

2015 spring (ca)

Given IP address = 10.200.100.0/22

Divided into 4 parts and 4 parts of two need
Subdivision of 8.

IP address = 10.200.100.0

Subnet mask = 255.255.252.0

performing AND operation

00001010.11001000.01100100.00000000

111.1111.1111111.1111100.00000000

00001010.11001000.01100100.00000000

10.200.100.0 gives network ID = 10.200.100.0

10.200.01100100.0/24 → N₁ 4 parts required

10.200.01100101.0/24 → N₂

10.200.01100110.0/24 → N₃

10.200.01100111.0/24 → N₄

or N₁ is divided into 3 parts is required a bit so,

10.200.01100100.0/24

now, N₁₁

10.200.01100100.00000000/26

now, N₁₂



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④ 10.200.01100100.00000000/26

for N13

⑤ 10.200.01100100.10000000/26

for N11 is

(a) 10.200.100.0/26

network ID = 10.200.100.0

Broadcast ID = 10.200.100.63

Subnet mask = 255.255.255.192

Wildcard mask = 0.0.0.63 (host bit 1 at ~~11110111~~
zero at ~~11110111~~)

useable host range = 10.200.100.1 to 10.200.100.62

⑤ for N12 is

10.200.100.64/26

network ID = 10.200.100.64

Broadcast ID = 10.200.100.127

Subnet mask = 255.255.255.192

Wildcard mask = 0.0.0.63

useable range = 10.200.100.65 to 10.200.100.126

⑥ for N13 is

10.200.100.128/26

network ID = 10.200.100.128



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Broadcast ID = 10.200.100.191

Subnet mask = 255.255.255.192

Useable range = 10.200.100.129 to 10.200.100.190

Wildcard = 0.0.0.63

for N₁ is divided into 8 parts (sub), is required 2 bits so,

10.200.100.0/24

N₂, N₂ is

10.200.100.0/26

Network ID = 10.200.101.0

^{N₁} 10.200.101.00000000/26

^{N₂} 10.200.101.01000000/26

^{N₃} 10.200.101.10000000/26

Broadcast ID = 10.200.101.63

Subnet mask = 255.255.255.192

Wildcard = 0.0.0.63

Useable range = 10.200.101.1 to 10.200.101.62

For N₂ is

10.200.101.64/26

Network ID = 10.200.100.64

Broadcast ID = 10.200.100.63/27

Subnet mask = 255.255.255.192

Wildcard = 0.0.0.63

Useable range = 10.200.100.65 to 10.200.100.126

For N₃ is 10.200.101.128/26

Network ID = 10.200.101.128



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Broadcast ID = 10.200.101.191

Subnetmask = 255.255.255.192

Wildcard = 0.0.0.63

Useable range = 10.200.101.129 to 10.200.100.190

2018 fall. 4(a)

Given IP address = 103.16.32.0 /22

Divided into 7 department among 7 department

3 department need to be subdivided into 2.

IP add = 103.16.32.0

Subnetmask = 255.255.252

Performing AND operation

01100111. 00010000. 00100000. 00000000

11111111. 11111111. 11111100. 00000000

01100111. 00010000. 00100000. 00000000

103.16.32.0 gives network IP 103.16.32.0

This ID is divided into 7 part

(i) 103. 16. 00100000. 00000000 → N₁ /25

(ii) 103. 16. 00100000. 10000000 → N₂ /25

(iii) 103. 16. 00100001. 00000000 → N₃ /25

(iv) 103. 16. 00100001. 10000000 → N₄ /25

(v) 103. 16. 00100010. 00000000 → N₅ /25



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(vi) $103 \cdot 16 \cdot 00 \cdot 100010 \cdot 10000000 \rightarrow N_6 / 25$

