計網

Fall 2018 Computer Networks (IT3007)

Quiz #1

2018/10/08 17:30-18:00

94

Student ID: B05 29025 Name: 潘騰昱

1. (34%) 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 explain each of them. Which of these delays are constant and which are variable? Note that the network may be congested.

Ans:

處理 processing delay：檢查位元錯誤 -2

傳送 transimission delay：$\frac{L}{R}$ (封包位元 / 頻寬 bps) -2

傳遞 propagation delay：$\frac{d}{s}$ (媒介長度 / 傳遞速率) -2

constant

佇列 Variable – queuing delay：封包在等待前一個封包傳輸所需時間

not a question

network may be congested: transmission delay

2. (42%) List the seven layers of the OSI model and describe the basic functions of each layer.

Ans:

應用層 applicotion：支援網路應用程式 ex: HTTP

展現 presatation：可分析資料意義 ex: 加密資料

會談 session：檢查點，資料回復

傳輸 transport：進程到程的傳輸 ex: TCP

網路 network：來源端、目的端的資料串流

連結 link：相鄰元件間的資料傳遞 ex: PPP

實體 physical：電路中的位元

3. (24%) Give at least two advantages and two disadvantages with the layered approach to network protocols.

Ans:

1. 可以提供較多使用者

2. 不需建立連線，資源分享

-12

torrent

所有參與散佈某檔案的對等點總稱

message segmentation drawbacks

packet is missing, then the overall file cannot be read

需要一個分段數據包的重建系統

Fall 2019 Computer Networks (IT3007)

Quiz #2

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

30

Student ID: B06902045 Name: 郭宇芹

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

+10

Ans:

Domain Name System

+0 2. (45%) Give at least three services that DNS provides, and briefly explain each of them.

Ans:

① 主機名稱到IP位址的轉換

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

+20

Ans:

當進入一個PC，第一次查詢網頁時，會出現唯一的辨識碼，將其存入後端資料庫中，常用於廣告等。

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

+0

Ans:

① 降低用戶端請求回應的時間

② 有自己的磁碟儲存空間，並會在其儲存空間中保存最近被請求過的物件副本

Department of Computer Science and Information Engineering
Chang Gung University
Fall 2019 Computer Networks (IT3007)
Midterm Exam 2019/11/11 14:10-17:00

作答前請務必詳閱下列規定：

1. 除作答需要使用的文具之外，其他物品請放到教室前方，特別是手機與平板電腦等手持裝置，嚴禁帶在身上或是放置在座位上，並請關機或切換至震動模式；否則視為違反考試規則，並視嚴重程度扣分。
2. 請記得於簽到表上簽名後再離開考場。
3. 考試結束請繳回此試卷。
4. 若使用超過一張答案紙，各頁均須寫上學號與姓名，並於右下角標示頁碼，使用教室前方提供的釘書機裝釘後再交卷。

---

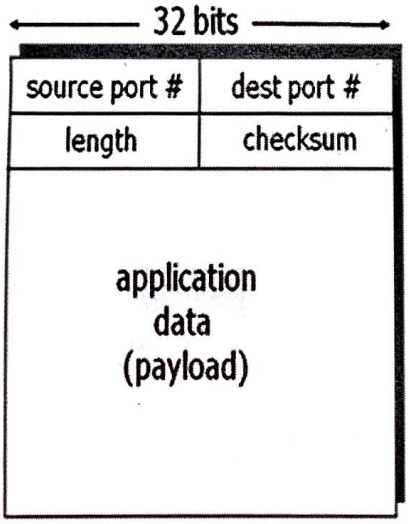
1. (10%) Answer true or false for each of the following statements:
   (a) With non-persistent connections between browser and origin server, it is possible for a single TCP segment to carry two distinct HTTP request messages.
   (b) HTTP response messages may have an empty message body.
   (c) All DNS query and reply messages are sent within UDP datagrams.
   (d) Virus are malware that can enter a device without any explicit user intervention.
   (e) Compared with packet switching, circuit switching offers better sharing of transmission capacity.
2. (10%) List the seven layers of the OSI model and describe the basic functions of each layer.
3. (10%) 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.
4. (20%) Explain the following terms:
   (a) tracker
   (b) forwarding table
   (c) botnet
   (d) DNS poisoning attack
5. (10%) Give at least three services that DNS provides, and briefly explain each of them.
6. (10%) Give an example to describe how cookies can be used to keep track of users.
7. (10%) Why are web caches (also called proxy servers) required in a network? Give an example to explain how a web cache works.

