

Student ID: ..... Name: .....

**PRINCE OF SONGKLA UNIVERSITY**

**FACULTY OF ENGINEERING**

Final Examination: Semester I

Academic Year: 2014

Date: 17 December 2014

Time: 13.30-15.30

Subject: 242-464 DESIGN AND DEVELOPMENT OF NETWORK COMMUNICATIONS

Room: A203

**ทุจริตในการสอบ โทษขั้นต่ำคือ ปรับตกในรายวิชาที่ทุจริต และพักการเรียน 1 ภาคการศึกษา**

**Instructions**

- 1. All notes, books, calculator are not allowed.
- 2. There are 14 questions.

1. **Figure 1** show MPEG Frames types: I-Frame, B-Frame, and P-Frame. Please complete MPEG Frames relationship between I, B, and P Frames in **Figure 2**. (10 marks)

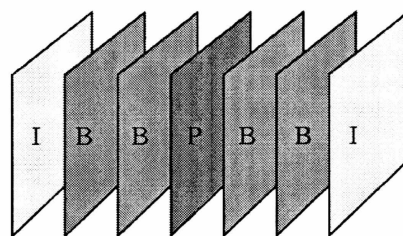


Figure 1 MPEG frames

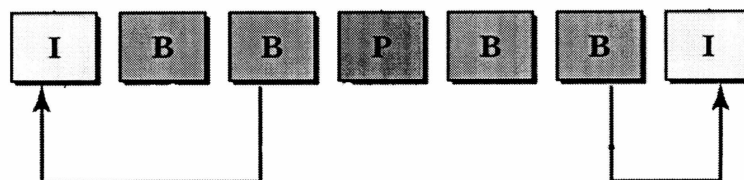


Figure 2 MPEG frame construction

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2. In Figure 3, it shows timestamp and playback time of media service between server and client using RTP. Please explain:

- a. Why does play time start at 00.00.08? (5 marks)
- b. Why does play time interval is 10 (e.g. 00.00.008, 00.00.18)? (5 marks)

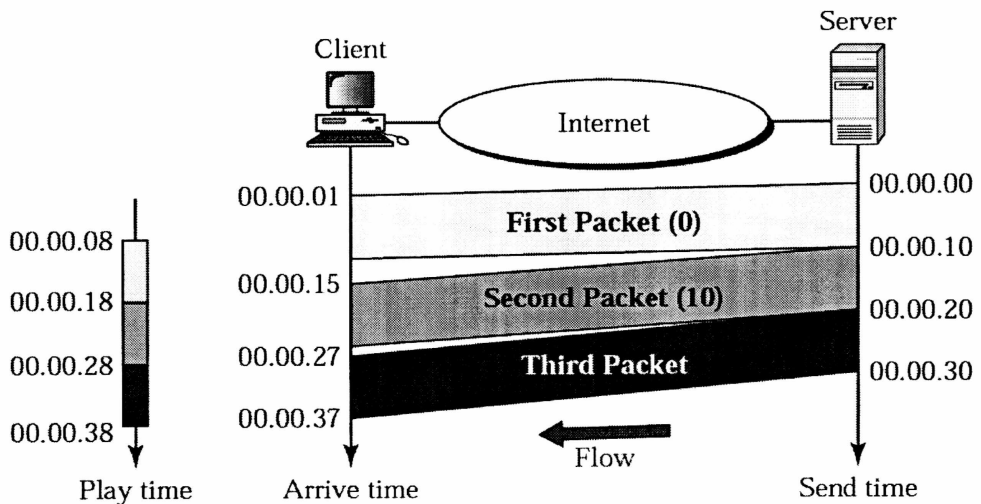


Figure 3 Time stamp and playback time

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3. Virtual private network (VPN) is a technology for large organizations that use the global Internet for both intra- and interorganization communication, but require privacy in their intraorganization communication. Please give advantages and disadvantages when we deploy VPN. (10 marks)

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4. In VPN service, there are 4 type of VPN services. Please give all type names, and describe each of them in details. (10 marks)

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1. VPN Tunneling supports two types: voluntary tunneling and compulsory tunneling

Voluntary tunneling is where the VPN client manages the connection setup. Compulsory tunneling is where the carrier network provider manages the VPN connection setup.

