Network Essentials Chapter 8 Review

Name _____

1. Binary numbering system has one 1 and 0. In computers, 1 is represented by a voltage, while 0 is represented by no voltage.

2. A binary number can contain 1 or more bits. One that contains 8 bits is known as an octet.

3. In an octet, the highest binary number is 11111111 or 255 in decimal.

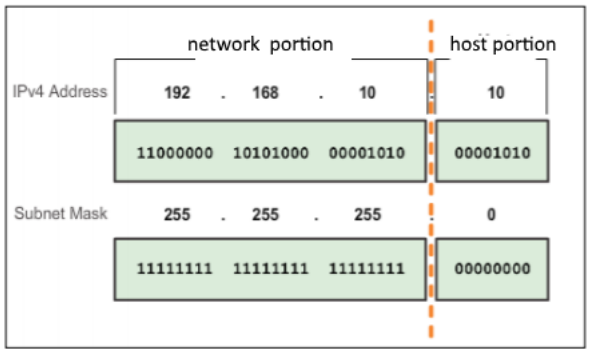
4. A IPv4 address contains 4 decimal numbers written in dotted decimal format. Each number is an octet in binary.

192.168.10.10 → 11000000.10101000.00001010.00001010

4. For every IP address, there is a corresponding subnet mask, eg

IP address : 192.168.10.10
Subnet mask : 255.255.255.0

5. A Subnet mask is a 32-bit number that masks an IP address, and divides the IP address into network address and host address.



6. A subnet mask can take one of the following 8 values:

Subnet Value	Bit Value							
	128	64	32	16	8	4	2	1
255	1	1	1	1	1	1	1	1
254	1	1	1	1	1	1	1	0
252	1	1	1	1	1	1	0	0
248	1	1	1	1	1	0	0	0
240	1	1	1	1	0	0	0	0
224	1	1	1	0	0	0	0	0
192	1	1	0	0	0	0	0	0
128	1	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0

7. In this IP address – 192.168.10.10/24
The '24' means the number of '1' bits in the address.
n = 0, number of subnets = 2^0, H=8, number of hosts = 2^H-2 = 2^8-2.

8. DHCP stands for Dynamic Host Configuration Protocol. It is used to automatically assigning IPv4 addresses to hosts.

9. Two categories of IPv4 addresses are : Public and Private.

10. Private addresses are used when internet access is not needed.

11. Shared IP addresses are for ue in service provider networks only.

12. Special Use IPv4 addresses include the following:

- Network and Broadcast addresses – within each network the first and last addresses cannot be assigned to hosts
- Loopback address – 127.0.0.1 a special address that hosts use to direct traffic to themselves (addresses 127.0.0.0 to 127.255.255.255 are reserved)
- Link-Local address – 169.254.0.0 to 169.254.255.255 (169.254.0.0/16) addresses can be automatically assigned to the local host
- TEST-NET addresses – 192.0.2.0 to 192.0.2.255 (192.0.2.0/24) set aside for teaching and learning purposes, used in documentation and network examples
- Experimental addresses – 240.0.0.0 to 255.255.255.254 are listed as reserved

13. Classes of IP address

IP Address Classes

Address Class	1st octet range (decimal)	1st octet bits (green bits do not change)	Network(N) and Host(H) parts of address	Default subnet mask (decimal and binary)	Number of possible networks and hosts per network
A	1-127**	00000000-01111111	N.H.H.H	255.0.0.0	128 nets (2^7) 16,777,214 hosts per net (2^24-2)
B	128-191	10000000-10111111	N.N.H.H	255.255.0.0	16,384 nets (2^14) 65,534 hosts per net (2^16-2)
C	192-223	11000000-11011111	N.N.N.H	255.255.255.0	2,097,150 nets (2^21) 254 hosts per net (2^8-2)
D	224-239	11100000-11101111	NA (multicast)		
E	240-255	11110000-11111111	NA (experimental)		

14. The need for IPv6

- Pv6 is designed to be the successor to IPv4.
- Depletion of IPv4 address space has been the motivating factor for moving to IPv6.
- Projections show that all five RIRs will run out of IPv4 addresses between 2015 and 2020.
- With an increasing Internet population, a limited IPv4 address space, issues with NAT and an Internet of things, the time has come to begin the transition to IPv6!
- IPv4 has a theoretical maximum of 4.3 billion addresses, plus private addresses in combination with NAT.
- IPv6 larger 128-bit address space provides for 340 undecillion addresses.
- IPv6 fixes the limitations of IPv4 and includes additional enhancements, such as ICMPv6.

15. IPv6 address are expressed in hexadecimal format, eg,
2001:0DB8:0000:1111:0000:0000:0000:0200

16. One hextet is made up of four hexadecimals, eg, 2001 or 0DBB.

17. Leading zeros can be omitted. Thus,

01AB is the same as 1AB

18. A double colon (::) can be used to replace a hextet of all zeros (0000)

Preferred	2001:0DB8:0000:0000:ABCD:0000:0000:0100
Omit leading 0s	2001: DB8: 0: 0:ABCD: 0: 0: 100
Compressed	2001:DB8::ABCD:0:0:100
OR	
Compressed	2001:DB8:0:0:ABCD::100

Only one : : may be used.

19. Prefix length indicates the network portion of an IPv6 address using the following format:

IPv6 address/prefix length, eg, 2001:0DB8:0000:1111:0000:0000:0000:0200/64

Prefix length can range from 0 to 128 . Typical prefix length is /64.

20. There are three types of IPv6 addresses;
Unicast, Multicast and Anycast (no broadcast)

21. Unicast – packet sent to one unique device, can be used only in a subnet.
Two types : Local Unicast and Global Unicast.
A Global Unicast address has a prefix length of 3
eg. 2001:0DB8:0000:1111:0000:0000:0000:0200/3

22. A subnet ID is used to identify subnets within a site. A interface ID is equivalent to the host portion of the IPv4 address; here, a host can many interfaces.