8. (10%) Suppose users share a 100 Mbps link. Also suppose each user requires 2.5 Mbps when transmitting, but each user transmits only 15 percent of the time.
   (a) (3%) When circuit switching is used, how many users can be supported?
   (b) (3%) For the remainder of this problem, suppose packet switching is used and there are 100 users. Find the probability that at any given time, exactly n users are transmitting simultaneously.
   (c) (4%) Find the probability that there are 100 or more users transmitting simultaneously.

9. (10%) The following figure shows the UDP segment structure. Suppose that the source IP address is 120.126.15.129, the destination IP address is 163.25.114.2, the source port number is 9487, the destination port number is 1111, and the application data is "CN2019". What is the value of the checksum field? Note that you have to show how you get the answer.

   Hint: The ASCII value of '0' is 0x30 and that of 'A' is 0x41. UDP pseudo header contains the following fields:
   (a) The source IP address (4 bytes)
   (b) The destination IP address (4 bytes)
   (c) The IP protocol (2 bytes) (UDP is 17)
   (d) The UDP length (2 bytes)

source IP: 120.126.15.129
destination IP: 163.25.114.2
source port = 9487
destination port = 1111



UDP segment format

長庚大學期中、期末考試答案用紙

科目 計網 61.5

+6 ____學年度 第____學期 中 考 資工三 系 姓名 郭子芹 學號 B0619

1- a/F b/T c/F d/F e/T.

2- application 執行應用程式
+9.5 transport 行程和行程的轉換
network ~~internet~~ 從出發端 routing 目的端
link 相鄰的点傳遞資料
physical 電路中的位元
presentation 怎詮讀取應用程式的意義(加密壓縮,不同電腦的轉換)
session 同步化,設查点,回復資料的轉換.

3- processing delay 檢查位元的錯誤(Time不變)
+10 queuing delay 等候傳送到輸出的時間(Time改變)
transmission delay 把全部封包傳送到連結的時間(Time不變)
propagation delay 在介質傳遞的時間(Time不變)

4-
~~+5~~ +5 a)
b)
(c) botnet = 受感染的PC,植入殭屍病毒。
d) DNS poisoning attack = 做出假訊息給server,讓User一直連到錯誤的IP位址.

5- ① 主機名稱到 IP 位址的轉換.
+8 ② 主機名稱別名 → 可以簡化主機的名稱.
③ 郵件伺服器名稱別名 → 可以簡化名稱

b-
+10 若都是用同一個PC來查詢網路網路,假設在第一次到某電子商場網頁,則Cookies會出現一個唯一的識別碼,然後把識別碼存入後端資料庫裡。

(請翻面繼續作答)

長庚大學期中、期末考試答案用紙

科目

學年度 第 學期 考 系 姓名 郭宇芹 學號 B06290?5

7. +10 web caches. (快取 Server)

① 減少網路流量

② 減少重載

存取近期查過的記錄，過一個時間點則會刪掉此空間的內容，這樣就不會一直跑到來源會有一個硬件空間。 伺服器做查詢。(請求)

9. Source IP address = 120.126.15.129 = 787E + 0F81 = 717F1

+3 destination IP address = 163.25.114.2 = A319.7202 = A151B

IP protocol = 17 → 11 #

UDP length = 8 + 32/4 = 16 → 10 14 = 0x000E.

717F1 + A151B + 11 + 10 = 112D12E

source port num = 9487 = 250F

destination port num = 1117 = 0457

250F + 0457 + 11 + 10 =

CN2019 = 43, 33, 31, 39.

