

**MIDTERM 2
STUDY FOCUS**



Midterm 2 Information

When: Week 11 during the 1hr lecture period.

Duration: 40 minutes

Content: Weeks 6 - 9 inclusive

Review These slides, Course slides, Review Slides, Quizzes, Net Acad supporting info

Policy: Closed-book exam on paper

Broadcast addresses always mean directed broadcast.

Calculators, including laptop calculators are not permitted.

Bring a pencil.



1. Routing table
2. Convert between decimal, hexadecimal, binary
3. For a given host address and mask, determine the network address
4. Configure the static route
5. IP Header fields
6. Compress and uncompress IPv6 addresses
7. IPv6 address types: global unicast and link local
8. Subnets in IPv6
9. Convert mask notations between dotted decimal and slash
10. How many bits are borrowed for n subnets
11. Partition the network into s subnets. What is the nth subnet ID?
12. Partition the network into subnets of n hosts. What is the nth subnet ID?
13. How many bits are borrowed to partition a classful network.
14. For a given subnet, identify first, last and broadcast addresses.
15. Router interfaces and subnets. Each Router Interface is a subnet.
16. Private addresses
17. Reasons for subnetting
18. Valid masks



2. What is the Subnet ID of host 82.35.67.102/15

82. 35. 67. 102

128 64 32 16 8 4 2 1

host

82 .00100011. 67. 102

mask

11111111.11111110.00000000.00000000

15 bits

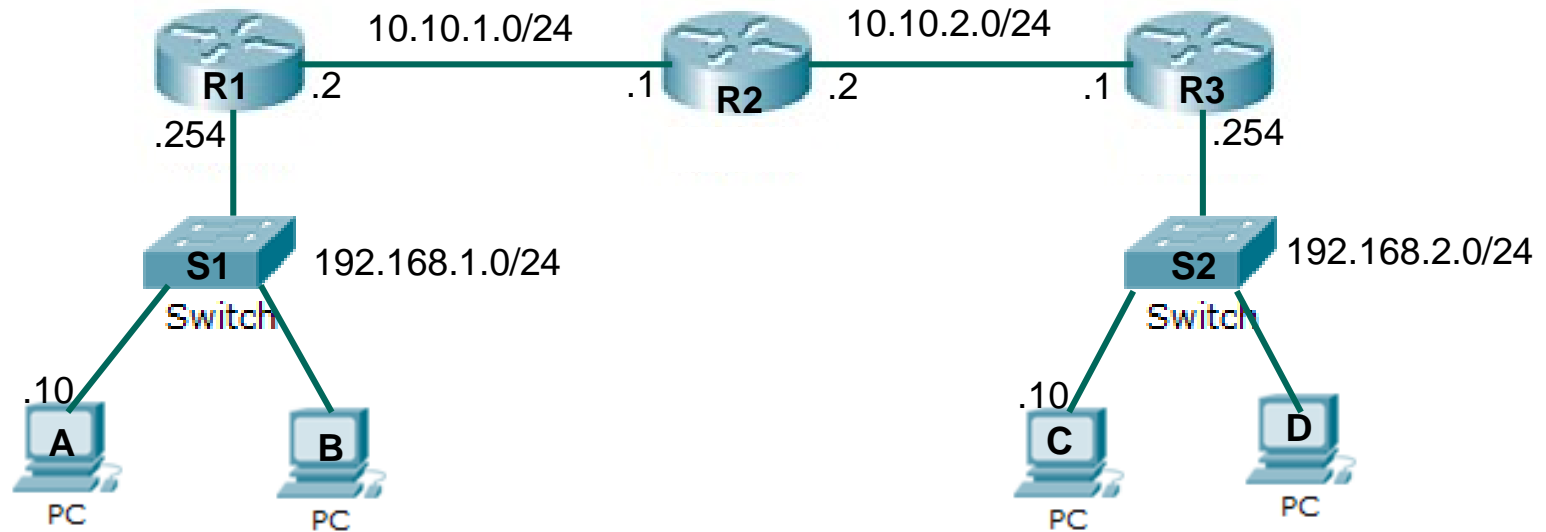
host AND mask

82. 00100010. 0. 0

82.34.0.0/15



3.



A packet needs to be sent from PC-A to PC-C. Which static route needs to be configured at R1?

