CS1356 Introduction to Information Engineering

Homework 9

Read textbook 4.2: Internet Addressing (pp183) and answer the following questions.

1. What is **IP** referred to? Why do we need an internet-wide addressing system? How many bits is an IP address (for **IPv4** and **IPv6**)? Why should each machine have a unique IP?
2. What is the "**dotted decimal notation**"? Express the following bit pattern to the dotted decimal notation: 00110001100110100100101100111.
3. Why does the Internet need **domain name** addressing? What is a **domain**?
4. What is the **top-level domain** (**TLD**) of www.cs.nthu.edu.tw? Please give 2 more examples of TLDs.
5. What is a **subdomain**? Could you explain that using an IP address for example?
6. What are **domain name systems** (**DNS**)? What's their job? And how do they work? What is **DNS lookup**?
7. Why should the domain names be translated to the IP addresses? Who's responsibility to maintain this translation? What would happen if the owner of domain name does not want to maintain a domain name server? Can it have a solution?

Read textbook 4.4: The TCP/IP Protocol Suite (pp.204) and answer the following questions.

1. Why does the seven-level-hierarchy proposed by OSI not become the network standard?
2. What are the full name of TCP and IP? What is another transport layer protocol other than TCP? Why does the Internet need two different transport layer protocols?
3. Compare the differences between TCP and UDP in terms of
   (a) How to send a message? What is a **connection** protocol and what is a **connectionless** protocol?
   (b) The guarantee of successful delivery of messages. What is a **reliable** protocol and what is an **unreliable** protocol?
   (c) Control the transmission rate. What is difference between the **flow control** and the **congestion control**?
4. What are the advantages of using **UDP**? What kinds of applications should they use UDP instead of TCP?

5. What are the jobs of IP? What is **forwarding** and what is **routing**?
6. What is a **hop count** used for? Which layer of protocols maintains this variable? What's the purpose of using it and how does it work?
7. Why need IPv6 be invented?
8. Answer the questions and exercises in 4.4. (Textbook's Appendix F has reference answers.)

Read textbook 4.1: Combining Networks (pp.174) and answer the following questions.
1. What is the function of a **repeater**? What is the function of a **bridge**? What is the function of a **switch**? What're their similarities and differences?
2. What is an **internet**? What is **the Internet**? Give an example of an internet that is not the Internet.
3. What is the function of a **router**? Why does it differ from repeaters, bridges, and switches?
4. Why does each machine need two kinds of addresses?
5. What is a **gateway**? How does it resolve two kinds of addresses when it received a message? In WiFi networks, what does the term gateway usually refer to?