4E 32, 30, 31, 39

250F 787E 434E x985

0457 0F81 3230 19D28

000E A319 3139 A687

+) 0011 7202 +) 3139 26D64

x985 19D28 ABB7 → 2

6D66

↓1-5

9299

8.

(a) $\frac{100 \times 10^3}{2.5 \times 10^3} = \frac{100}{2.5} = 40$ (個 users)

(b) $\sum_{n=0}^{10} (0.15)^n (1-0.15)^{(10-n)}$

(c)

(請翻面繼續作答)

計網

Department of Computer Science and Information Engineering

Chang Gung University

Fall 2018 Computer Networks (IT3007)

Midterm Exam 2018/11/12 15:10-18:00

作答前請務必詳閱下列規定：

1. 除作答需要使用的文具之外，其他物品請放到教室前方，特別是手機與平板電腦等手持裝置，嚴禁帶在身上或是放置在座位上，並請關機或切換至震動模式；否則視為違反考試規則，並視嚴重程度扣分。
2. 請記得於簽到表上簽名後再離開考場。
3. 考試結束請繳回此試卷。
4. 若使用超過一張答案紙，各頁均須寫上學號與姓名，並於右下角標示頁碼，使用教室前方提供的釘書機裝釘後再交卷。

---

1. (10%) Answer true or false for each of the following statements:
   - F (a) SMTP (Simple Mail Transfer Protocol) is a mail access protocol used to transfer mail from the recipient's mail server to the recipient's user agent.
   - T (b) POP3 (Post Office Protocol—Version 3) does not provide any means for a user to create remote folders and assign messages to folders.
   - F (c) All DNS query and reply messages are sent within TCP segments.
   - F (d) Compared with packet switching, circuit switching offers better sharing of transmission capacity.
   - (e) Worms are malware that can enter a device without any explicit user intervention.

2. (20%) Explain the following terms:
   - (a) torrent
   - (b) DNS poisoning attacks
   - (c) IP spoofing
   - (d) packet sniffer

3. (10%) 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.

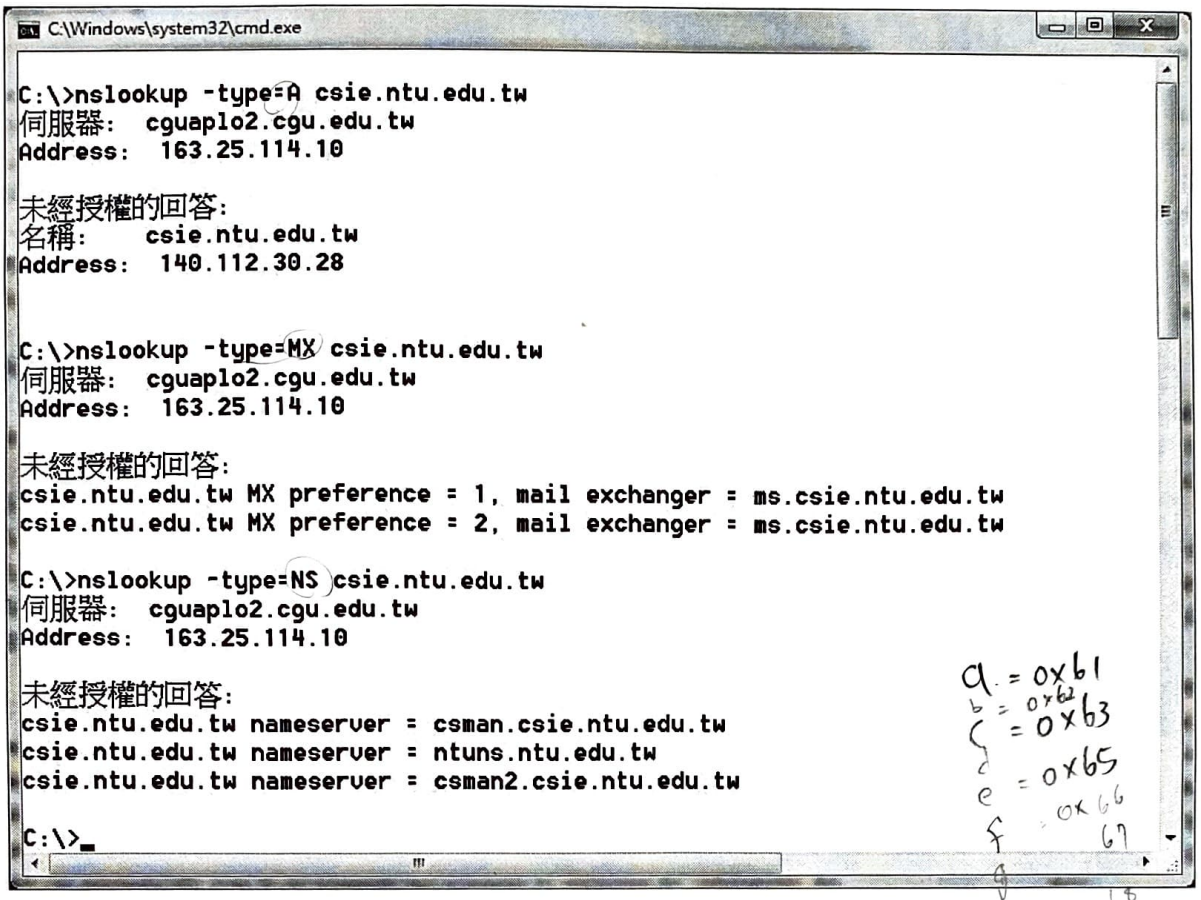
4. (10%) List the seven layers of the OSI model and describe the basic functions of each layer.

