

Network Mapping Lab

Part1:

1. An organization is granted a block; one address is 110.10.10.64/20. The organization needs 10 subnets of equal size. What is the subnet prefix length?

/24

2. An organization is granted a block; one address is 110.10.10.64/25. If the subnet prefix length is /28, what is the maximum number of subnets?

— subnets of — total addresses each

3. An organization is granted a block of classless addresses with the starting address: 156.78.51.0/22. They want to create subnets of size, 512, 256, 128, and 128. What is the subnet prefix for each subnet.

512 prefix = /23

256 prefix = /24

128 prefix = /25

128 prefix = /26

Part2:

Weber State University is given an IP addresses block of 137.190.0.0 /16. There are 7 colleges (Applied Science, Arts & Humanities, Business & Economics, Education, Health, Science, and Social & Behavioral Science) and 4 divisions (Administrative Services, Facilities Management, Information Technology, and Student Services). The University has found that it needs to divide its network up evenly among all of the groups. Complete the following information to show how you would divide the network

Name	Organization Network Address	Subnet
Mask		

Colleges:

Applied Science	<u>137.190.0.0</u>	<u>/19</u>
Arts & Humanities	<u>137.190.48.0</u>	<u>/19</u>

Business & Economics	<u>137.190.96.0</u>	<u>119</u>
Education	<u>137.190.144.0</u>	<u>119</u>
Health	<u>137.190.192.0</u>	<u>119</u>
Science	<u>137.190.240.0</u>	<u>119</u>
Social & Behav. Science	<u>137.191.0.0</u>	<u>119</u>

Divisions:

Administrative Services	<u>137.191.48.0</u>	<u>119</u>
Facilities Management	<u>137.191.96.0</u>	<u>119</u>
Information Technology	<u>137.191.144.0</u>	<u>119</u>
Student Services	<u>137.191.192.0</u>	<u>119</u>

Now take the Organization Network Address and Subnet Mask that you created for each college and create a subnet network address of equal size for the departments listed in the colleges below

COLLEGES

Applied Science (Computer Science, Sales and Service Technology, Electronic Engineering, Construction Management, Automotive Technology, Network Technology)

Name	Organization Network Address	Subnet Mask
Computer Science	<u>137.190.4.0</u>	<u>/22</u>
Sales and Service Technology	<u>137.190.8.0</u>	<u>/22</u>
Electronic Engineering	<u>137.190.12.0</u>	<u>/22</u>
Construction Management	<u>137.190.16.0</u>	<u>/22</u>
Automotive Technology	<u>137.190.20.0</u>	<u>/22</u>
Network Technology	<u>137.190.24.0</u>	<u>/22</u>

Arts & Humanities (Foreign Languages, English, Visual Arts, Performing Arts, Communications)

Name	Organization Network Address	Subnet Mask
Foreign Languages	137.190.56.0	/21
English	137.190.64.0	/21
Visual & Performing Arts	137.190.72.0	/21
Communications	137.190.80.0	/21

Education (Child and Family Studies, Health Promotion, Teacher Education, Athletic Training, Human Performance)

Name	Organization Network Address	Subnet Mask
Child and Family Studies	137.190.148.0	/22
Health Promotion	137.190.152.0	/22
Athletic Training	137.190.156.0	/22
Human Performance	137.190.160.0	/22
Teacher Education	137.190.164.0	/22

Social & Behavioral Science (Criminal Justice, Geography, History, Military Science, Philosophy & Political Science, Psychology, Social Work, Sociology & Anthropology)

Name	Organization Network Address	Subnet Mask
Criminal Justice	137.191.2.0	/23
Geography	137.191.4.0	/23
History	137.191.6.0	/23
Military Science	137.191.8.0	/23
Philosophy & Poli Sci	137.191.10.0	/23
Psychology	137.191.12.0	/23
Social Work	137.191.14.0	/23
Sociology	137.191.16.0	/23

Anthropology

137.191.18.0

123

Now take the Organization Network Address and Subnet Mask that you created for each division and create a subnet network address for each of the departments listed in the division below based upon the size of the department

DIVISIONS

137.191.48.0

Administrative Services (Athletics, Accounting, Budget, Environmental Health & Safety, Printing, Human Resources, Purchasing)

