Agenda

1. Solve the 4 LC Problems
2. Stock span
3. Largest area histogram
4. Celebrity Problem
5. infix evaluation and conversion

Balanced Bracket-

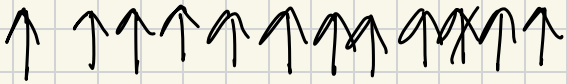
→ '()' '{}' '[]'

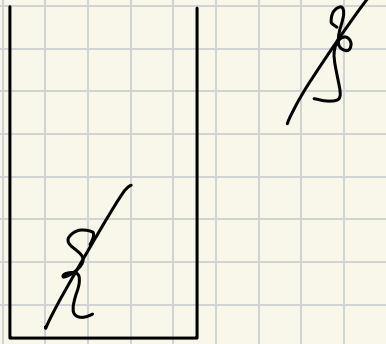
- valid exp
  - each bracket that is opened, should be closed by same type of bracket
  - they should follow correct order.

eg: "({)}" ✗ not valid

"({})" ✓ valid

exp = " { ( ) [ ] { ([ ]) } } "





Stack

```
Stack<Character> st = new Stack<>();

for (ch char -> str)
{
    if (ch == '(' or ch == '{' or ch == '[')
        st.push(ch);
    else
        if (st.size() == 0) return false;
        else if (ch == ')' and st.peek() == '(')
            st.pop();
        else if (ch == '}' and st.peek() == '{')
            st.pop();
        else if (ch == ']' and st.peek() == '[')
            st.pop();
        else return false;
}
if (st.size() != 0) return false;

return true;
```

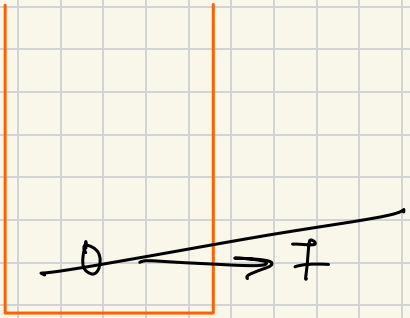
TC : O(N)
SC : O(N)

Previous Greater Element {Next greater element on left}

int[] arr = { 7 , 4 , 6 , 2 , 3 }

0 1 2 3 4

{ -1 7 7 6 6 }

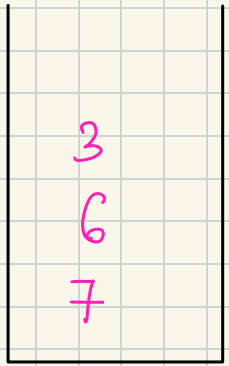


st { people looking for ngel }

int[] arr = { 7 , 4 , 6 , 2 , 3 }

0 1 2 3 4

{ -1 7 7 6 6 }

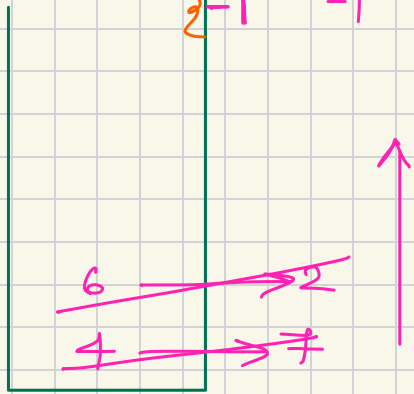


stack { potential vgel }

next greater element on right.

	0	1	2	3	4	5	6
int[] arr =	3	6	5	4	7	1	2
	6	7	7	7	-1	2	-1
	-1	-1	6	5	-1	7	7

→ ugd



stack {people looking for uger}

Stock Span Problem

```
                 0    1   2   3   4   5   6
int[] arr = { 100, 80, 60, 70, 60, 75, 85 }
              1    1   1   2   1   4   6
```

span : no. of consecutive days inc. today, where stock price was less than equal to today.

Brute force

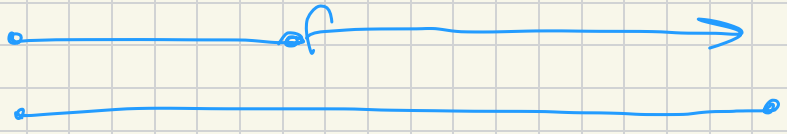
TC : O(N²)
SC : O(1)