(vii) $103 \cdot 16 \cdot 00 \cdot 100011 \cdot 00000000 \rightarrow N_7 / 25$

For N_1 is divided into 2 parts is require 1 bit

(a) $103 \cdot 16 \cdot 32 \cdot 00000000 / 26$

(b) $103 \cdot 16 \cdot 32 \cdot 01000000 / 26$

(a) For (a) N_{11} is

$103 \cdot 16 \cdot 32 \cdot 0 / 26$

Network ID = $103 \cdot 16 \cdot 32 \cdot 0$

Broadcast ID = $103 \cdot 16 \cdot 32 \cdot 63$

Subnetmask = $255 \cdot 255 \cdot 255 \cdot 192$

Wildcard = $0 \cdot 0 \cdot 0 \cdot 63$

Useable range = $103 \cdot 16 \cdot 32 \cdot 1$ to $103 \cdot 16 \cdot 32 \cdot 62$

(b) For N_{12} is

$103 \cdot 16 \cdot 32 \cdot 64 / 26$

Network ID = $103 \cdot 16 \cdot 32 \cdot 64$

Broadcast ID = $103 \cdot 16 \cdot 32 \cdot 127$

Subnet mask = $255 \cdot 255 \cdot 255 \cdot 192$

Wildcard = $0 \cdot 0 \cdot 0 \cdot 63$

Useable range = $103 \cdot 16 \cdot 32 \cdot 65$ to $103 \cdot 16 \cdot 32 \cdot 126$



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For N_2 is

$103 \cdot 16 \cdot 32 \cdot 128 / 25$

(a) $103 \cdot 16 \cdot 32 \cdot 100000000 / 26$

(b) $103 \cdot 16 \cdot 32 \cdot 11000000 / 26$

N_2 is divided into 2 part so 6 bit is required.

for N_2

(a) $103 \cdot 16 \cdot 32 \cdot 128 / 26$

Network ID = $103 \cdot 16 \cdot 32 \cdot 128$

Broadcast ID = $103 \cdot 16 \cdot 32 \cdot 191$

Subnet mask = $255 \cdot 255 \cdot 255 \cdot 192$

Wildcard = $0 \cdot 0 \cdot 0 \cdot 63$

Useable range = $103 \cdot 16 \cdot 32 \cdot 129$ to $103 \cdot 16 \cdot 32 \cdot 190$

(b) for N_2 is $103 \cdot 16 \cdot 32 \cdot 192 / 26$

Network ID = $103 \cdot 16 \cdot 32 \cdot 192$

Broadcast ID = $103 \cdot 16 \cdot 32 \cdot 255$

Subnet mask = $255 \cdot 255 \cdot 255 \cdot 192$

Wildcard = $0 \cdot 0 \cdot 0 \cdot 63$

useable range = $103 \cdot 16 \cdot 32 \cdot 193$ to $103 \cdot 16 \cdot 32 \cdot 254$

for N_3 is $103 \cdot 16 \cdot 33 \cdot 0 / 25$

(a) $103 \cdot 16 \cdot 33 \cdot 000000000 / 26$

(b) $103 \cdot 16 \cdot 33 \cdot 010000000 / 26$



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For N₃₀ is required 16bit because N₃ is divided into 2 sub department.

N₃₁ is 103.16.33.0/26

Network ID = 103.16.33.0

Broadcast ID = 103.16.33.63

Subnetmask = 255.255.255.192

Wildcard = 0.0.0.63

useable range = 103.16.33.1 to 103.16.33.62

N₃₂ is 103.16.33.64/26

Network ID = 103.16.33.64

Broadcast ID = 103.16.33.127

Subnetmask = 255.255.255.192

Wildcard = 0.0.0.63

useable range = 103.16.33.65 to 103.16.33.126



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2016 spring 5(a)

Date _____
Page _____

IP address = 192.168.10.0/25 is class C IP whose network bit by default is 24.

$$\text{Number of Subnet} = 2^n \quad \{ \text{s. where } n = \text{number of bits} \\ = 2^1 \quad \text{borrowed } (25-25=1) \quad \} \\ = [2]$$

$$\text{no. of host per subnet} = 2^{x-2} \quad \{ \text{s. } x = \text{no. of host bit} \\ = 2^7-2 \quad (32-25=7) \quad \} \\ = 128-2 \\ = [126]$$