According to the above description, please draw diagrams of

- a) the VPN client manages the connection setup (5 marks)
- b) the carrier network provider manages the VPN connection setup. (5 marks)

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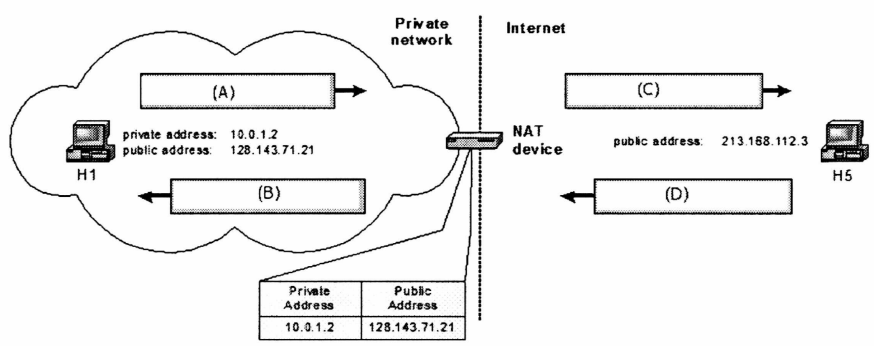
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2. From the below scenario where NAT is used between private and public networks. Please fill in the information of "Source" and "Destination" of (A), (B), (C), and (D) (10 marks)



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3. Please put on your explanation on NAT concerning on the following issues: (10 marks)

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- (a) Performance
- (b) Fragmentation
- (c) End-to-end connectivity
- (d) IP address in application data

Answer

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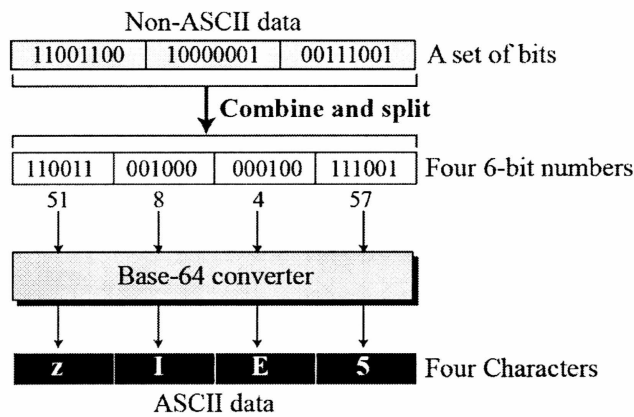
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4. Figure below shows Base-64 encoding technique.

- a) How it works, (5 marks)
- b) Why it uses a block of 6 bits instead of 7 bits where 7 bits is a full ASCII code. (5 marks)



Answer

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5. The actual mail transfer is done through message transfer agents (MTAs). To send mail, a system must have the client MTA, and to receive mail, a system must have a server MTA. The formal protocol that defines the MTA client and server in the Internet is called Simple Mail Transfer Protocol (SMTP). As we said before, two pairs of MTA client-server programs are used in the most common situation. Please use the below information to solve the questions: what are signals of (A), (B), (C), and (D). Please use the signal list in Table 1 and Table 2. (10 marks)