Nested loop

int[] arr = { 100, 80, 60, 70, 60, 75, 85 }

0 1 2 3 4 5 6

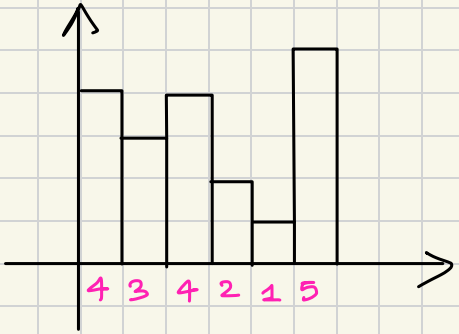
ngeli = { -1, 0, 1, 1, 3, 1, 0 }



5 - 1 = 4

Largest area histogram

- find rectangle in this histogram with max area

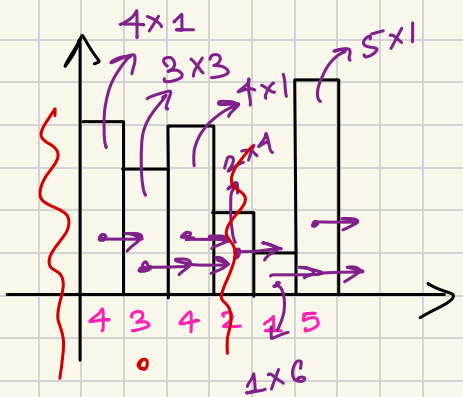


int[] arr = {4, 3, 4, 2, 1, 5}

Brute force.

TC : O(N²)
SC : O(1)

```
maxArea = 0;
for (int i=0; i<n; i++)
{   int minH = arr[i];
    for (int j = i+1; j<n; j++) {
        minH = min(minH, arr[j]);
        maxArea = max(maxArea, minH * (j - i + 1));
    }
}
```



maxArea = ~~8~~ ~~9~~ 9

next smaller on right → Right Boundary
next smaller on left → Left Boundary

	0	1	2	3	4	5
	4	3	4	2	1	5
nseri =	1	3	3	4	6	6
nseli =	-1	-1	1	-1	-1	4

width = nseri − nseli − 1

Celebrity Problem

n- people invited

- find celeb

- person who doesn't know anyone
- is known everyone.

```
int[][] arr =
```

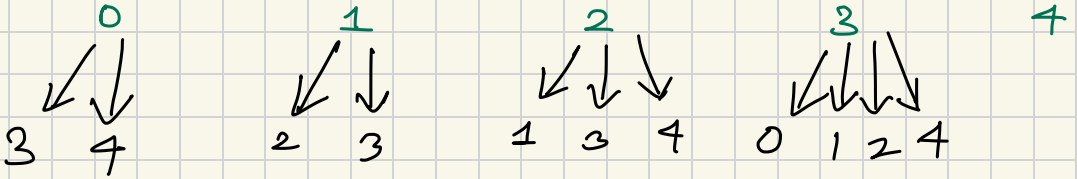
	0	1	2	3	4
0	1	0	0	1	1
→ 1	0	1	1	1	0
→ 2	0	1	1	1	1
→ 3	1	1	1	1	1
→ 4	0	0	0	0	1

arr[i][j] = 0

i doesn't know j

arr[i][j] = 1

i knows j



can there be more than one celeb?

Brute force

TC: O(N²)

SC: O(1)

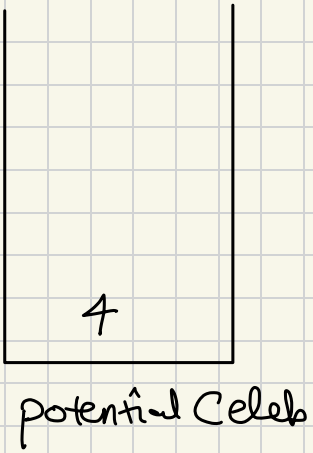
int[][] arr =

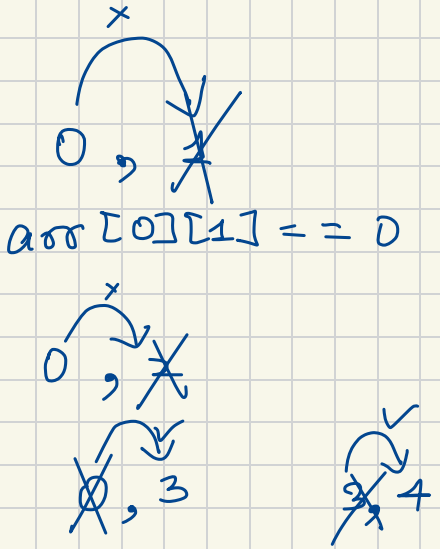
	0	1	2	3	4
0	1	0	0	1	1
1	0	1	1	1	0
2	0	1	1	1	1
3	1	1	1	1	1
4	0	0	0	0	1

TC : O(N) + O(N) ≈ O(N)

SC : O(N)

elimination method





H.W.

- reverse integer