Name	Organization Network Address	Subnet Mask
Athletics (250)	<u>137.191.60.128</u>	<u>126</u>
Accounting (1000)	<u>137.191.50.0</u>	<u>123</u>
Budget (500)	<u>137.191.53.0</u>	<u>124</u>
Enviro Health & Safety (100)	<u>137.191.53.192</u>	<u>126</u>
Printing (1000)	<u>137.191.52.0</u>	<u>123</u>
Human Resources (100)	<u>137.191.64.0</u>	<u>126</u>
Purchasing (90)	<u>137.191.64.64</u>	<u>126</u>

137.191.96.0

Facilities Management (Campus planning, Construction, Custodial, Landscaping, Electrical, Mechanical, Business Services)

Name	Organization Network Address	Subnet Mask
Campus planning (300)	<u>137.191.101.0</u>	<u>124</u>
Construction (200)	<u>137.191.103.128</u>	<u>125</u>
Custodial (800)	<u>137.191.98.0</u>	<u>123</u>
Landscaping (100)	<u>137.191.103.192</u>	<u>126</u>
Electrical (500)	<u>137.191.102.0</u>	<u>124</u>
Mechanical (400)	<u>137.191.103.6</u>	<u>124</u>
Business Services (900)	<u>137.191.100.0</u>	<u>123</u>

(1)

Taylor Earl

Assignment 4

1. 110.10.10.64 /20

$$2^{12} = 4096$$

$$10 \overline{)4096} = 409.6$$

$$\log_2(409.6) = 8.6$$

$$2^8 = 256 = \boxed{124}$$

2. 110.10.10.64 /25

$$2^7 = 128$$

3. 512 prefix = /23

128 prefix = /24

128 prefix = /25

128 prefix = /26

Part 2:

$$2^{26} = 33,554,432 \quad 7 \overline{)33,554,432} = \\ 4793490$$

$$32 - \log_2(4793490) = 22.19$$

$$2^{22} = 4194304 = \boxed{10}$$

$$2^{16} = 65,536 \quad 7 \overline{)65,536} = 9362$$

$$32 - \log_2(9362) = 13 = \boxed{19}$$

137. 190. 0. 0 /19 00000000

255. 255. 224. 0 11100000

0. 0. 47. 255 00011111

137. 190. 0. 0137. 190. 47. 255

(2) Assignment 4

137.190.48.0 /19

255.255.224.0

00110000

0.0.47.255

11100000

137.190.48.255

137.190.99.255

137.190.240.0

0.0.47.255

10001001 1011110 11110000 00000000

00000000 00000000 00101111 11111111

10001001 1011110 11111111 11111111

Applied Science - b

137.190.0.0 /19

$2^{13} = 8192 / b = 1365$

/22

137.190.0.0

255.255.252.0 complement 0.0.3.255

137.190.0.0

0.0.3.255

137.190.3.255

Arts - 4 137.190.48.0

$8192 / 4 = 2048 = 121$

255.255.248.0

0.0.7.255

137.190.48.0

0.0.7.255

00110000

137.190.55.255

00000111

00110111

(3)

Assignment 4

Education - 5 137.190.114.0 / 19

$$8192 / 5 = 1638$$

$$32 - 10 = 22$$

Social - 9 137.191.0.0

$$8192 / 9 = 910 = 123$$

$$137.191.0.0 / 123$$

$$255.255.254.0 \quad 0.0.1.255$$

$$137.191.0.0$$

$$0.0.1.255$$

$$137.191.1.255$$

Admin - 8192

$$\cancel{1000} \times 2 / 23$$

$$\cancel{500} / 24$$

$$250 / 25$$

$$100 \times 2 / 26$$

$$90 / 26$$

$$137.191.52.0$$

$$0.0.0.255 \quad 255.255.255.0$$

$$137.191.52.255$$

$$137.191.63.0$$

$$0.0.0.127$$

$$137.191.63.128$$

(4)

Assignment 4

137.191.96.0

X 32 - log₂(X)

900 32-9 123

800 32-9 123

500 32-8 124

400 32-8 124

300 32-8 124

200 32-7 125

100 32-6 125