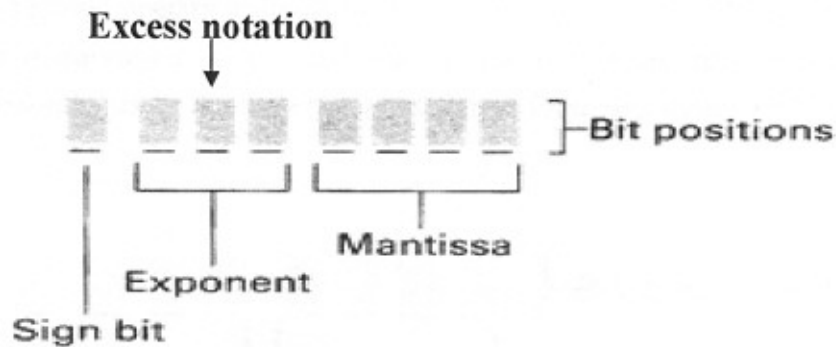


Problem 1. Multiple Choices (20 %)

a. What is the correct decimal value if $\frac{11101010}{2.5}$ is presented by using floating-point notation as following figure? (5 %)



- (1) 2.5
- ✓ (2) -2.5
- (3) 0.3125
- (4) -0.3125

b. Select the correct unit sort in descending order. (5 %)

- 4
- (1) 1 KB > 1 Kb > 1 Bit > 1 Byte
 - (2) 1 Kb > 1 KB > 1 Bit > 1 Byte
 - (3) 1 Kb > 1 KB > 1 Byte > 1 Bit
 - ✓ (4) 1 KB > 1 Kb > 1 Byte > 1 Bit

4 c. When the time slice of a process is over, the dispatcher will do four operations in order. What is the order? (5%)

- I. Load the state of the process.
- II. Start the next time slice.
- III. Select another process from the process table.
- IV. Save the current state of the process.

- (1) III. I. IV. II.
- ✓ (2) II. III. I. IV.
- (3) III. IV. I. II.
- ✓ (4) IV. III. I. II.

4 d. What is the feature of scheduler? (5 %)

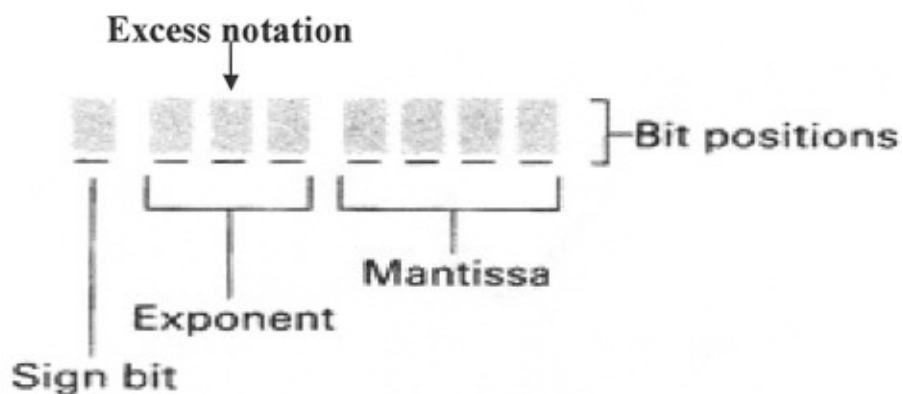
- (1) Release the resources of a process
- (2) Allocate time slice
- (3) Allocate resources
- (4) Select jobs to do

Chapter 1. Data Storage

Problem 2. (25 %)

① ②

a. Which addition operation should be done first for $2 + 0.125 + 0.125$, in order to get the minimal truncation error? How much is the truncation error? Present the final addition result by using floating-point notation as following figure. (10 %)



$$2 \Rightarrow 10.00$$

$$0.125 \Rightarrow 00.001$$

$$\therefore \text{② 要先做} \Rightarrow 00.01$$

$$\text{①: } \begin{array}{ccc} 0 & 110 & 1000 \end{array} + \begin{array}{ccc} 0 & 110 & 0001 \end{array} = \begin{array}{ccc} 0 & 110 & 1001 \end{array}$$

truncation error = 0

\downarrow
 $= 2.25$

1

b. What would be the hexadecimal representation of the largest memory address in a memory consisting of 10MB if each cell had a one-byte capacity? (5%)

$$\begin{aligned} 10 \text{ MB} &= 10 \times 1024 \text{ KB} = 1024^2 \times 10 \text{ Bytes} \\ &= 10485760 \text{ Bytes} \end{aligned}$$