2017 spring 4(a)

IP 192.168.10.0/27 is class C IP address whose network bit by default is 24.

$$\text{Number of Subnet} = 2^n \\ = 2^3 = [8] \quad \{ \text{s. } 27-24 = 3 \quad \}$$

$$\text{no. of host per subnet} = 2^{x-2} \quad \{ \text{s. } 32-27=5 \quad \} \\ = 2^5-2 \\ = 32-2 \\ = [30]$$



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2014 Spring - 4(a)

Given ip address = 192.168.218.0/27

Subnet mask = 255.255.255.224

performing AND operation

11000000.10101000.11011010.00000000

11111111.11111111.11111111.11100000

11000000.10101000.1101110.00000000

192.168.218.0 gives network ip: 192.168.218.0

for 30 computers (\because 30 host is 5 bit required so, $32-5=27$)

192.168.218.0/27

network ID = 192.168.218.0

Broadcast ID = 192.168.218.31

Subnetmask = 255.255.255.224

Wildcard = 0.0.0.31

useful range = 192.168.218.1 to 192.168.218.30

gain, 30 computers

192.168.218.32/27

Network ID = 192.168.218.32

Subnet mask = 255.255.255.224

Broadcast ID = 192.168.218.63 Wildcard = 0.0.0.31

useful range = 192.168.218.33 to 192.168.218.62

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~~2012 Spring~~ 4(b)

Given IP = 205.105.10.10/28 is class C IP address

IP = 205.105.10.10

Network ID = 205.105.10.0
= 205.105.10.0

Broadcast ID = 205.105.10.15

Subnet mask = 255.255.255.240

Wildcard = 0.0.0.15

first valid address = 205.105.10.1

last valid address = 205.105.10.14

useable host range = 205.105.10.1 to 205.105.10.14



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2019 spring 3(b)

Date _____
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~~Given IP address = 150.152.0.0~~

This IP address is class B IP address so.
By default network bit is 16.

IP = 150.152.0.0/16

network ID = 150.152.0.0

Broadcast ID = 150.152.255.255

Subnet mask = 255.255.0.0

first valid address = 150.152.0.1

last valid address = 150.152.255.254

useable host range = 150.152.0.1 to 150.152.255.254

2017 fall 4(b)

~~IP address = 172.31.255.0/22~~

is divided into 4 schools and this 2 schools 2
divided into 4 department

IP = 172.31.255.0

Subnetmask = 255.255.252.0

performing AND operation

10101100.00011111.1111111.00000000

11111111.1111111.11111100.00000000

10101100.00011111.11111100.00000000

172.31.255.0 gives network ID 172.31.252



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172.31.1111100.0/27 → N₁

172.31.1111101.0/27 → N₂

172.31.1111110.0/27 → N₃

172.31.1111111.0/27 → N₄

for N₁ is divided into 4 parts it requires 2 bit so

(a) 172.31.1111100.01000000/26

(b) 172.31.1111100.01000000/26

(c) 172.31.1111100.10000000/26

(d) 172.31.1111100.11000000/26

) For N₁ 172.31.1111100.00000000/26

network ID = 172.31.252.0.

Broadcast ID = 172.31.252.63

Subnet mask = 255.255.255.192

Wildcard = 0.0.0.63

Useable range = 172.31.252.1 to 172.31.252.62

N₂ 172.31.252.01000000/26

network ID = 172.31.252.64

Broadcast ID = 172.31.252.127

Subnet mask = 255.255.255.192

Wildcard = 0.0.0.63

Useable range = 172.31.252.65 to 172.31.252.126



(c) N₁₃ 172.31.252.128 /26

Network ID = 172.31.252.128

Broadcast ID = 172.31.252.191

Subnet mask = 255.255.255.192

Useable range = 172.31.252.129 to 172.31.252.190

(d) For N₁₄ 172.31.252.192 /26

Network ID = 172.31.252.192

Broadcast ID = 172.31.252.255

Subnet mask = 255.255.255.192

Useable range = 172.31.252.193 to 172.31.252.254

for N₁₄ is divided into 4 part is required 2 bit

(a) 172.31.253.00000000 /26

(b) 172.31.253.01000000 /26

(c) 172.31.253.10000000 /26

(d) 172.31.253.11000000 /26

~~→~~ Solution is same as N₁.



