Chapter 8: Hints & Answers

8.2 The prefix identifies the address class.

8.3

2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
128	64	32	16	8	4	2	1

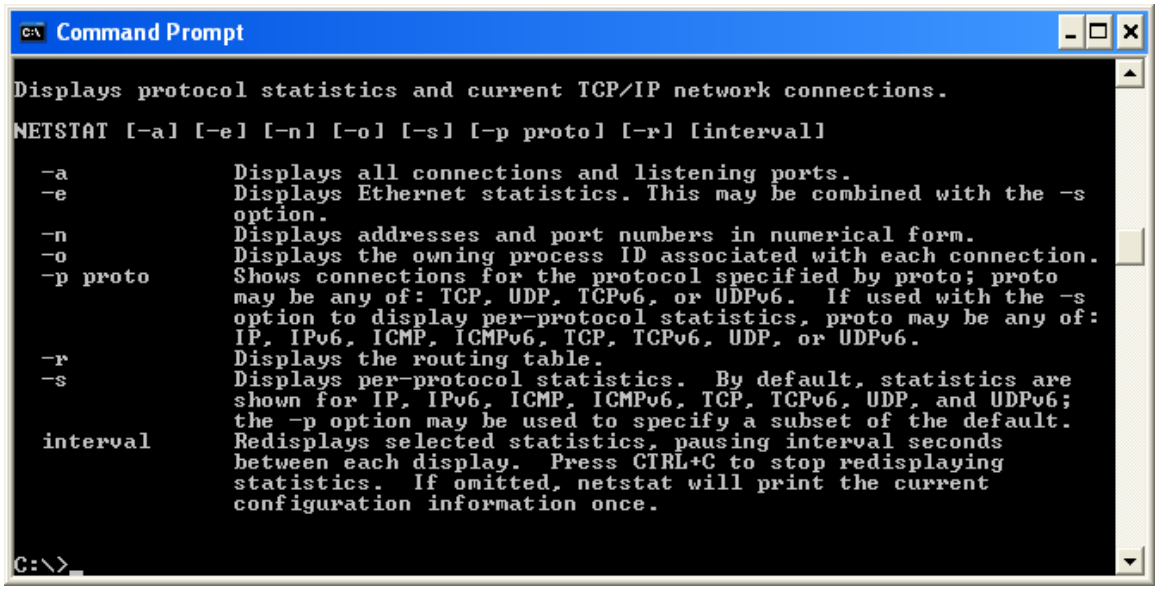
200 = 128+64+8 => 11001000
58 = 32+16+8+2 => 00111010
20 = 16+4 => 00010100
165 = 128+32+4+1 => 10100101
and so, 200.58.20.165 => 11001000.00111010.00010100.10100101

8.7 A CIDR addressing scheme would use a 17-bit prefix.

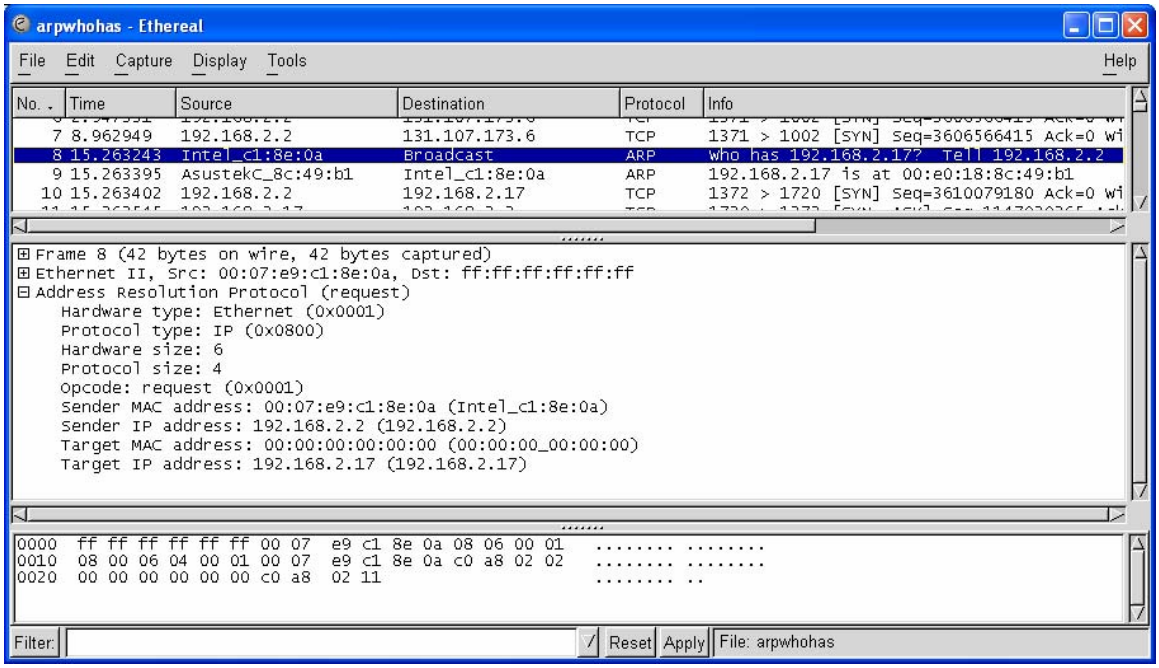
8.11 True; True.

