

Data Structure Assignment 1

Paper Homework

(Textbook p.41)

1. Show that the following statements are correct:
(a) $5n^2 - 6n = \Theta(n^2)$ ✓

(d) $\sum_{i=1}^n i^2 = \Theta(n^3)$

(g) $n^3 + 10^6 n^2 = \Theta(n^3)$

★ (h) $6n^3 / (\log n + 1) = O(n^3)$ ✓

2. Show that the following statements are incorrect:

(b) $n^2 \log n = \Theta(n^2)$ ✓

(e) $3^n = O(2^n)$

6. Determine the worst-case complexity of Program 1.22.

```
void transpose(int a[][MAX_SIZE])
{
    int i, j, temp;
    for (i = 0; i < MAX_SIZE-1; i++)
        for (j = i+1; j < MAX_SIZE; j++)
            SWAP(a[i][j], a[j][i], temp);
}
```

Program 1.22: Matrix transposition function

General Information:

- Deadline : 2016/10/7 (Please submit to TA after class)
- Late homework will not be accepted.
- Please write on A4 papers.
- Notice : You won't get any point if you only write the answer, please list your process and reason.
- Any copies will be scored as zero. Do not plagiarize

Data Structure Assignment 1

Programming Homework1

(Textbook p.17 Exercises 7)

The factorial function $n!$ has value 1 when $n < 1$ and value $n*(n-1)!$ when $n > 1$. Write both a recursive and an iterative C function to compute $n!$.

Input:

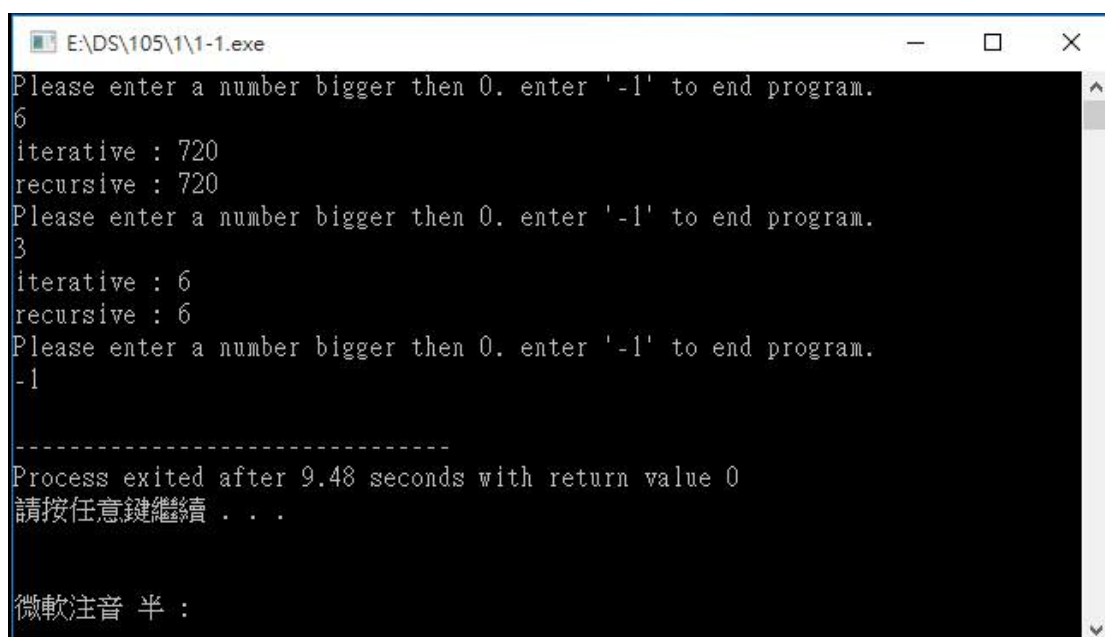
5

Output:

Recursive: 120

Iterative: 120

如果輸入-1，直接結束程式



```
E:\DS\105\1\1-1.exe
Please enter a number bigger than 0. enter '-1' to end program.
6
iterative : 720
recursive : 720
Please enter a number bigger than 0. enter '-1' to end program.
3
iterative : 6
recursive : 6
Please enter a number bigger than 0. enter '-1' to end program.
-1

-----
Process exited after 9.48 seconds with return value 0
請按任意鍵繼續 . . .

微軟注音 半 :
```

Data Structure Assignment 1

Programming Homework2

(Textbook p.18 Exercises 12)

If S is a set of n elements the power set of S is the set of all possible subsets of S . For example, if $S = \{a, b, c\}$, then $\text{powerset}(S) = \{ \{ \}, \{a\}, \{b\}, \{c\}, \{a, b\}, \{a, c\}, \{b, c\}, \{a, b, c\} \}$. Write a recursive function to compute $\text{powerset}(S)$.

Input:

$\{a, b, c\}$

Output:

$\{ \}$

$\{a\}$

$\{b\}$

$\{c\}$

$\{a, b\}$

$\{a, c\}$

$\{b, c\}$

$\{a, b, c\}$

Powerset 裡總共有 8 個集合

General Information:

- Deadline : 2016/10/7 23:55.
- Upload your assignment to Moodle system.
- Upload file format: Student-Id_Name.rar , Ex.P76991094_王小明.rar
- Your file should consist of the following items: **Source Code & Readme file**
(Program description)
- Late homework will not be accepted.
- Any copies will be scored as zero. Do not plagiarize