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2016 fall (Q.NO 316)

Given IP = 192.168.1.0/24
3 department is 20, 29 and 30

IP = 192.168.1.0
Subnetmask = 255.255.255.0

for 30 host ($\because 30 \text{ host} = 5 \text{ bit}$ so, $32 - 5 = 27$)

192.168.1.0/27

Network ID = 192.168.1.0

Broadcast ID = 192.168.1.31

Subnet mask = 255.255.255.224

first valid address = 192.168.1.1

last valid address = 192.168.1.30

useable host range = 192.168.1.6 to 192.168.1.80

for 24 host (26 bit extra chacking required)

192.168.1.32/27

Network ID = 192.168.1.32

Broadcast ID = 192.168.1.63

Subnet mask = 255.255.255.224

first valid address = 192.168.1.33

last valid address = 192.168.1.62

useable host range = 192.168.1.38 to 192.168.1.62

for 20 host (20 host is 5 bit required ~~so, 32 - 5 = 27~~)

192.168.1.64/27

Network ID = 192.168.1.64

Last valid address = 192.168.1.67

Broadcast ID = 192.168.1.95

Useable host range = 192.168.1.65 to

Subnet mask = 255.255.255.240

192.168.1.94

First valid address = 192.168.1.65

2015 full - 5(a)

IP address = 192.168.218.0/27

8 department each 28 computers

IP address = 192.168.218.0

Subnetmask = 255.255.255.224

performing AND operation

11000000.10101000.11011010.00000000

11111111.11111111.11111111.11100000

11000000.10101000.11011010.00000000

192.168.218.0/27 gives network ID = 192.168.218.0

for 28 host (28 hosts, 5 bits required so $32-5=27$)

① 192.168.218.0/27

network ID = 192.168.218.0

broadcast ID = 192.168.218.31

Subnet mask = 255.255.255.224

first valid address = 192.168.218.1

last valid address = 192.168.218.30

useable host range = 192.168.218.160 to 192.168.218.30

② All 28 host

192.168.218.32/27

network ID = 192.168.218.32

broadcast ID = 192.168.218.63

subnet mask = 255.255.255.224

first valid address = 192.168.218.33

last valid address = 192.168.218.62

useable host range = 192.168.218.33 to 192.168.218.62

192.168.218.00000009
0 0 1
0 1 0
0 1 1
0 0 0
1 0 1
1 1 0
1 1 1

(ii) 192.168.218.64/27

Network ID = 192.168.218.64

Broadcast ID = 192.168.218.95

Subnet mask = 255.255.255.224

useable host range = 192.168.218.65 to 192.168.218.94

(iv) 192.168.218.96/27

Network ID = 192.168.218.96

Broadcast ID = 192.168.218.127

Subnet mask = 255.255.255.224

useable host range = 192.168.218.97 to 192.168.218.126

(v) 192.168.218.128/27

Network ID = 192.168.218.128

Broadcast ID = 192.168.218.159

Subnet mask = 255.255.255.224

useable host range = 192.168.218.129 to 192.168.218.158

(vi) 192.168.218.160/27

Network ID = 192.168.218.160

Broadcast ID = 192.168.218.191

Subnet mask = 255.255.255.224

useable host range = 192.168.218.161 to 192.168.218.190

(vii) 192.168.218.192/27

Network ID = 192.168.218.192

Broadcast ID = 192.168.218.223

Subnet mask = 255.255.255.224

useable host range = 192.168.218.193 to 192.168.218.222

~~00000000
00100000~~

(viii) $192 \cdot 168 \cdot 218 \cdot 224 / 27$

Network ID = $192 \cdot 168 \cdot 218 \cdot 224$

Broadcast ID = $192 \cdot 168 \cdot 218 \cdot 255$

Subnetmask = $255.255.255.224$

Useable range = $192 \cdot 168 \cdot 218 \cdot 225$ to $192 \cdot 168 \cdot 218 \cdot 254$.