5. (10%) Give an example to explain how HTTP's conditional GET mechanism works.

6. (10%) Consider a user who needs to transmit 10 gigabytes of data to a server. The user lives in a small town where only low-speed ADSL access (512 Kbps upload) is available. A bus visits the small town once a day from the closest city, located 760 km away, and stops in front of the user's house. The bus has a 50-Mbps WiFi connection. It can collect data from users in rural areas and transfer them to the Internet through a 1 Gbps link once it gets back to the city. Suppose the average speed of the bus is 40 km/h. Calculate the times taken to transfer the data to the server with the ADSL accesses and with the bus, respectively.

7. (5%) Why are some applications better suited for UDP rather than TCP?

8. (10%) The following figure shows the results after executing a series of nslookup commands in Windows.



```
C:\Windows\system32\cmd.exe

C:\>nslookup -type=A csie.ntu.edu.tw
伺服器:  cguaplo2.cgu.edu.tw
Address:  163.25.114.10

未經授權的回答:
名稱:    csie.ntu.edu.tw
Address:  140.112.30.28


C:\>nslookup -type=MX csie.ntu.edu.tw
伺服器:  cguaplo2.cgu.edu.tw
Address:  163.25.114.10

未經授權的回答:
csie.ntu.edu.tw MX preference = 1, mail exchanger = ms.csie.ntu.edu.tw
csie.ntu.edu.tw MX preference = 2, mail exchanger = ms.csie.ntu.edu.tw

C:\>nslookup -type=NS csie.ntu.edu.tw
伺服器:  cguaplo2.cgu.edu.tw
Address:  163.25.114.10

未經授權的回答:
csie.ntu.edu.tw nameserver = csman.csie.ntu.edu.tw
csie.ntu.edu.tw nameserver = ntuns.ntu.edu.tw
csie.ntu.edu.tw nameserver = csman2.csie.ntu.edu.tw

C:\>_
```

(a) (8%) Explain the result of each nslookup command.

(b) (2%) Every result contains "未經授權的回答". What does that mean?

9. (5%) Consider a new peer Alice that joins BitTorrent without possessing any chunks. Without any chunks, she cannot become a top-four uploader for any of the other peers, since she has nothing to upload. How then will Alice get her first chunk?

10. (10%) The following figure shows the UDP segment structure. Suppose that the source IP address is 163.25.101.20, the destination IP address is 140.113.33.54, the source port number is 9527, the destination port number is 8800, and the application data is "facebook". What is the value of the checksum field? Note that you have to show how you get the answer.