- A) 192.168.2.0/24; 10.10.1.2
- B) 192.168.1.0/24; 10.10.1.1
- C) 192.168.2.0/24; 10.10.1.1
- D) 192.168.2.0/24; 10.10.2.2

Static Route = Dest Network; Next Hop Address

Right answer: C



4. Which is the most efficient IPv6 compression?

2001:0000:0000:aa20:0000:0000:0000:0001

A) **2001::aa20::1**

B) **2001:0:0:aa20::1**

C) **2001::aa20:0:0:0:1**

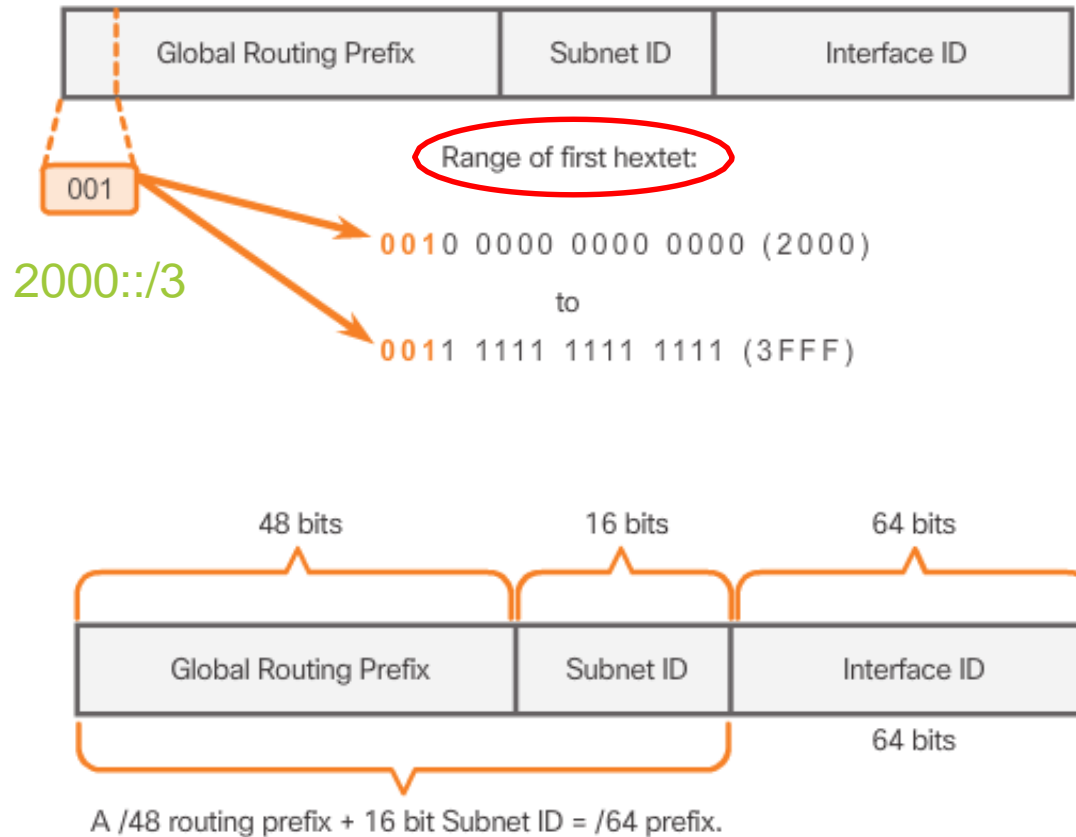
D) **2001:0:0:aa20:0:0:0:1**

The right answer: B

You also need to uncompress IPv6 addresses.

