Fall 2019 Computer Networks (IT3007)

Quiz #1

2019/10/07 16:30-17:00

100

Student ID: B06290l0 Name: 蘇青儒

1. (42%) List the seven layers of the OSI model and describe the basic functions of each layer.

Ans: application - supporting network applications ex. HTTP. FTP

+42

presentation - allow applications to interpret the meaning of data ex. 加密, 壓縮

session - synchronization, checkpointing, recovery of data exchange.

transport - process - process data transfer ex. Tcp, UDP

network - routing the datagrams from source to destination ex IP

link - data transfer between neighboring network elements. ex wifi

physical, bits, "on the wire"

2. (20%) List at least two advantages of packet switching compared with circuit switching.

Ans:

+20

1. 不用在通訊前先建立連結. (no call setup)

2. simple, 且頻寬為 shared, 可讓更多人使用.

3. (38%) Consider sending a packet from a source host to a destination host over a fixed route. List the delay components in the end-to-end delay, and briefly explain each of them. Which of these delays are constant and which are variable? Note that the network may be congested.

+38

Ans:

1. nodal processing delay → (constant)
   → 於 route 檢查封包是否有錯 (checking bits), 且取得建立連線所需的時間

2. queueing delay (variable)
   → 資料在 route 阻塞的時間, 取決於 router 的壅塞等級

3. transmission delay (constant)
   → 封包從 router 傳到 link 的時間, (L) → bits (R) → 傳送速率 (bps)

4. propagation delay (constant)
   → 資料在 link 上傳送的時間, $\frac{d}{s}$ → length of link / 傳送速率

Fall 2019 Computer Networks (IT3007)

Quiz #2

2019/10/28 16:30-17:00

Student ID: B06290[illegible] Name: [illegible] 62

1. (10%) What does DNS stand for?

+7 Ans: Domain name Server system

主機名稱到IP位置的轉換

load distribution (負載分配)

郵件伺服器別名

2. (45%) Give at least three services that DNS provides, and briefly explain each of them.

+10 Ans:

Mail Server → DNS → 正規名 (別名) 使用

Type MX：可查到該網站的信箱服務器位置

Type NS：可查到該網站的伺服器名稱 (nameserver)

ex.

nslookup -type=ns www.google.com

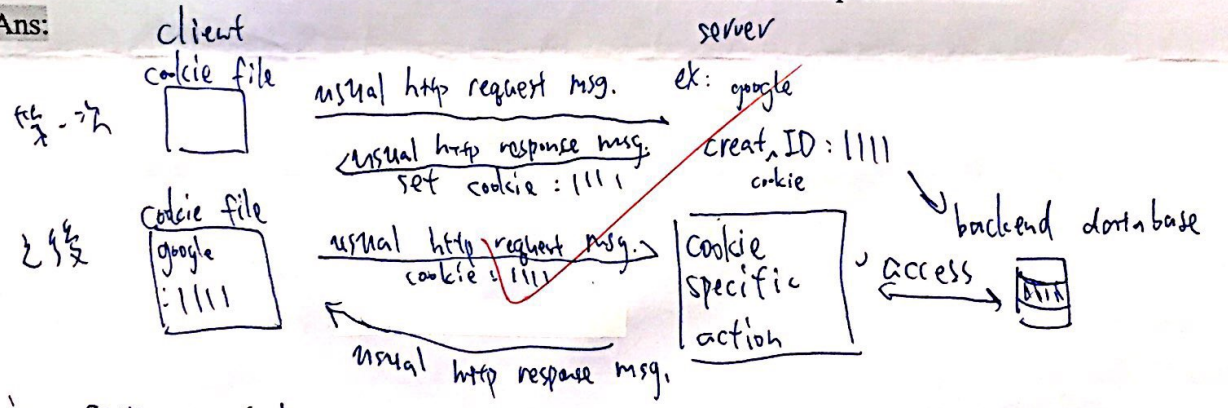
⇒ 可知道ns為 ns1.google.com (可能多個)

Type Cname：可查到該網站的真正的名稱

Type A：可查到該網站的 IP address.

3. (20%) Give an example to describe how cookies can be used to keep track of users.

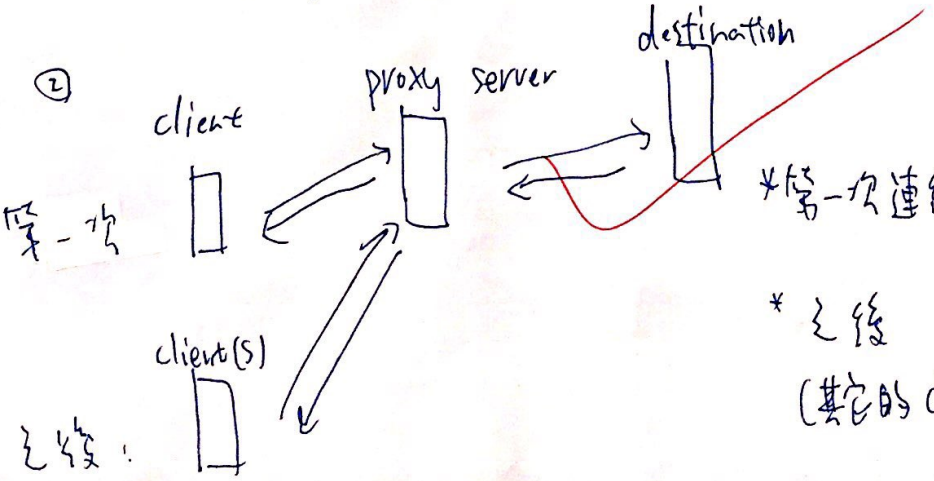
+20 Ans:



∴ cookie：carry user's http state

4. (25%) Why are web caches (also called proxy servers) required in a network? Give an example to explain how a web cache works.

