Data Structure Assignment 1

Paper Homework

(Textbook p.41)

1. Show that the following statements are correct:

   (b) $\mathrm{n!} = \mathrm{O}(n^n)$

   (e) $\sum_{i=0}^{n} i^3 = \Theta(n^4)$

   (h) $6n^3/(\log n + 1) = \mathrm{O}(n^3)$

   (k) $10n^3 + 15n^4 + 100n^2 2^n = \mathrm{O}(n^2 2^n)$

2. Show that the following statements are incorrect:

   (b)$n^2 \log n = \Theta(n^2)$

   (d)$n^3 2^n + 6n^2 3^n = \mathrm{O}(n^2 2^n)$

General Information:

- Deadline：2017/10/13 (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 Homework 1

(Textbook p.17 Exercises 9)

9. Write a recursive function to compute a binomial coefficient.

A binomial coefficients (n, k) can be defined as the coefficient of x^k in the expansion of $(1+x)^n$.

Input:

(n k)

4 2

Output:

6

Input:

8 4

Output:

70

Data Structure Assignment 1

Programming Homework 2

(Textbook p.17 Exercises 11)

11. [Towers of Hanoi] There are three towers and 64 disks of different diameters placed on the first tower. The disks are in order of increasing diameter as one scans up the tower. Monks were reputedly supposed to move the disk from tower 1 to tower 3 obeying the rules:

(a) Only one disk can be moved at any time.

(b) No disk can be placed on top of a disk with a smaller diameter.

Write a recursive function that prints out the sequence of moves needed to accomplish this task.

Bonus: List all steps 10%

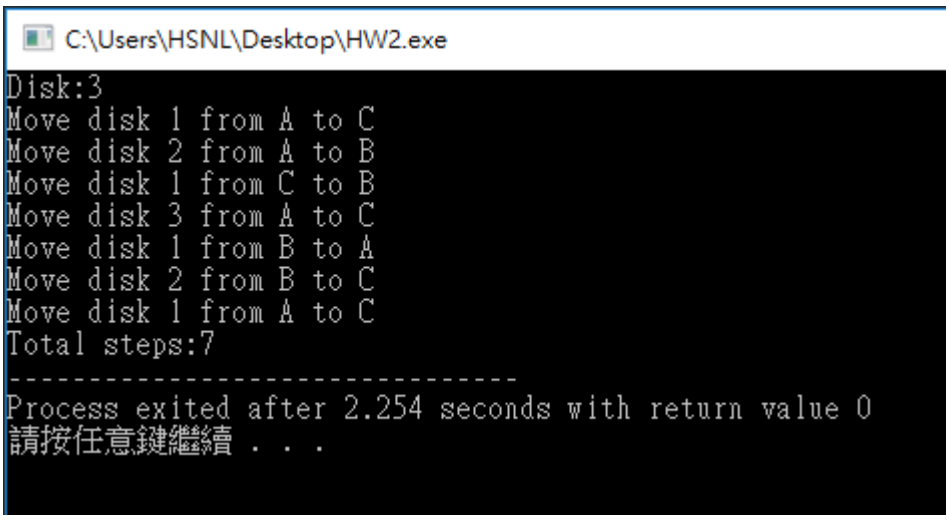
Input:

(disks number 3~64)

3

Output:

bonus



General Information:

- Deadline：2017/10/20 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