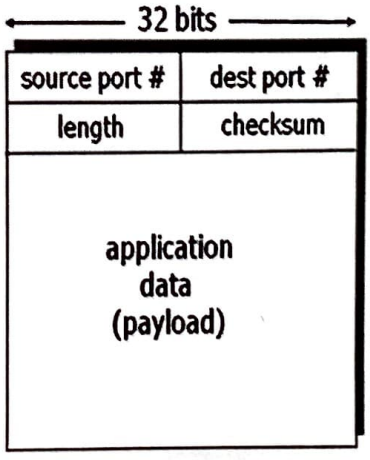
Hint: The ASCII value of 'a' is 0x61. UDP pseudo header contains the following fields:

(a) The source IP address (4 bytes)

(b) The destination IP address (4 bytes)

(c) The IP protocol (2 bytes) (UDP is 17)

(d) The UDP length (2 bytes)



UDP segment format

長庚大學期中、期末考試答案用紙

47.5

科目 _____

_____學年度 第___學期 考 資工 系 姓名 潘騰昱 學號 B05z9025

1. (a) False (b) True (c) False (D) False (e) True

2. (a) 資料傳輸的所有參與者，整個為 torrent （所有參與者

10 (b) 駭客遠端操控多台電腦，利用這些電腦對目標傳送大量訊息，使目標癱瘓
服務被阻斷

(c) IP 詐騙利用假的IP，對目標進行攻擊，目標會以為此IP是非惡意，疏不知已被軟體攻擊
使目標被操控。

(d) 傳送大量封包給目標，使目標不得取得服務

3 3. delay
- processing ✗ 路由器傳到路由器所花時間，$\frac{L}{R}$、
- transmission 封包去出路由器所花時間，$\frac{d}{s}$、 — constant
- propregation ✗ 進入到路由器後檢查位元錯誤所花時間
- quequing ✗ 封包等待進入路由器的時間 — variable

4. 應用層 application = 網路支援應用 ex: HTTP

5 會談層 session = ✗ ex: ppp

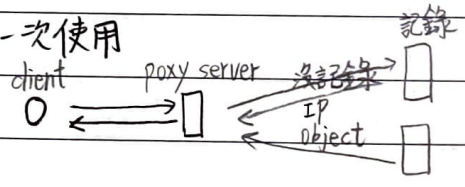
實體層 ✗ = 電路中的位元

展現層 presatation = ✗ 資料保護 ex: 加密資料

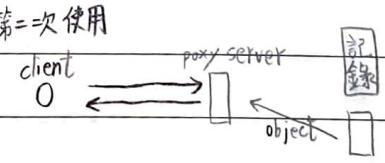
傳輸層 transport = ✗ 資料傳輸

網路層 network = ✗ ex: tcp

10 6. 第一次使用



第二次使用



10 6.

7. 當我們只求快速時，可以用 UDP，因為 UDP 不像 TDP 有流量限制、壅塞限制
不過 UDP 較不穩定，ex: 網路電話，通話時常斷斷續續

8 8. (a) 查詢伺服器名稱

(b) 當傳出的訊息不是主伺器 server 傳出時，就會顯示"未經授權的回答"。

（請翻面繼續作答）

長庚大學期中、期末考試答案用紙

科目 _____

_____學年度 第____學期 ____考 _____系 姓名 _____ 學號 _____

9. -5

10. -1.5

source port = 9527 = 0x2537 ✓

destination port = 8800 = 0x2260 ✓

length = 8+8 = 16 = 0x0010 ✓

S_1 = 2537 + 2260 + 0010 = 0x47A7

source IP address = 0xA3196514 ✓

destination IP address = 0x8C712136 ✓

length = 16 = 0x0010 ✓

IP protocol = 17 = 0x0011 ✓

S_2 = A319 + 6514 + 8C71 + 2136 + 0010 + 0011 = 0x1B5F5000

facebook = 0x6661|6365|6275|7571 = S_3

$S_1 + S_2 + S_3$ = 47A7 + 1B5F + 5000 + 6661 + 6365 + 6275 + 7571

= 254B2000 = 0x454B

checksum value = FFFF - 454B = BAB4 ※

+1