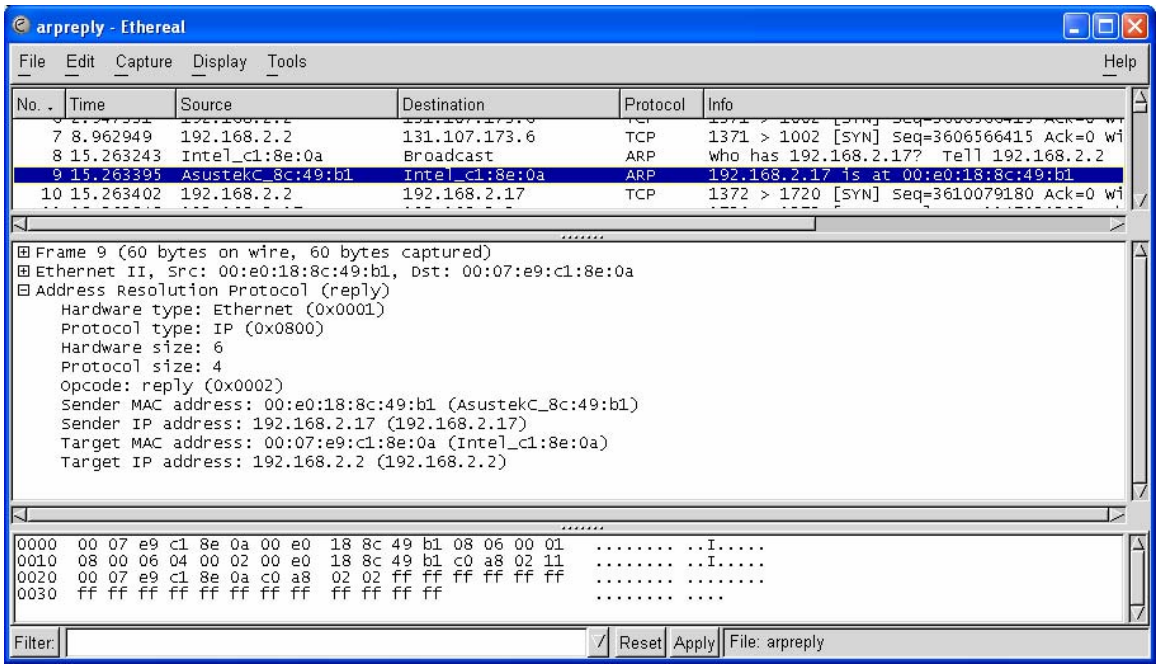
8.12 128.56.24.0/22

8.17 The figure below shows the parameters of the netstat command in Windows XP.



8.22 The following screen captures show and ARP request and the corresponding ARP reply.





8.23 (d) 2819:00AF:0000:0000:0000:0035:0CB2:B271=>2819:AF::35:CB2:B271

8.29 (a) Hint: Assume that the send window is replenished by the receiver as soon as it receives a segment. Draw the time scale in microseconds.

(b) What is the impact of the long segments from B to A?

8.30 Draw the time axis at station A, at the intermediate router, and at station B, then show the impact of the intermediate router on the sequence of events.

