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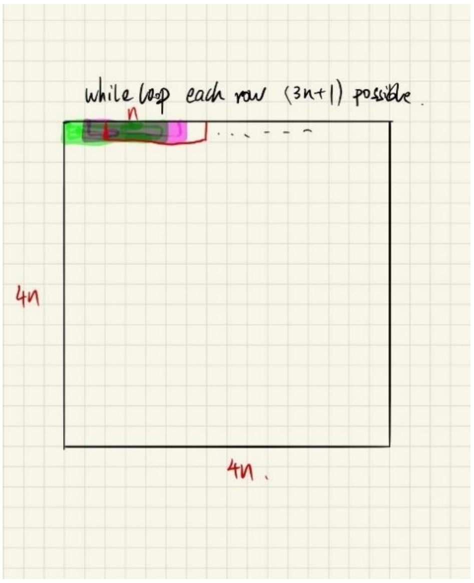
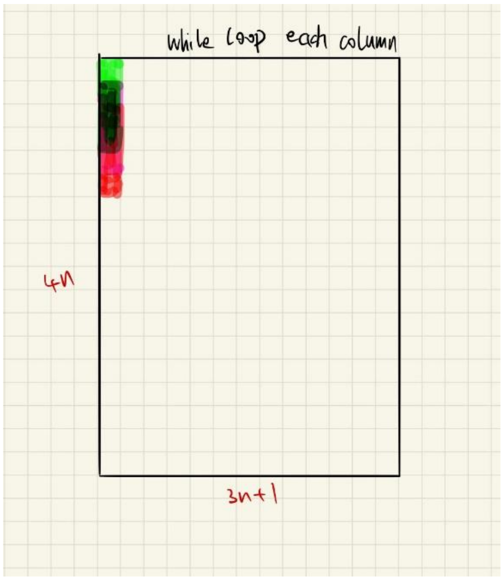
Question4

First, I use a two-dimensional array to store how many apples there are on each tree. Then we will loop through each row, each row has 3n+1 possibilities, we will use a loop to calculate the total number of apples in n trees. Store each sum into an array of size (3n+1)*4n, which represents a matrix of (3n+1)*4n. The time complexity is O(n^2). We will use the similar method above to accumulate the apples of n trees in each column of this new matrix, and we will get a (3n+1)^2 matrix stored in a new array, this array contains All possible combinations. Finally we merge sort this array, we will get a square which contains the largest total number of apples. The time complexity of the above algorithm is O(n^2).





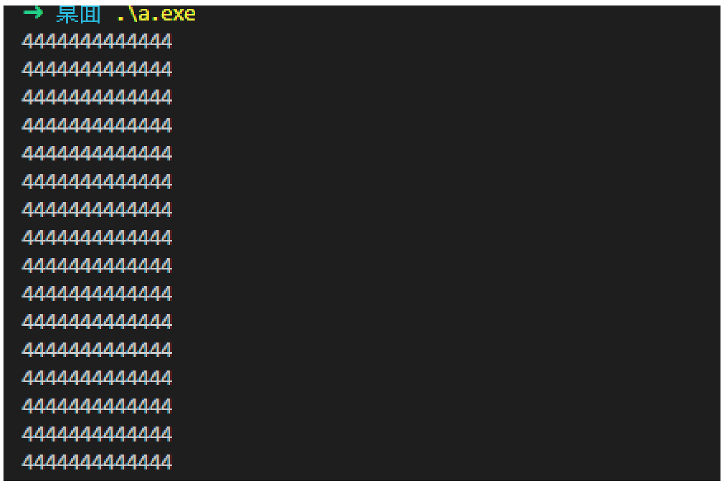
Sample code (C file)

Generate the origin array all value are 1.

Suppose n=4，then we will get the size of an array is 13*16,like the output.

```c
#include<stdio.h>
int main(void) {
    //set the value of n is 4
    int n = 4;
    int array[4*n][4*n];
    // generate an array
    // all value is 1
    for(int i = 0; i < 4*n; i++) {
        for(int j = 0; j < 4*n; j++) {
            array[i][j] = 1;
        }
    }
    //size (3n+1)*4n
    int A[12*n*n+4*n];
    int sum = 0;
    int origin = n;
    int i = 0;
    int j = 0;
    int z = 0;
    int tmp;
    while(i < 4*n) {
        sum = 0;
        tmp = j;
        while(j < n) {
            sum = sum + array[i][j];
            j++;
        }
        n++;
        if(n > 4*origin) {
            i++;
            n = origin;
        }
        A[z] = sum;
        z++;
        if(j > 3*n+1) j = 0;
        else j = tmp+1;
    }
    // test case
    // print that array like square
    i = 0;
    int k = 1;
    while(i < (3*n+1)*4*n) {
        printf("%d",A[i]);
        if(k == 3*n+1) {
            k = 0;
            printf("\n");
        }
        k++;
        i++;
    }
    return 0;
}
```

The program output:



```
→ 桌面 .\a.exe
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