Instructor: Jinkyu Lee

Homework 3 (100 points): 2015/3/31

Due date: 2015/4/11 23:59 (submission to icampus)

Problem 3-1: Multiplication

- For given positive integer values a and n, write an algorithm that calculates b=a^y with the minimum number of multiplications. To this end,

- For given y < 10000, find the array x, such that x[n]=y.

    ■ x[0]=1, x[1]=1, x[2]=3

    ■ If n>=3, x[n] = x[n1] + x[n2] (0 <= n1, n2 < n, n1 != n2)

- You will get more points with smaller n.

- Sample Result

    What is y? 10
    1 1 3 4 7 10

    What is y? 5
    1 1 3 2 5

    What is y? 9
    1 1 3 4 7 8 9

In your code

- You need to implement cal_x() function; do not modify main(). You are allowed to modify contents marked. You may add additional functions within the marked part.

- TA will copy your code "from here" "to here" to the template code; other parts will not be evaluated.

- Insert comments to contents you created or modified.

- TA will test your program in http://ideone.com/

In your report

- Explain your solution idea (algorithm) and code.

Problem 3-2: Rotating a String

- We are trying to rotate a string P times (to the left). For example, if we rotate a string "ABCDEFG" 3 times, the resulting string is "DEFGABC". For a given string and P, develop an algorithm to rotate a string only using multiple swaps of two characters so as to minimize the number of swaps. (You can only swap two characters in the string).

- For example, if a string is "ABC" and P=1, then the minimum number of swaps is 2. (ABC -> CBA -> BCA).

- The length of P is less than 1000.

- Sample Result

What is p? 1
What is String? ABC
SWAP 0 and 2
Current String: CBA
SWAP 0 and 1
Current String: BCA
n=2

In your code

- You need to implement cal_S() function; do not modify main(). You are allowed to modify contents marked.   You may add additional functions within the marked part.

- TA will copy your code "from here" "to here" to the template code; other parts will not be evaluated.

- Insert comments to contents you created or modified.

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In your report

- Explain your solution idea (algorithm) and code.