

CNT3004: Computer Network Concepts (Summer 2012)

Homework 4: Chapter 15, 19, 20, 21, 25, 26, 27

(assigned 07/24; due: 07/30 midnight on webcourse)

Name: _____ PID: _____

Note: You need to compute the final numerical results for all computing questions (i.e., you cannot just list the formula as the final result).

1. Knowledge questions:
 - a. How is a repeater different from an amplifier (chapter 15)?
 - b. What is the full name of ARP? Is the size of ARP packet fixed? Explain.
 - c. Why so many networks and routers either block ICMP packets or do not respond with ICMP error messages?
 - d. What is the full name of DHCP, NAT, DNS, TLD, RR, MTU, ICMP, TTL?
 - e. What are the commands for DNS query in Windows and Unix, respectively? What are the commands for traceroute in Windows and Unix, respectively?
 - f. What is the default service port used by telnet? What is the service port used by Email server? What is the service port used by SSH server? What is the service port (unencrypted one) used by HTTP server?
 - g. Why an email with a 9MB file attachment cannot be accepted by a receiving email server if the server imposes a rule that it rejects any email that is larger than 10MB?
 - h. What protocols does an email user agent use for sending out email to an email server and retrieving email from an email server, respectively?
 - i. When a browser gets a webpage, does it set up connections only to that web server?
 - j. What are the three transition strategies for IPv6?
2. Calculate the HLEN (in IPv4) value in a packet header if the total length of the packet is 1200 bytes, 1176 of which is data from the upper layer.
3. Suppose you open a startup company "flashNetwork" and want to set up your company network. Your network has the following servers:
DNS server: "dns1.flashNetwork.com" with IP as "128.119.1.40"
Web server: "flashNetwork.com" with two IP as "128.119.1.55" and "128.119.1.56". Internet users can also access the web server by "www.flashNetwork.com".
Email server: "mailserver.flashNetwork.com" with IP as "128.119.1.60"

Your company's email address is "username@flashNetwork.com".
 - a). What resource records (RRs) do you need to provide to the upper-level ".com" Registrar?
 - b). What RRs do you need to put in your company's DNS server?
4. List the several SMTP commands you must use in order to use telnet to manually send an email. You must list these commands in order.
5. When I use "dig mx knights.ucf.edu" command on Eustis Unix machine, the dig command responds with the following text:

```

czou@eustis:~$ dig mx knights.ucf.edu
; <<> DiG 9.8.1-P1 <<> mx knights.ucf.edu
;; global options: +cmd
;; Got answer:
;; ->HEADER<<- opcode: QUERY, status: NOERROR, id: 43960
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 3, ADDITIONAL: 8

;; QUESTION SECTION:
;knight.ucs.edu.                IN      MX

;; ANSWER SECTION:
knight.ucs.edu.                692     IN      MX      0 680526354.mail.outlook.com.

;; AUTHORITY SECTION:
ucs.edu.                       1278    IN      NS      ucf1.ucs.edu.
ucs.edu.                       1278    IN      NS      ucf2.ucs.edu.
ucs.edu.                       1278    IN      NS      ucf3.ucs.edu.

;; ADDITIONAL SECTION:
680526354.mail.outlook.com. 2689    IN      A       94.245.120.86
680526354.mail.outlook.com. 2689    IN      A       213.199.180.150
680526354.mail.outlook.com. 2689    IN      A       216.32.180.22
680526354.mail.outlook.com. 2689    IN      A       216.32.181.178
680526354.mail.outlook.com. 2689    IN      A       65.55.88.22
ucs1.ucs.edu.                  1588    IN      A       10.171.12.5
ucs2.ucs.edu.                  1278    IN      A       10.171.12.37
ucs3.ucs.edu.                  1278    IN      A       10.171.12.69

```

Please answer the following questions:

- (a). What is the email server's domain name and its IP addresses?
- (b). What is the domain names and IP addresses of the DNS servers in charge of UCF network?

6. **Wireshark usage and WWW monitoring:** You are required to install wireshark on your own computer and then monitor your web connection in this assignment. You are required to connect to <http://www.wikipedia.org/> and monitor the HTTP traffic:

- a). What is the IP address of your computer and the IP address of the website you connected?
- b). How long did it take from when the HTTP GET message was sent until the HTTP OK reply was received?
- c). Show the "summary" text of the HTTP GET message and the HTTP OK message (these two packets should be the first two http packets captured by wireshark). You can right-click a packet line, then select "copy" → "summary" to copy down the summary text.