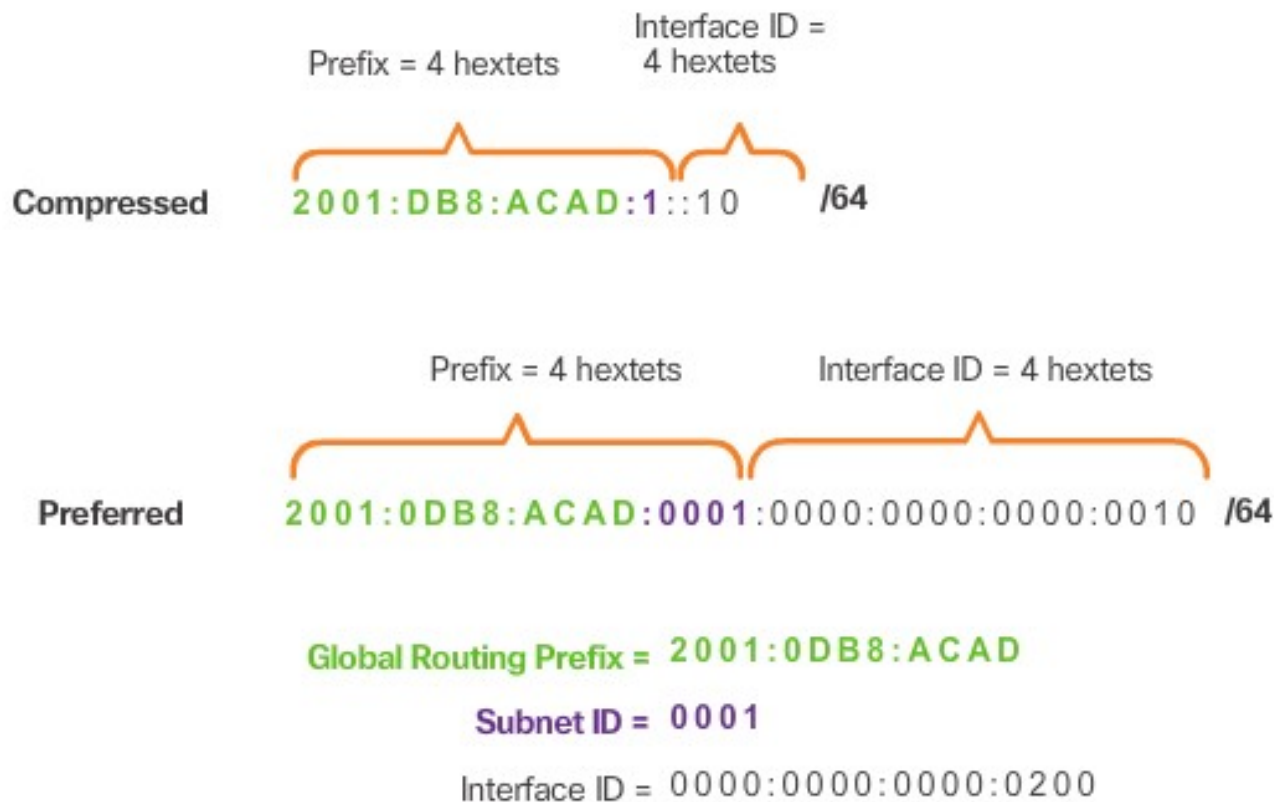


Structure of an IPv6 Global Unicast Address



Structure of an IPv6 Global Unicast Address (cont.)

Reading a Global Unicast Address



Structure of an IPv6 Link Local Address

Similar to 169.254.0.0 Address in IPv4

Only used in a network segment – it is non routable

Example: used between two connected routers



Example

fe80:0000:0000:0000:c001:37ff:fe6c:001

fe80::c001:37ff:fe6c:1



5. What is the subnet ID of the following IPv6 global unicast address?

2001:db8:1f23:aa20:5b6e:0000:0000:0001/64

A) 2001:db8:1f23:aa20::/64

B) db8

C) aa20

D) 5b6e

Right answer: C



Convert /17 to dotted decimal notation.

11111111.11111111.100000000.00000000

17 bits

11111111.11111111.1^{128 64 32 16 8 4 2 1}00000000.00000000

255.

255.

128.

0



Convert 255.255.255.192 to slash notation.

255. 255. 255. 192

11111111.11111111.11111111.11000000^{128 64 32 16 8 4 2 1}

11111111.11111111.11111111.11000000
26bits

/26



Partition the network address 192.168.24.0/23 into 16 subnets. What are the subnet 0 and 3 IDs?

192 .168 .24 .0

^{128 64 32 16 8 4 2 1}
192 .168 .00011000 .0
 23 bits

16 subnets requires
that we borrow 4
bits

^{128 64 32 16 8 4 2 1 128 64 32 16 8 4 2 1}
192 .168 .0001100s.sss000000
 27 bits

Subnet 0;
ssss=0000
mask= /27

192 .168 .24 .0 /27

Subnet 3;
ssss=0011;
mask = /27

192 .168 .24 .96 /27



Partition the network address 172.16.128.0/17 into subnets of 30 hosts each. What are subnet ID 0 and 5?