2020 Fall - 4(a)

Given IP = $172 \cdot 16 \cdot 1 \cdot 0 / 27$

4 department each department consists of 24 host.

IP address = $172 \cdot 16 \cdot 1 \cdot 0$

Subnetmask = $255.255.255.224$

performing AND operation

~~10101100.00010000.00000001.00000000~~

~~11111111.11111111.11111111.11100000~~

~~10101100.00010000.00000001.00000000~~

$172 \cdot 16 \cdot 1 \cdot 0$ gives network ID = $172 \cdot 16 \cdot 1 \cdot 0$

for 24 host (24 host requires 5 bits so, $32-5=27$)

(i) $172 \cdot 16 \cdot 1 \cdot 0 / 27$

Network ID = $172 \cdot 16 \cdot 1 \cdot 0$

Broadcast ID = $172 \cdot 16 \cdot 1 \cdot 31$

Subnet mask = $255.255.255.224$

useable host range = $172 \cdot 16 \cdot 1 \cdot 1$ to $172 \cdot 16 \cdot 1 \cdot 30$

(ii) $172 \cdot 16 \cdot 1 \cdot 32 / 27$

Network ID = $172 \cdot 16 \cdot 1 \cdot 32$

Broadcast ID = $172 \cdot 16 \cdot 1 \cdot 63$

Subnet mask = $255.255.255.224$

useable host range:

$172 \cdot 16 \cdot 1 \cdot 33$ to $172 \cdot 16 \cdot 1 \cdot 62$

(iii) 17

network

Broadcast

Subnet

useable

(iv) 17

network

Broadcast

Subnet

useable

2015 spring

IP

divided;

A

40

IP ad

Subne

perform

00

11

00

01

(i) 10

netw

fuse | machine

800
800

(iii) $172 \cdot 16 \cdot 1 \cdot 64 / 27$

Network ID = $172 \cdot 16 \cdot 1 \cdot 64$

Broadcast ID = $172 \cdot 16 \cdot 1 \cdot 95$

Subnetmask = $255 \cdot 255 \cdot 255 \cdot 224$

useable host range = $172 \cdot 16 \cdot 1 \cdot 65$ to $172 \cdot 16 \cdot 1 \cdot 94$

(iv) $172 \cdot 16 \cdot 1 \cdot 96 / 27$

Network ID = $172 \cdot 16 \cdot 1 \cdot 96$

Broadcast ID = $172 \cdot 16 \cdot 1 \cdot 127$

Subnetmask = $255 \cdot 255 \cdot 255 \cdot 224$

useable host range = $172 \cdot 16 \cdot 1 \cdot 97$ to $172 \cdot 16 \cdot 1 \cdot 126$

2015 spring L1(a)

Ip address = $10 \cdot 200 \cdot 100 \cdot 0 / 22$

Divided into 4 different school.

Among 4 schools two school need to be subdivided
4 different department

Ip address = $10 \cdot 200 \cdot 100 \cdot 0$

Subnetmask = $255 \cdot 255 \cdot 252 \cdot 0$

performing AND operation

$00001010 \cdot 11001000 \cdot 01100100 \cdot 00000000$

$11111111 \cdot 11111111 \cdot 11111100 \cdot 00000000$

$00001010 \cdot 11001000 \cdot 01100100 \cdot 00000000$

at $10 \cdot 200 \cdot 100 \cdot 0$ gives network ID = $10 \cdot 200 \cdot 100 \cdot 0$

(i) $10 \cdot 200 \cdot 100 \cdot 0 / 22$

Network ID = $10 \cdot 200 \cdot 100 \cdot 0$