∴ 範圍為 cell 0 ~ cell 10485759 \Rightarrow 9FFFFFFF

c. What is the transfer rate (byte per second) and rotation delay (latency time) for a disk with 512 sectors per track, 512 bytes per sectors, and 7200 revolutions per minute? (10%)

$$7200 \text{ 轉/min} = 120 \text{ 轉/sec}$$

$$\text{傳輸速度 (bps)} = 512 \times 512 \times 120 = 31457280 \text{ (bps)}$$

$$\text{latency time (sec)} = \frac{1}{120} \times \frac{1}{2} = \frac{1}{240} \text{ (sec)}$$

Chapter 2. Data Manipulation

Problem 3. (20 %)

a. Identify both the mask and the logical operation needed to accomplish each of the following objectives:

(a) Complement a pattern of eight bits. (5 %)

(b) A pattern of eight bits will not be changed after doing the logical operation. (5 %)

(a)
10101010
NOT
01010101

(b)
11111111
OR
11111111

b. In each of the following case, write a short program in the machine language described in the following figure to perform the requested activities. Assume that each of your programs is placed in memory starting at address 00.

(a) Move the value at memory location 6C to memory location A2. (5 %)

(b) Multiply the integer at memory location 69 by 4 and then store the result to memory location 69. (5 %)

- | | |
|-------|--|
| 1 RXY | LOAD the register R with the bit pattern found in the memory cell whose address is XY. |
| 2 RXY | LOAD the register R with the bit pattern XY. |
| 3 RXY | STORE the bit pattern found in register R in the memory cell whose address is XY. |
| C 000 | HALT execution. |
| D R0X | ARITHMETIC SHIFT the bit pattern in register R one bit to the left X times. Each time the sign bit will not be changed. |
| E R0X | ARITHMETIC SHIFT the bit pattern in register R one bit to the right X times. Each time the sign bit will not be changed. |

0010.
1000

(a)
106C: Load the register 0 with the bit pattern at address 6C
30A2: Store the register 0 at address A2
C000: Halt.

(b)
1069: Load the register 0 with the bit pattern at address 69
E002: Arithmetic shift the register 0 one bit to the right 2 times. ($\because 4 = 2^2$)
3069: Store the register 0 at address 69
C000: Halt.

Chapter 3. Operating Systems

Problem 4. (10 %)

a. Why can the time-sharing system make people think there is no interruption when they use the system? Please explain the reason. (5 %)

由於系統在處理各個程序時，將時間分割成極小的碎片，每執行完一個 time-slice，就切換到另一個工作執行，所以會產生系統同時處理多個程序的錯覺，而不會有滯礙的感覺。

b. Please briefly explain what the deadlock is. (5 %)

當系統遇到以下三種情形時，所產生的系統停頓的狀況：

- 2
1. 當不能共用的資源被要求時。
 2. 當兩邊的 ^{processes} 程序都要求兩個以上同樣的資源。
 3. 已經分配好的資源無法有效地被取用

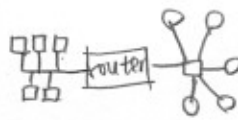
✓

Chapter 4. Networking and the Internet

Problem 5. (25 %)

a. Identify the difference between the bridge and router. (5 %)

bridge: build the connection between compatible networks.
router: build the connection between incompatible networks.



b. Briefly explain the pro and com between TCP and UDP. (5 %)

TCP: 傳輸封包後會確認接收端有完整收到

優點: 資料傳遞有保障, 不易遺失
可作為重要文件的傳遞方式

UDP: 不會確認, 丟出封包後即不予理會.

優點: 但由於其特性, 傳遞訊息較快速
可用於影音資料的即時傳送

c. What are the differences between XML and HTML. (5 %)

HTML: 記錄 tag 裡的內容。

XML: 記錄 tag 的屬性一類。

d. Identify the matching component of the following URL.

<http://www.cs.nthu.edu.tw/~yishin/Courses/CS1356/CS135601.htm>

Fill in the blank. (10%)

(1) Mnemonic name : www.cs.nthu.edu.tw

(2) Directory path : ~yishin/courses/cs1356/

(3) Document name : CS1356

(4) Protocol : HTTP