+25 Ans: ① proxy 在越多人使用後越快，取得的是該網頁的快取 (不需要再連到原始網頁抓資料)



*第一次連結：client → proxy server → destination

* 之後：只需 client → proxy server (其它的 clients) (已有該網站的快取)

Fall 2019 Computer Networks (IT3007)

Quiz #3

2019/12/30 16:30-17:00

67.5

Student ID: B06291010 Name: 蘇育德

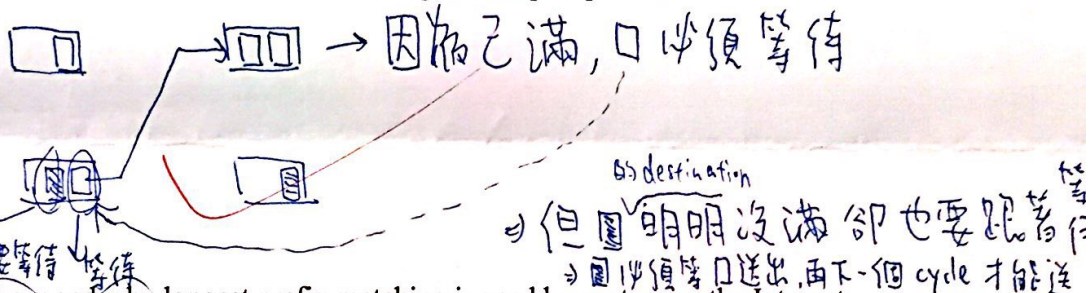
1. (25%) Consider sending a 2200-byte datagram into a link that has an MTU of 500 bytes. Suppose the original datagram is stamped with the identification number 196. What are the values in the various fields (*datagram length*, *identifier*, *flag*, and *fragmentation offset*) in the IP datagram(s) generated related to fragmentation?

Ans: (2200-20) - (480×4) +20 =

Datagram	Datagram length	Identifier	Offset	Flag
1	500	196	0	1
2	500	196	60	1
3	500	196	120	1
4	500	196	180	1
5	~~280~~	196	~~212~~	0

2. (20%) Explain the head-of-the-line (HOL) blocking in an input-queued switch.

Ans:



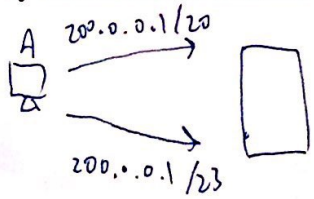
3. (30%) Explain how and why longest prefix matching is used by routers on the Internet.

-30 Ans:

A 外連時可能有多個管道

⇒ 中繼站只收最長的 200.0.0.1/23

⇒ 25位元為固定，之後比對較為快速



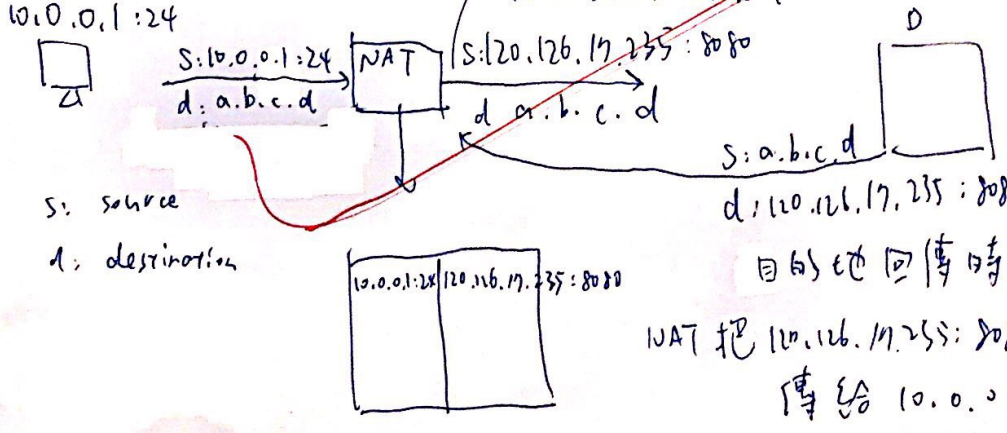
4. (25%) Explain how computers in your dorm rooms can connect to hosts outside the campus with the help of NAT.

Ans:

有一個固定的 ip address，假設為 120.126.17.235

然後會分配一個對應的 port，假設為 8080

然後記錄到表中



目的地回傳時再轉回去

NAT 把 120.126.17.235:8080 的資料收到傳給 10.0.0.1:24