

## Data Structures

### Assignment 3: Input/Output Format

#### P1,P2

For P1, P2, there are multiple test cases.

Each line has one test case, containing unique space separated integers.

You have to scan line by line till EOF, since number of test cases is **NOT** in input.

Make you properly free memory from the BST after each test case, since input will be very large.

#### Constraints:

Max Elements: 1000000

#### Sample Input:

```
10 15 5 7 4 3 12 6 17
1 3 98 43 2 85
```

#### Sample Output(P1):

```
3
6
4
5
```

#### Sample Output(P2):

```
10 5 4 3
10 5 7 6
10 15 12
10 15 17
1 3 2
1 3 98 43 85
```

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#### P5,P6

There are multiple test cases.

Each line has one test case, containing **space separated** tokens.

You have to scan line by line till EOF, since number of test cases is **NOT** in input.

For P5, a token can be either an operator: {/, \*, +, -} or an integer.

The integer can be more than one digit, 0 or negative. Ex: -20, 0, 19, 2 -4, etc..

Note that there will not be any space between the negative sign and value of a negative integer – you have to treat negative integers in the same way as positive integers – keep them as they are in the output. Input will be a valid postfix expression.

For P6, '(' and ')' are also valid tokens, along with the operators and integers. They are also space separated from other tokens. Also input, will be a valid infix expression with balanced parenthesis.

In your output, it is okay if there are spaces at the end, or multiple spaces between tokens. **But there should be at least one space between two tokens in the output.**

#### Constraints:

Max Number of Operators (for P6, without including parenthesis): 1000

Max Input Expression Length: 5000

All Integers will be in the range [-20,20]

**Sample Input (P5):**

3 5 +  
1 4 + 2 + -8 14 \* 17 \* +

**Sample Output (P5):**

+ 3 5  
+ + + 1 4 2 \* \* -8 14 17

**Sample Input (P6):**

0  
(((0 - (0))))  
3 + (5 \* 5)  
((1 + ((2 + 3) - (((4) \* (6 / (7 / 5)) + 1)) \* (9 + -1 - (2 - -6)))) + (1 / 2) / 3)

**Sample Output (P6):**

0  
0 - 0  
3 + 5 \* 5  
1 + 2 + 3 - (4 \* 6 / (7 / 5) + 1) \* (9 + -1 - (2 - -6)) + 1 / 2 / 3

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**P7**

There are multiple test cases. The first line will be the number of test cases.

Each test case will start with two space separated integers M and N. The size of the matrix is MxN. Then M lines follow. The ith line contains the number of 0s in row i, followed by the list of column numbers of 0s present in the ith row (zero-indexed).

Finally, the co-ordinates of the point of interest will be present on a separate line, space separated (zero-indexed).

You have to print the co-ordinates of the nearest 0 to the point of interest (zero-indexed). Distance between two points is defined as the minimum number of steps requires to reach one point from another. A step is defined as a move along one of the 8 directions (fewer possibilities with boundary points).

If there are multiple solutions, follow these 2 rules to resolve:

1. Choose the solution with the highest row number
2. If there are multiple solution in the highest row, choose the solution with the highest column number

**Constraints:**

$1 \leq M, N \leq 100000$

$0 \leq \text{No. Of Zeros} \leq \min(2000000, M * N - 1)$

**Sample Input:**

1  
5 4  
0  
0  
0  
1 0  
1 2  
1 2

**Sample Output:**

3 0

---

P8

Format is specified in the assignment.

**Constraints:**

$1 \leq a, b \leq 100000$

$1 \leq c \leq 100000$

**Sample Input:**

2

5

2

3

2

3

4

**Sample Output:**

2

-1