8.37 Refer to Figure 8.36.

8.38 The following sequence of packet captures was obtained by connecting to www.yahoo.com using telnet. The TCP open and close can be observed at the beginning and end of the packet sequence. Advertised window sizes, acknowledgments, and sequence numbers are also shown. (The data was obtained from Ethereal using the print-to-file option.)

```
 1 0.000000    Intel_c1:8e:0a  Broadcast       ARP    Who has 192.168.2.3?  Tell 192.168.2.2
 2 12.992506   192.168.2.18    192.168.2.1     DNS    Standard query A www.yahoo.com
 3 13.001008   192.168.2.1     192.168.2.18    DNS    Standard query response CNAME www.yahoo.akadns.net A 216.109.125.79 A
216.109.125.72 A 216.109.125.69 A 216.109.117.205 A 216.109.125.78 A 216.109.125.71 A 216.109.125.64 A 216.109.118.64
 4 13.001678   192.168.2.18    216.109.125.79  TCP    2498 > http [SYN] Seq=147142992 Ack=0 Win=8192 Len=0
 5 13.039151   216.109.125.79  192.168.2.18    TCP    http > 2498 [SYN, ACK] Seq=2183346772 Ack=147142993 Win=65535 Len=0
 6 13.039221   192.168.2.18    216.109.125.79  TCP    2498 > http [ACK] Seq=147142993 Ack=2183346773 Win=8760 Len=0
 7 18.472270   192.168.2.18    216.109.125.79  TCP    2498 > http [PSH, ACK] Seq=147142993 Ack=2183346773 Win=8760 Len=1
 9 18.622879   216.109.125.79  192.168.2.18    TCP    http > 2498 [ACK] Seq=2183346773 Ack=147142994 Win=65535 Len=0
10 18.734094   192.168.2.18    216.109.125.79  TCP    2498 > http [PSH, ACK] Seq=147142994 Ack=2183346773 Win=8760 Len=1
11 18.905241   216.109.125.79  192.168.2.18    TCP    http > 2498 [ACK] Seq=2183346773 Ack=147142995 Win=65535 Len=0
12 18.924462   192.168.2.18    216.109.125.79  TCP    2498 > http [PSH, ACK] Seq=147142995 Ack=2183346773 Win=8760 Len=1
13 19.078556   216.109.125.79  192.168.2.18    TCP    http > 2498 [ACK] Seq=2183346773 Ack=147142996 Win=65535 Len=0
14 19.244070   192.168.2.18    216.109.125.79  TCP    2498 > http [PSH, ACK] Seq=147142996 Ack=2183346773 Win=8760 Len=1
15 19.369356   216.109.125.79  192.168.2.18    TCP    http > 2498 [ACK] Seq=2183346773 Ack=147142997 Win=65535 Len=0

49 20.016538   192.168.2.18    216.109.125.79  TCP    2498 > http [ACK] Seq=147142999 Ack=2183377433 Win=8760 Len=0
50 20.018301   216.109.125.79  192.168.2.18    TCP    http > 2498 [ACK] Seq=2183380353 Ack=147142999 Win=65535 Len=1460
51 20.018342   192.168.2.18    216.109.125.79  TCP    2498 > http [ACK] Seq=147142999 Ack=2183377433 Win=8760 Len=0
52 20.034934   216.109.125.79  192.168.2.18  TCP  http > 2498 [FIN, PSH, ACK] Seq=2183381813 Ack=147142999 Win=65535 Len=697
53 20.035032   192.168.2.18    216.109.125.79  TCP    2498 > http [ACK] Seq=147142999 Ack=2183377433 Win=8760 Len=0
54 21.275248   216.109.125.79  192.168.2.18    TCP    http > 2498 [ACK] Seq=2183377433 Ack=147142999 Win=65535 Len=1460
55 21.275415   192.168.2.18    216.109.125.79  TCP    2498 > http [ACK] Seq=147142999 Ack=2183382510 Win=8760 Len=0
56 21.346468   216.109.125.79  192.168.2.18    TCP    http > 2498 [FIN, ACK] Seq=2183382510 Ack=147142999 Win=65535 Len=0
57 21.346585   192.168.2.18    216.109.125.79  TCP    2498 > http [ACK] Seq=147142999 Ack=2183382511 Win=8760 Len=0
58 23.239449   192.168.2.18    216.109.125.79  TCP    2498 > http [FIN, ACK] Seq=147142999 Ack=2183382511 Win=8760 Len=0
59 23.273437   216.109.125.79  192.168.2.18    TCP    http > 2498 [ACK] Seq=2183382511 Ack=147143000 Win=65535 Len=0
```

By comparing frame 9 and frame 59 we see that 35,738 bytes are transferred by TCP in 4.65 seconds which corresponds to about 61.5 kbps.

8.44 15 nodes.

8.50 Explain why the router is called a “black hole.”

8.58 0.20 bits/second.

8.65 Approximate the Binomial distribution by a Gaussian distribution. The probability that the ISP does not have enough addresses to serve customer connection requests is then 8.8%.