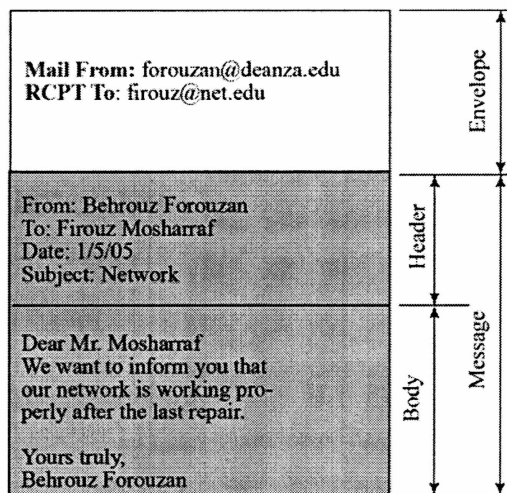


Figure 4 Sample email

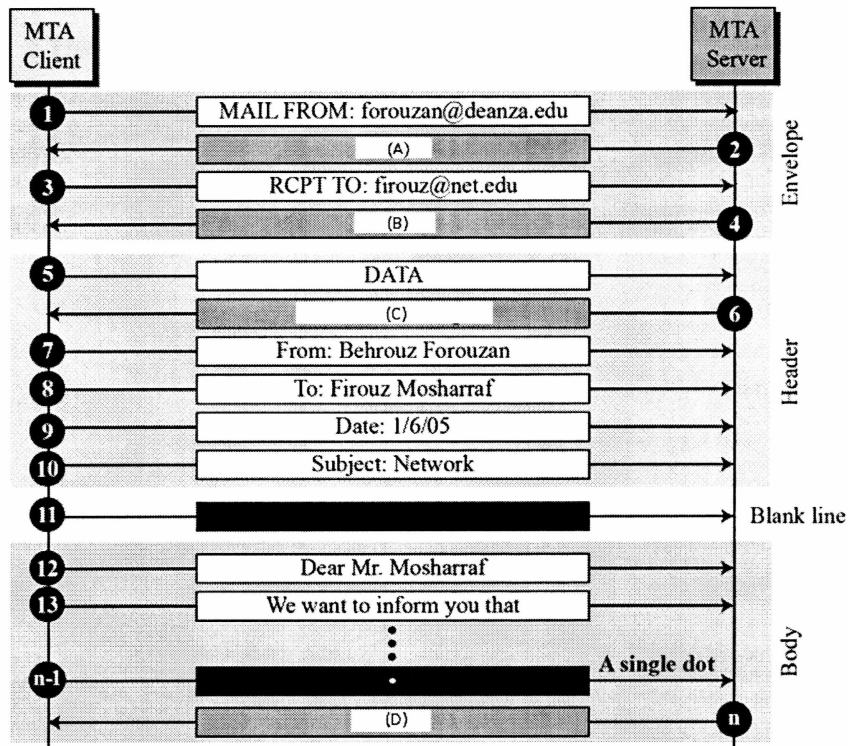
Table 1. Commands

| Keyword   | Argument(s)           | Keyword   | Argument(s)        |
|-----------|-----------------------|-----------|--------------------|
| HELO      | Sender's host name    | NOOP      |                    |
| MAIL FROM | Sender of the message | TURN      |                    |
| RCPT TO   | Intended recipient    | EXPN      | Mailing list       |
| DATA      | Body of the mail      | HELP      | Command name       |
| QUIT      |                       | SEND FROM | Intended recipient |
| RSET      |                       | SMOL FROM | Intended recipient |
| VERFY     | Name of recipient     | SMAL FROM | Intended recipient |

Table 2 Responses

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| Code                                       | Description  |
|--|--|
| <b>Positive Completion Reply</b>           |  |
| 211  | System status or help reply                          |
| 214  | Help message   |
| 220  | Service ready  |
| 221  | Service closing transmission channel                 |
| 250  | Request command completed                            |
| 251  | User not local; the message will be forwarded        |
| <b>Positive Intermediate Reply</b>         |  |
| 354  | Start mail input                                     |
| <b>Transient Negative Completion Reply</b> |  |
| 421  | Service not available                                |
| 450  | Mailbox not available                                |
| 451  | Command aborted: local error                         |
| 452  | Command aborted; insufficient storage                |
| <b>Permanent Negative Completion Reply</b> |  |
| 500  | Syntax error; unrecognized command                   |
| 501  | Syntax error in parameters or arguments              |
| 502  | Command not implemented                              |
| 503  | Bad sequence of commands                             |
| 504  | Command temporarily not implemented                  |
| 550  | Command is not executed; mailbox unavailable         |
| 551  | User not local                                       |
| 552  | Requested action aborted; exceeded storage location  |
| 553  | Requested action not taken; mailbox name not allowed |
| 554  | Transaction failed                                   |



