eth1 10.1.49.110 netmask 255.255.255.240
```

On **ophelia**:

```
sudo ifconfig eth1 10.1.49.102 netmask 255.255.255.240
```

On **othello**:

```
sudo ifconfig eth1 10.1.49.62 netmask 255.255.255.192
```

On **desdemona**:

```
sudo ifconfig eth1 10.1.49.2 netmask 255.255.255.192
```

Configure routes on each router

On **router-a**, add a route to LAN B:

```
sudo ip route add 10.1.49.96/28 via 10.1.10.2
```

On **router-a**, add a route to LAN C:

```
sudo ip route add 10.1.49.0/26 via 10.1.10.3
```

On **router-b**, add a route to LAN A:

```
sudo ip route add 10.1.49.64/27 via 10.1.10.1
```

On **router-b**, add a route to LAN C:

```
sudo ip route add 10.1.49.0/26 via 10.1.10.3
```

On **router-c**, add a route to LAN A:

```
sudo ip route add 10.1.49.64/27 via 10.1.10.1
```

On **router-c**, add a route to LAN B:

```
sudo ip route add 10.1.49.96/28 via 10.1.10.2
```

Configure routes on each host

On **romeo**:

```
sudo ip route add 10.1.49.0/25 via 10.1.49.65
```

On **juliet**:

```
sudo ip route add 10.1.49.0/25 via 10.1.49.65
```

On **hamlet**:

```
sudo ip route add 10.1.49.0/25 via 10.1.49.97
```

On **ophelia**:

```
sudo ip route add 10.1.49.0/25 via 10.1.49.97
```

On **othello**:

```
sudo ip route add 10.1.49.0/25 via 10.1.49.1
```

On **desdemona**:

```
sudo ip route add 10.1.49.0/25 via 10.1.49.1
```

Submitted answer 66

Submitted at 2023-01-29 22:17:16 (MST)

100%



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Subnet design

There is more than one correct solution - any solution that satisfies the requirements above is acceptable! Once you have made your design decisions, complete the following table:

LAN	Subnet Mask	Network Address	Smallest Address	Highest Address	Broadcast Address
LAN A ≥ 21	255.255.255.224 100%	10.1.49.64 100%	10.1.49.65 100%	10.1.49.94 100%	10.1.49.95 100%
LAN B ≥ 9	255.255.255.240 100%	10.1.49.96 100%	10.1.49.97 100%	10.1.49.110 100%	10.1.49.111 100%
LAN C ≥ 56	255.255.255.192 100%	10.1.49.0 100%	10.1.49.1 100%	10.1.49.62 100%	10.1.49.63 100%

Configure LAN interface on each router

On **router-a**:

```
sudo ifconfig ethX 10.1.49.65 100% netmask 255.255.255.224 100%
```

On **router-b**:

```
sudo ifconfig ethX 10.1.49.97 100% netmask 255.255.255.240 100%
```

On **router-c**:

```
sudo ifconfig ethX 10.1.49.1 100% netmask 255.255.255.192 100%
```

Configure LAN interface on each host

On **romeo**:

```
sudo ifconfig eth1 10.1.49.94 100% netmask 255.255.255.224 100%
```

On **juliet**:

```
sudo ifconfig eth1 10.1.49.93 100% netmask 255.255.255.224 100%
```

On **hamlet**:

```
sudo ifconfig eth1 10.1.49.110 100% netmask 255.255.255.240 100%
```

On **ophelia**:

```
sudo ifconfig eth1 10.1.49.109 100% netmask 255.255.255.240 100%
```

On **othello**:

```
sudo ifconfig eth1 10.1.49.62 100% netmask 255.255.255.192 100%
```

On **desdemona**:

```
sudo ifconfig eth1 10.1.49.61 100% netmask 255.255.255.192 100%
```

Configure routes on each router

On **router-a**, add a route to LAN B:

```
sudo ip route add 10.1.49.96 100%/28 100% via 10.1.10.2 100%
```

On **router-a**, add a route to LAN C:

```
sudo ip route add 10.1.49.0 100%/26 100% via 10.1.10.3 100%
```

On **router-b**, add a route to LAN A:

```
sudo ip route add 10.1.49.64 100%/27 100% via 10.1.10.1 100%
```

On **router-b**, add a route to LAN C:

```
sudo ip route add 10.1.49.0 100%/26 100% via 10.1.10.3 100%
```

On **router-c**, add a route to LAN A:

```
sudo ip route add 10.1.49.64 100%/27 100% via 10.1.10.1 100%
```

On **router-c**, add a route to LAN B:

```
sudo ip route add 10.1.49.96 100%/28 100% via 10.1.10.2 100%
```

Configure routes on each host

On **romeo**:

```
sudo ip route add 10.1.49.0 100%/25 100% via 10.1.49.65 100%
```

On **juliet**:

```
sudo ip route add 10.1.49.0 100%/25 100% via 10.1.49.65 100%
```

On **hamlet**:

```
sudo ip route add 10.1.49.0 100%/25 100% via 10.1.49.97 100%
```

On **ophelia**:

```
sudo ip route add 10.1.49.0 100%/25 100% via 10.1.49.97 100%
```

On **othello**:

```
sudo ip route add 10.1.49.0 100%/25 100% via 10.1.49.1 100%
```

On **desdemona**:

```
sudo ip route add 10.1.49.0 100%/25 100% via 10.1.49.1 100%
```

Submitted answer 65

Submitted at 2023-01-29 22:17:00 (MST)

97%

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Submitted answer 64

Submitted at 2023-01-29 22:16:31 (MST)

94%

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