Computer Networks Midterm

Date: April 25 2016

1. Give the full name of the following acronyms. (15%)

   (a) ISP

   (b) HTTP

   (c) DNS

   (d) SMTP

   (e) POP3

2. What are the five layers in the Internet protocol stack? (10%)

3. Please give a description of how recursive queries work on DNS. (10%)

4. Consider sending a packet from a sending host to a receiving host over a fixed route. List the delay components in the end-to-end delay. (8%)

5. List the underlying transport protocol name (TCP or UDP) for each of the following network-application services and briefly explained the reasons. (8%)

   (a) Video conferencing.

   (b) DNS service.

   (c) E-Mail.

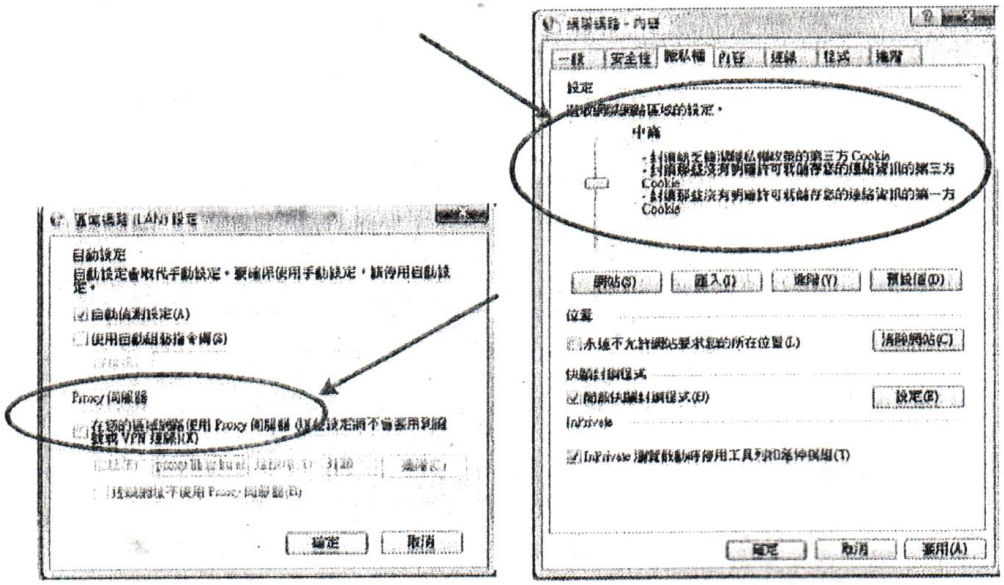
   (d) Web service.

6. Suppose Host A wants to send a large file to Host B. This path from Host A to Host B has four links, of rates $R_1 = 500kbps$, $R_2 = 3Mbps$, $R_3 = 2Mbps$, and $R_4 = 4Mbps$. Suppose the file is 12MB.

   (a) How long will it take to transfer the file to Host B (use message switching)? (5%)

   (b) How long does it take to send the file to host B (use circuit switching)? Please use the bottleneck link as the link transmission rate, each link uses TDM with 24 slots/sec, and to establish the end-to-end circuit takes 500 msec. (5%)

7. (14%) Please see Figure 1 and answer the following questions.



(a) (b)

Figure 1:

(a) What is the Cookie in web service and what can it do? (5%)

(b) Which part is the network setting for Cookie in Windows 7 (Figure 1(a) or Figure 1(b))? (2%)

(c) What advantages does a proxy cache have? (5%)

(d) Which part is the network setting for Proxy cache in Windows 7 (Figure 1(a) or Figure 1(b))? (2%)

8. (6%)

   (a) What is the network service that uses 80 as the well-known port number of a server? (3%)

   (b) What is the network service that uses 25 as the well-known port number of a server? (3%)

9. Please list the e-mail protocols (SMTP or POP3) used in each of the communication links of Figure 2. (6%)

10. Please see the Figure 3 and then to answer each of the following questions. (13

    (a) Which packet (the packet number) is to query the IP address of domain name "www.nctu.edu.tw"? (2%)

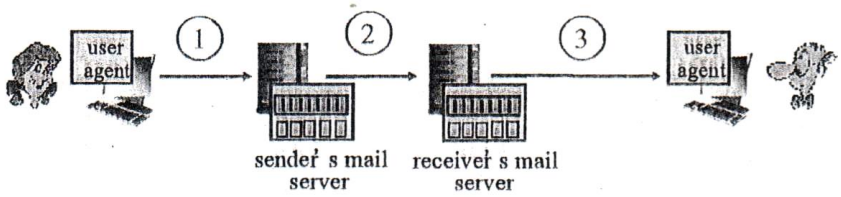


Figure 2:

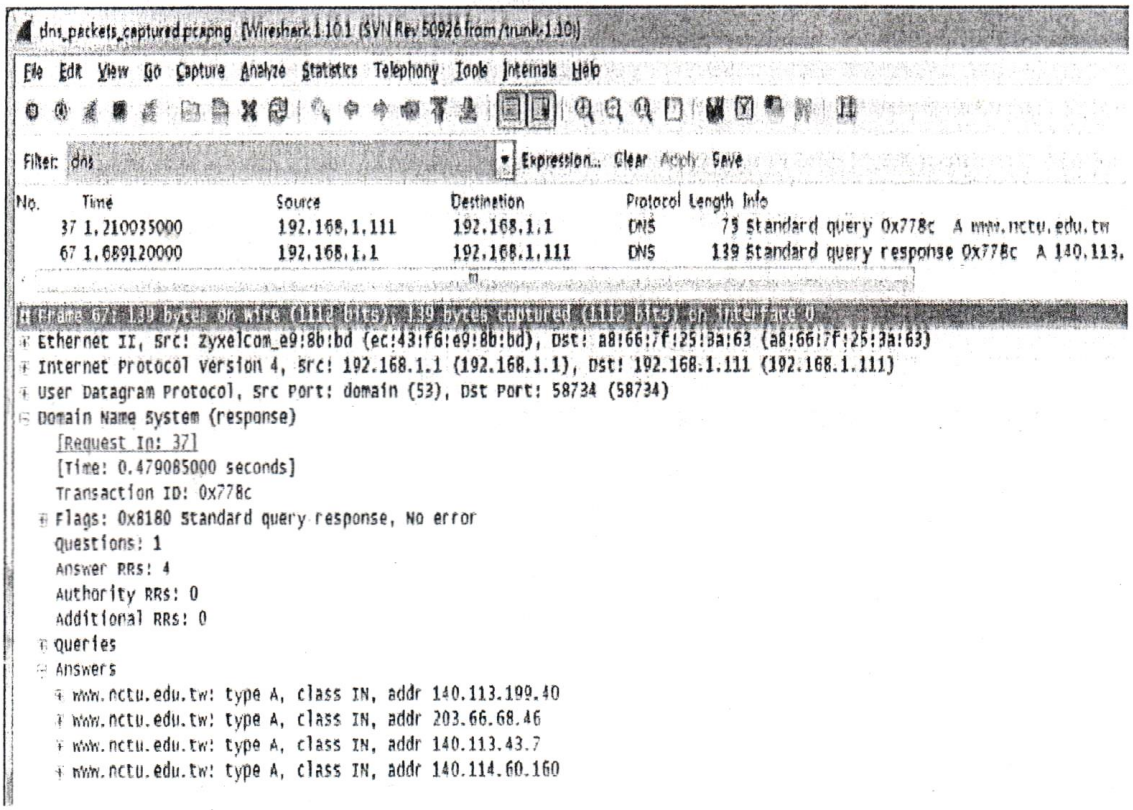


Figure 3:

(b) What is the source port of DNS response message? (2%)

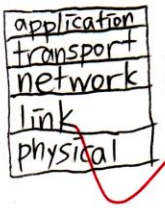
(c) Which IP address of domain name "www.nctu.edu.tw" will directly communicate with the browser? (2%)

(d) Please use this example to explain how does a DNS server to equally distribute traffic load among servers? (7%)

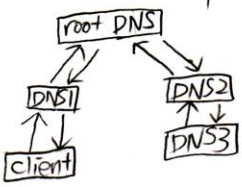
詳解

①(a) Internet Service Provider (b) Hyper-Text Transfer Protocol
(c) Domain Name System (d) Simple Mail Transfer Protocol (e) Post Office Protocol ver3

②



③



先問DNS1，它不知道，並幫我問root DNS，它也不知道，root幫DNS幫DNS1問DNS2，DNS2也不知道，DNS2問DNS3後終於知道了，並把結果告訴DNS2→root DNS→DNS1→client

④ Queue delay、Transmisson delay、Propagation delay、Processing delay

⑤(a) UDP，因為要速度快 (b) UDP，因為要速度快 (c) TCP，因為不能有錯 (d) TCP，因為不能有錯

⑥

$$A \xrightarrow[62.5kB/s]{500kbps} \xrightarrow[384kB/s]{3Mbps} \xrightarrow[256kB/s]{2Mbps} \xrightarrow[512kB/s]{4Mbps} B \quad 12MB = 12288\,kB$$

(a) $\frac{12288}{62.5} + \frac{12288}{384} + \frac{12288}{256} + \frac{12288}{512} = 196,608 + 32 + 48 + 24 = 300,608$ 秒

(b) $\frac{12288}{62.5} \times 24 + 0.005 = 196,608 \times 24 + 0.005 = 4718,592 + 0.005 = 4718,597$ 秒

-2

⑦(a)記錄使用者的設定、登入狀態、瀏覽過的頁面 (b) Figure 1(b)
(c) 如果很多人要去同一個網站，就直接從proxy cache下載，就好，加快速度 (d) Figure 1(a)

+2

⑧(a) HTTP (b) SMTP ⑨ ①SMTP ②SMTP ③POP3

⑩(a) 37 (b) 53 (c) 140.113.199.40 (d) 它會平均分配所有使用者到4台伺服器

how?