IP Addressing and Subnetting

Workbook

Version 1.5

11111110

10010101

00011011

10000110

11010011

Student Name:

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IP Address Classes

Class A	1 – 127	(Network 127 is reserved for loopback and internal testing) Leading bit pattern	0	00000000.00000000.00000000.00000000 Network . Host . Host . Host
Class B	128 – 191	Leading bit pattern	10	10000000.00000000.00000000.00000000 Network . Network . Host . Host
Class C	192 – 223	Leading bit pattern	110	11000000.00000000.00000000.00000000 Network . Network . Network . Host
Class D	224 – 239	(Reserved for multicast)		
Class E	240 – 255	(Reserved for experimental, used for research)		

Private Address Space

Class A	10.0.0.0 to 10.255.255.255
Class B	172.16.0.0 to 172.31.255.255
Class C	192.168.0.0 to 192.168.255.255

Default Subnet Masks

Class A	255.0.0.0
Class B	255.255.0.0
Class C	255.255.255.0

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Workbooks included in the series:

IP Addressing and Subnetting Workbooks
ACLs - Access Lists Workbooks
VLSM Variable-Length Subnet Mask IWorkbooks

Binary To Decimal Conversion

128	64	32	16	8	4	2	1	Answers
1	0	0	1	0	0	1	0	146
0	1	1	1	0	1	1	1	119
1	1	1	1	1	1	1	1	255
1	1	0	0	0	1	0	1	197
1	1	1	1	0	1	1	0	246
0	0	0	1	0	0	1	1	19
1	0	0	0	0	0	0	1	129
0	0	1	1	0	0	0	1	49
0	1	1	1	1	0	0	0	120
1	1	1	1	0	0	0	0	240
0	0	1	1	1	0	1	1	59
0	0	0	0	0	1	1	1	7
						00011011		27
						10101010		170
						01101111		111
						11111000		248
						00100000		32
						01010101		85
						00111110		62
						00000011		3
						11101101		237
						11000000		192

Scratch Area

128 64
16 32
2 16
146 4
2
1
119

Decimal To Binary Conversion

Use all 8 bits for each problem

128	64	32	16	8	4	2	1	= 255
1	1	1	0	1	1	1	0	238
0	0	1	0	0	0	1	0	34
0	1	1	1	1	0	1	1	123
0	0	1	1	0	0	1	0	50
1	1	1	1	1	1	1	1	255
1	1	0	0	1	0	0	0	200
0	0	0	0	1	0	1	0	10
1	0	0	0	1	0	1	0	138
0	0	0	0	0	0	0	1	1
0	0	0	0	1	1	0	1	13
1	1	1	1	1	0	1	0	250
0	1	1	0	1	0	1	1	107
1	1	1	0	0	0	0	0	224
0	1	1	1	0	0	1	0	114
1	1	0	0	0	0	0	0	192
1	0	1	0	1	1	0	0	172
0	1	1	0	0	1	0	0	100
0	1	1	1	0	1	1	1	119
0	0	1	1	1	0	0	1	57
0	1	1	0	0	0	1	0	98
1	0	1	1	0	0	1	1	179
0	0	0	0	0	0	1	0	2

Scratch Area

```
238
-128
 110
 -64
  46
 -32
  14
  -8
   6
  -4
   2
  -2
   0
```

```
34
-32
 2
-2
 0
```

Address Class Identification

Address	Class
10.250.1.1	A
150.10.15.0	B
192.14.2.0	C
148.17.9.1	B
193.42.1.1	C
126.8.156.0	A
220.200.23.1	C
230.230.45.58	D
177.100.18.4	B
119.18.45.0	A
249.240.80.78	E
199.155.77.56	C
117.89.56.45	A
215.45.45.0	C
199.200.15.0	C
95.0.21.90	A
33.0.0.0	A
158.98.80.0	B
219.21.56.0	C

Network & Host Identification

Circle the network portion of these addresses:

Using blue text instead of circles

Circle the host portion of these addresses:

177.100.18.4

119.18.45.0

209.240.80.78 = 209.240.80

199.155.77.56 = 199.155.77

117.89.56.45 = 117

215.45.45.0 = 215.45.45

192.200.15.0 = 192.200.15

95.0.21.90 = 95

33.0.0.0 = 33

158.98.80.0 = 158.98

217.21.56.0 = 217.21.56

10.250.1.1 = 10

150.10.15.0 = 150.10

192.14.2.0 = 192.14.2

148.17.9.1 = 148.17

193.42.1.1 = 193.42.1

126.8.156.0 = 126

220.200.23.1= 220.200.23

10.15.123.50

171.2.199.31

198.125.87.177 = .177

223.250.200.222 = .222

17.45.222.45 = .45.222.45

126.201.54.231= .201.54.231

191.41.35.112 = .35.112

155.25.169.227 = .169.227

192.15.155.2= .2

123.102.45.254= .102.45.254

148.17.9.155 = .9.155

100.25.1.1= .25.1.1

195.0.21.98 = .98

25.250.135.46 = .250.135.46

171.102.77.77 = .77.77

55.250.5.5 = .250.5.5

218.155.230.14 = .14

10.250.1.1 = .250.1.1

Network Addresses

Using the IP address and subnet mask shown write out the network address:

188.10.18.2 255.255.0.0	188 . 10 . 0 . 0
10.10.48.80 255.255.255.0	10 . 10 . 48 . 0
192.149.24.191 255.255.255.0	192.149.24.0
150.203.23.19 255.255.0.0	150.203.0.0
10.10.10.10 255.0.0.0	10.0.0.0
186.13.23.110 255.255.255.0	186.13.23.0
223.69.230.250 255.255.0.0	223.69.0.0
200.120.135.15 255.255.255.0	200.120.135.0
27.125.200.151 255.0.0.0	27.0.0.0
199.20.150.35 255.255.255.0	199.20.150.0
191.55.165.135 255.255.255.0	191.55.165.0
28.212.250.254 255.255.0.0	28.212.0.0

Host Addresses

Using the IP address and subnet mask shown write out the host address:

188.10.18.2 255.255.0.0	0 . 0 . 18 . 2
10.10.48.80 255.255.255.0	0 . 0 . 0 . 80
222.49.49.11 255.255.255.0	0.0.0.11
128.23.230.19 255.255.0.0	0.0.230.19
10.10.10.10 255.0.0.0	0.10.10.10
200.113.123.11 255.255.255.0	0.0.0.11
223.169.23.20 255.255.0.0	0.0.23.20
203.20.35.215 255.255.255.0	0.0.0.215
117.15.2.51 255.0.0.0	0.15.2.51
199.120.15.135 255.255.255.0	0.0.0.135
191.55.165.135 255.255.255.0	0.0.0.135
48.21.25.54 255.255.0.0	0.0.25.54

Default Subnet Masks

Write the correct default subnet mask for each of the following addresses:

177.100.18.4	255 . 255 . 0 . 0
119.18.45.0	255 . 0 . 0 . 0
191.249.234.191	255.255.0.0
223.23.223.109	255.255.255.0
10.10.250.1	255.0.0.0
126.123.23.1	255.0.0.0
223.69.230.250	255.255.255.0
192.12.35.105	255.255.255.0
77.251.200.51	255.0.0.0
189.210.50.1	255.255.0.0
88.45.65.35	255.0.0.0
128.212.250.254	255.255.0.0
193.100.77.83	255.255.255.0
125.125.250.1	255.0.0.0
1.1.10.50	255.0.0.0
220.90.130.45	255.255.255.0
134.125.34.9	255.255.0.0
95.250.91.99	255.0.0.0

Custom Subnet Masks

Problem 4

Number of needed subnets **6**
Number of needed usable hosts **30**
Network Address **210.100.56.0**

Address class C

Default subnet mask 255.255.255.0

Custom subnet mask 255.255.255.224

Total number of subnets 8

Total number of host addresses 32

Number of usable addresses 30

Number of bits borrowed 3

Show your work for Problem 4 in the space below.

	256	128	64	32	16	8	4	2	– Number of Hosts
Number of Subnets –	2	4	8	16	32	64	128	256	
	128	64	32	16	8	4	2	1	– Binary values
210 . 100 . 56 .	0	0	0	0	0	0	0	0	

128
64
+ 32
---
224 custom sub

32 host addr
- 2 usable
---
30 usable addr

8 subnets
- 2
---
6 needed subnets