Introduction to Computers and Programming LAB-9 2014/11/26

- ✧ Your output must be in our sample output format.
- ✧ In **Problem 1~5**, please wrap each of your code inside main(){} with while(1){}

1. Finish the lab_9_1_sample.c program in which you will enter two array elements and its size. The program will calculate the inner product of this two array. Please write your code to replace the region of the comment

```
Please input array size: 3
Please input array A: 1 2 3
Please input array B: 5 6 7
Inner product of this two array is : 38.000000
```

2. Please write a program that uses the BUBBLE SORT to sort n numbers you input. (n ≥ 100) Following is the pseudo code of the BUBBLE SORT.

```
function bubbleSort(list)
    for i=0 to list.length-1
        for j=0 to list.lenght-i-1
            if list[j] > list[j+1]
                swap(list[j], list[j+1])
            end if
        end for
    end for
end function
```

```
Input the size: 5
Before sort: 3 6 5 8 7
After sort: 3 5 6 7 8
請按任意鍵繼續 . . .
```

3. Please write a program to read in a non-negative integer ***n***, and print out the ***n***th number of the Fibonacci series F_n with a recursive function.
   The recurrence relation of Fibonacci numbers is $F_n = F_{n-1} + F_{n-2}$

```
n : 0
0
n : 1
1
n : 2
1
n : 3
2
n : 5
5
```

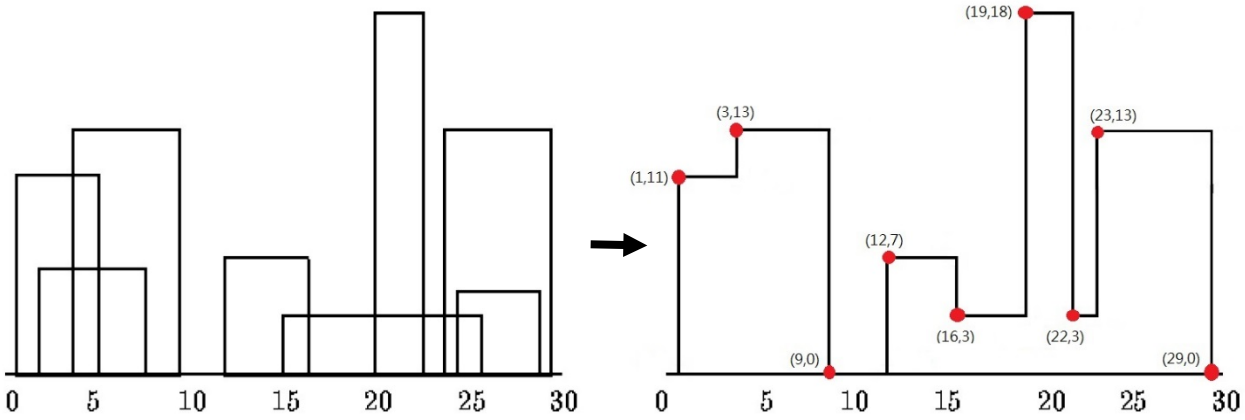
4. (Bonus) Write a function to determine the number of T-junction in a city. You will be given a city map as a 100 by 100 integer array. The element in the array will be 1 or 0. An element is a T-junction, if it is 1, and EXACTLY three of its neighbors are also 1. In right graph(4*4 sample array), blue ones are T-junctions. We've given you the code (lab_9_4_sample.c) with I/O already, you can input the filename directly, if code and input file is in the same directory.
You SHOULD ONLY modify the *T_junction* function.

1	1	1	1
1	0	1	0
1	1	0	1
1	1	1	1

```
Input filename: 1.in
Number of T-junction is 0
請按任意鍵繼續 . . .
Input filename: 2.in
Number of T-junction is 392
請按任意鍵繼續 . . .
Input filename: 3.in
Number of T-junction is 1160
請按任意鍵繼續 . . .
Input filename: 4.in
Number of T-junction is 0
請按任意鍵繼續 . . .
```

5. (Bonus) You have to design a program to draw skyline of a city given the locations of the buildings in the city. All buildings are rectangular in shape and dimensional. A building is specified by an ordered triple (L_i, H_i, R_i) where L_i and R_i are left and right coordinates, respectively, of building i and H_i is the height of the building.
For example, in the diagram below buildings are shown on the left with triples
$(1,11,5),(2,6,7),(3,13,9),(12,7,16),(14,3,25),(19,18,22),(23,13,29),(24,4,28)$
The skyline, shown on the right, is represented by the sequence:
$$(1,11,3,13,9,0,12,7,16,3,19,18,22,3,23,13,29,0)$$

The output should consist of the vector that describes the skyline as shown in the example above. In the skyline vector (v_1, v_2, v_3, . . . , v_{n-2}, v_{n-1}, v_n), the v_i such that i is an even number represent a horizontal line (height). The v_i such that i is an odd number represent a vertical line (x-coordinate). The skyline vector should represent the "path" taken, for example, by a bug starting at the minimum x-coordinate and traveling horizontally and vertically over all the lines that define the skyline. Thus the last entry in all skyline vectors will be a 0.




```
Please input a sequence of building triples (end of 0 0 0):
1 11 5
2 6 7
3 13 9
12 7 16
14 3 25
19 18 22
23 13 29
24 4 28
0 0 0
The skyline is :
1 11 3 13 9 0 12 7 16 3 19 18 22 3 23 13 29 0
請按任意鍵繼續 . . .
```