

Homework 2

Pair Parentheses (25%)

Write a program to check if a given string of "parentheses" is balanced where the open and close symbols are given by inputs. Output "YES" if balanced, "NO" otherwise.

Example Input

```
2  
(  
{  
( ( { { } } ) )
```

Example Output

YES

Example Input

```
2  
()  
{ }  
( { ) }
```

Example Output

NO

Find the Shortest Subarray (25%)

Given an array of integers and a target value T , find length of the shortest subarray whose sum is greater than or equal to T .

Example Input

```
6 13  
1 3 5 6 7 9
```


Example Output

The shortest subarray is [7, 9].

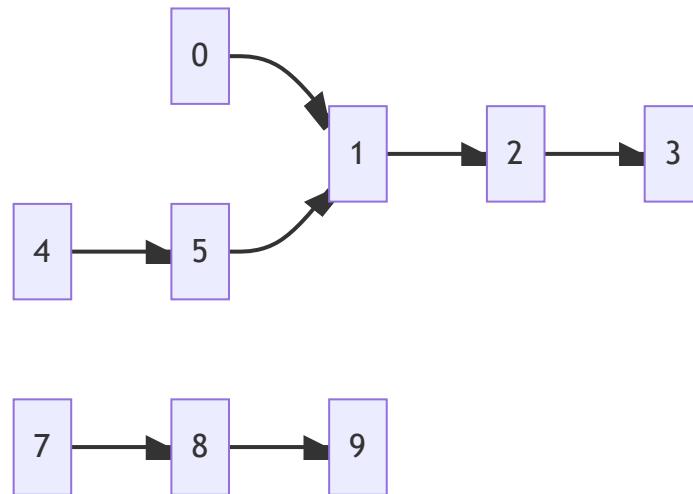
2

Count List Groups (25%)

Given some linked lists, write a function to count how many non-intersected linked list groups formed by these lists.

Count List Groups

For example, there are 3 lists in graph, but only 2 groups ($\{0, 4\}$, $\{7\}$).



API

```
// Definition for singly-linked list.
struct ListNode
{
    int id;
    ListNode *next;
    ListNode(int i) : id(i), next(NULL) {}
};

int count_list_groups(int n, std::vector<ListNode *> &lists);
```

Find the k-th Smallest Number (25%)

Given an array of integers. Write a program to support 2 operations:

- i X: add X to array.
- q K: print K-th smallest number.

Example Input

First line is array size N and number of operation Q.
Second line has N integers.
Following Q lines are operations.

```
3 3  
1 3 5  
q 3  
i 4  
q 3
```

Example Output

5
4