CHAPTER 16

Host Configuration: BOOTP and DHCP

Exercises

- 1. The minimum length of a BOOTP packet is 44 bytes since the server name field, the boot filename field and the options field are optional. The maximum is 300 bytes.
- We assume that the packet contains the server name field and the boot filename field:

Total	290 bytes
Ethernet frame with preamble	26 bytes
IP header	20 bytes
UDP header	8 bytes
BOOTP packet	236 bytes

Efficiency = 236 / 290 = 0.8138 or 81%

RARP packet 28 bytes padding 18 bytes IP header 20 bytes Ethernet frame with preamble 26 bytes

Total 72 bytes

Efficiency = 28 / 72 = 0.3889 or 39%

3. Figure 16.1 shows an example of the *padding* option. We assume that the packet is using the *subnet mask* option. We also need the *end of list* option.

Figure 16.1 Exercise 3

Code: 2	Hardware type	Hardware length	Hop count	
Transaction ID				
No. (of seconds	0		
Client IP address				
Client IP address				
Server IP address				
Gateway IP address				
Client hardware address				
99.130.83.99				
1	4	Subn	et mask	
Subnet mask		0	255	

4. Figure 16.2 shows an example of the *end of list* option. We assume that the packet is using the *subnet mask* and *time of day* options. We need three *padding options* and one *end of list* option.

Figure 16.2 Exercise 4

Code: 2	Hardware type	Hardware length	Hop count			
	Transaction ID					
No.	No. of seconds		0			
	Client IP address					
	Client IP address					
	Server IP address					
	Gateway IP address					
	Client hardware address					
	99.130.83.99					
1	4	Subne	et mask			
Subi	Subnet mask 0		0			
2	4	Time of day				
Tim	Time of day 0		255			

- 5. $2^{16} 1 = 65,535$
- **6**. See Figure 16.3.
- 7. See Figure 16.4.
- **8**. See Figure 16.5.

Figure 16.3 Exercise 6

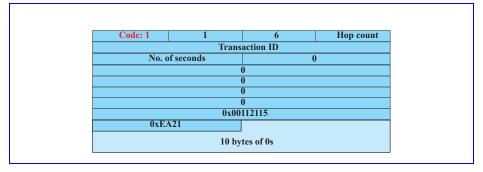


Figure 16.4 Exercise 7

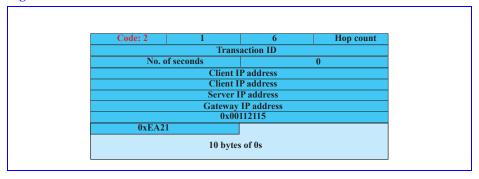
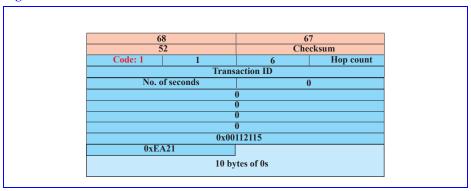


Figure 16.5 Exercise 8



- 9. See Figure 16.6.
- 10. See Figure 16.7.
- 11. See Figure 16.8.

Figure 16.6 Exercise 9

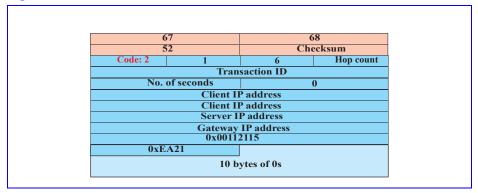


Figure 16.7 Exercise 10

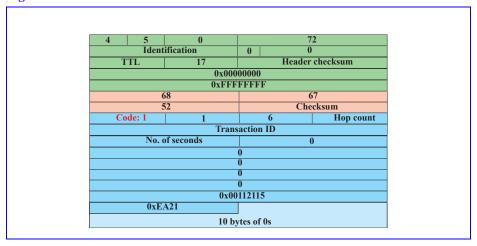
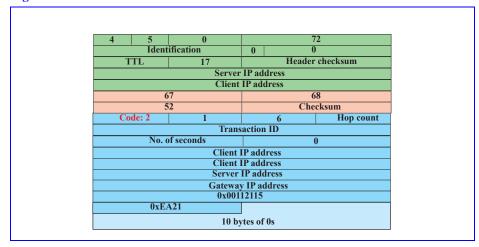


Figure 16.8 Exercise 11



- 12. A newly added host needs to know its subnet mask because this allows the host to find out which subnet it is on.
- 13. A newly added host needs to know the address of a router in order to send a message outside of its own local network.
- 14. A newly added host needs to know the address of a name server in order to resolve a domain name to an IP address.
- 15. BOOTP needs the services of TFTP because the BOOTP packet is of a set size and format. If a BOOTP client needs more information than a packet can hold, the client must retrieve the information using some other method.
- 16. See Figure 16.9. We assume that the server is 4 hops away. We also use transaction ID of 1456. The messages between the client and the relay agent are broadcast. The messages between the relay agent and the server are unicast.

Figure 16.9 Exercise 16