Answer



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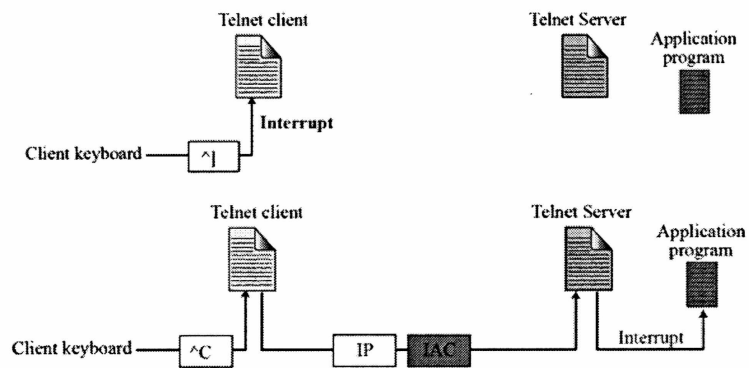
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6. Telnet client is connecting to Telnet Server to run an application program. There are two type of interrupts on Telnet, as shown below. Please describe the following questions:
- a. What each one is so called, how each one works, (5 marks)
  - b. What they differ to each other. (5 marks)



Answer

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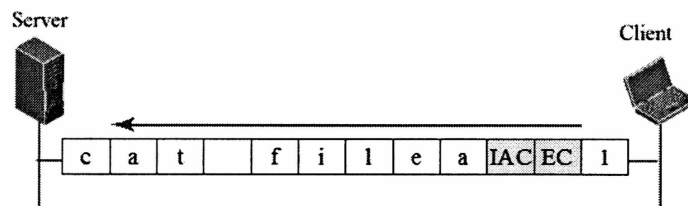
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7. Telnet client just established a connection to Telnet server. a) Client is sending some data, from keyboard input, to server, as shown in (a). Table 3 show some NVT control characters. Please show what information will be displayed on the Client terminal. (5 marks)



(a) Client sends data to server

Table 3 some NVT control characters

| Character | Decimal | Binary   | Meaning                                   |
|-----------|---------|----------|---|
| EOF       | 236     | 11101100 | End of file                               |
| EOR       | 239     | 11101111 | End of record                             |
| SE        | 240     | 11110000 | Suboption end                             |
| NOP       | 241     | 11110001 | No operation                              |
| DM        | 242     | 11110010 | Data mark                                 |
| BRK       | 243     | 11110011 | Break                                     |
| IP        | 244     | 11110100 | Interrupt process                         |
| AO        | 245     | 11110101 | Abort output                              |
| AYT       | 246     | 11110110 | Are you there?                            |
| EC        | 247     | 11110111 | Erase character                           |
| EL        | 248     | 11111000 | Erase line                                |
| GA        | 249     | 11111001 | Go ahead                                  |
| SB        | 250     | 11111010 | Suboption begin                           |
| WILL      | 251     | 11111011 | Agreement to enable option                |
| WONT      | 252     | 11111100 | Refusal to enable option                  |
| DO        | 253     | 11111101 | Approval to option request                |
| DONT      | 254     | 11111110 | Denial of option request                  |
| IAC       | 255     | 11111111 | Interpret (the next character) as control |

Answer

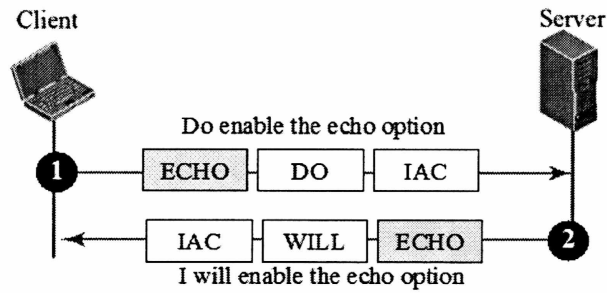
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B) Some time later, Telnet client send some control information, as shown in (b), then repeat all inputs again, as shown in (a). Please show what information will be displayed on the Client terminal. (5 marks)



(b) Client send some control options to server

Answer

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8. Why do we need DNS (Domain Name Systems), at least 5 items are needed? (5 marks)

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9. Please describe how DNS works when you type http://www.google.com into your web browser and hit enter. The following components need to be mentioned: your PC, ISP, Root Server, .com Server. Please give the answer is each step clearly, you may draw a diagram. (5 marks)

Answer

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10. A DNS query may be either a non-recursive query or a recursive query. Please describe how a non-recursive query and recursive query work.(5 marks)

Answer

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