30 hosts requires
5 host bits
8 subnets
requires that we
borrow 3 bits

172.16.128.0

172.16.1
sssssssss.sss
000000

27-17=10 bits are available for subnets
5 host bits

Subnet 0;
ssssssssss=
0000000000
mask= /27

172.16.100000000.000000000

172.16.128.0 /27

Subnet 5;
ssssssssss=
0000000101
mask= /27

172.16.100000000.101000000

172.16.128.160 /27



Network Address: 192.168.125.128/25

Network Address in Dotted Binary Notation:

11000000.10101000.01111101.10000000

192.168.125.128/25

Network Address: Host portion are all 0s

First Host Address:

11000000.10101000.01111101.10000001

192.168.125.129

First Host Address: Host portion is 1 binary

Network Address: 192.168.125.128/25

Last Host Address:

11000000.10101000.01111101.11111110
192.168.125.254

Last Host Address: one less than broadcast in host portion

Broadcast Address:

11000000.10101000.01111101.11111111
192.168.125.255

Broadcast Address: host portion are all 1s

For the 10th subnet, what are the first, last, broadcast addresses and number of hosts?

192 .169 .64 .0 /19

192 .169 . 01000000 .00000000

128 64 32 16 8 4 2 1

Host = 13 bits

directed broadcast

192 .169 . 01011111 .11111111

128 64 32 16 8 4 2 1

192 .169 .95 .255

First = Net ID + 1

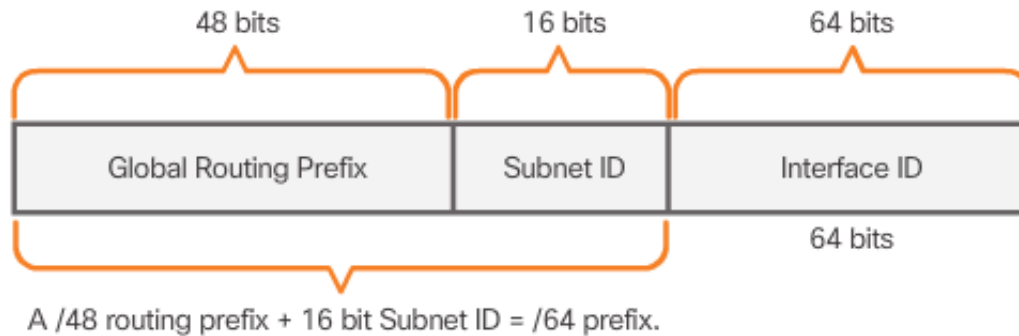
192 .169 .64 .1

Last = Broadcast - 1

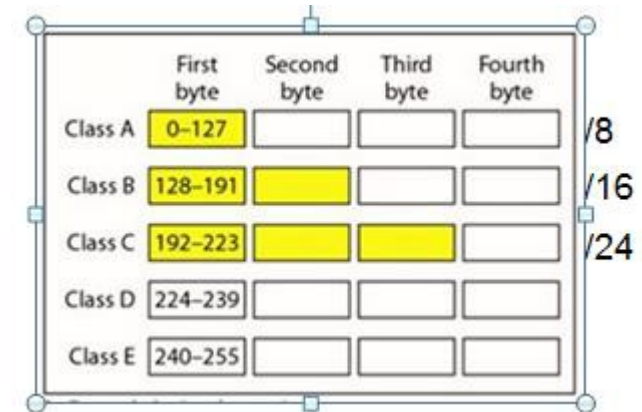
192 .169 .95 .254

Number of hosts = $2^{13} - 2 = 8,190$

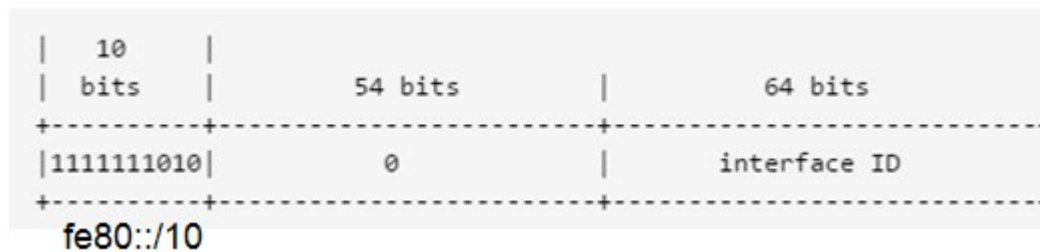
Information Sheet



IPv6 Global Unicast Format



Address Classes



IPv6 Link Local Format

Class	Starting IP Address	Ending IP Address	# of Hosts
A	10.0.0.0	10.255.255.255	16,777,216
B	172.16.0.0	172.31.255.255	1,048,576
C	192.168.0.0	192.168.255.255	65,536

Private Addresses

