**SDE BATCH PROGRAMMING ASSIGNMENT**

Problem-1

There are n children in a school with their roll numbers from 1 to n. Each of those children has x number of storybooks and y number of toys. Now the school admin has decided to give toy cars to these children but due to a shortage of toy cars, the school has decided to arrange the children in a specific order

1. Children with fewer toys are preferred first.
2. In case the children have the same number of toys, children with more number of storybooks will get their chances first.
3. In case the children have the same number of toys and the same number of storybooks, children with higher roll number will get their chances first

Your task is to find out the order of the children based on which they are going to receive their toys.

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## Input:

- First line will contain $N$, number of children.
- Each of the following $N$ lines contains two integers $X,Y$. The roll number of the children is the corresponding line number.

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## Output:

In a single line print N space-separated roll numbers of the children in the order in which they are going to get their toys.

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## Constraints

- $1 \leq N \leq 4 * 10^5 1 \leq N \leq 4 * 10^5$
- $2 \leq X,Y \leq 100 2 \leq X,Y \leq 100$

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## Sample Input:

5

56 43

8 27

32 27

32 27

35 24

**Sample Output:**

5 4 3 2 1

Problem-2

# Find k most frequent in linear time

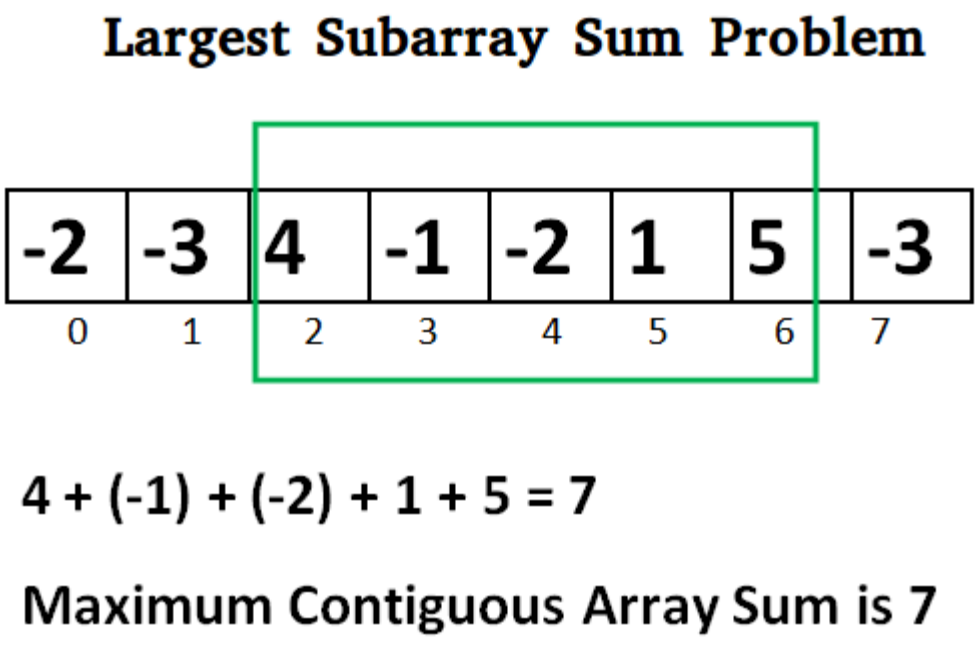
Given an array of integers, we need to print k most frequent elements. If there is a tie, we need to prefer the elements whose first appearance is first.

**Examples:**
***Input :*** *arr[] = {10, 5, 20, 5, 10, 10, 30}, k = 2*
***Output :*** *10 5*
***Input :*** *arr[] = {7, 7, 6, 6, 6, 7, 5, 4, 4, 10, 5}, k = 3*
***Output :*** *7 6 5*
***Explanation :***
*In this example, 7 and 6 have same frequencies. We print 7 first because first appearance of 7 is first. Similarly, 5 and 4 have same frequencies. We prefer 5 because 5's first appearance is first.*
Input: arr[]={ 3, 1, 4, 4, 5, 2, 6, 1 };

Output: 1 4 3

Problem-3

Write an efficient program to find the sum of contiguous subarray within a one-dimensional array of numbers which has the largest sum.



Problem-4

# Print unique rows in a given boolean matrix

Given a binary matrix, print all unique rows of the given matrix.
**Example:**
**Input:**
{0, 1, 0, 0, 1}
{1, 0, 1, 1, 0}
{0, 1, 0, 0, 1}
{1, 1, 1, 0, 0}
**Output:**
0 1 0 0 1
1 0 1 1 0
1 1 1 0 0
**Explanation:**
The rows are r1={0, 1, 0, 0, 1},
r2={1, 0, 1, 1, 0}, r3={0, 1, 0, 0, 1},
r4={1, 1, 1, 0, 0}, As r1 = r3, remove r3
and print the other rows.

**Input:**
{0, 1, 0}
{1, 0, 1}
{0, 1, 0}
**Output:**
0 1 0
1 0 1
**Explanation:**
The rows are r1={0, 1, 0},
r2={1, 0, 1}, r3={0, 1, 0} As r1 = r3,
remove r3 and print the other rows.

Problem-5

As we all know, a palindrome is a word that equals its reverse. Here are some examples of palindromes: malayalam, gag, appa, amma.

We consider any sequence consisting of the letters of the English alphabet to be a word.
So axxb,abbba and bbbccddx are words for our purpose. And aaabbaaa, abbba and bbb are examples of palindromes.

By a subword of a word, we mean a contiguous subsequence of the word. For example the subwords of the word abbba are a, b, ab, bb, ba, abb, bbb, bba, abbb, bbba and abbba.

In this task you will given a word and you must find the longest subword of this word that is also a palindrome.

For example if the given word is abbba then the answer is abbba. If the given word is abcbcabbacba then the answer is bcabbacb.

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## Input:

The first line of the input contains a single integer $N$ indicating the length of the word. The following line contains a single word of length $N$, made up of the letters a,b,…, z.

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## Output:

The first line of the output must contain a single integer indicating the length of the longest subword of the given word that is a palindrome. The second line must contain a subword that is a palindrome and which of maximum length. If there is more than one subword palindrome of maximum length, it suffices to print out any one.

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## Constraints:

- $1 \leq N \leq 5000$.
- You may assume that in $30\%$ of the inputs $1 \leq N \leq 300$.

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## Sample Input 1:

5

abbba

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## Sample Output 1:

5

abbba

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## Sample Input 2:

12

abcbcabbacba

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## Sample Output 2:

8

bcabbacb

Problem-6

In this problem the input will consist of a number of lines of English text consisting of the letters of the English alphabet, the punctuation marks ' (apostrophe), . (full stop), , (comma), ; (semicolon), :(colon) and white space characters (blank, newline). Your task is print the words in the text in reverse order without any punctuation marks.

For example consider the following candidate for the input text:

This is a sample piece of text to illustrate this

problem.  If you are smart you will solve this right.

The corresponding output would read as:

right this solve will you smart are you If problem

this illustrate to text of piece sample a is This

That is, the lines are printed in reverse order and in each line the words are printed in reverse order.

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## Input:

The first line of input contains a single integer $N$, indicating the number of lines in the input. This is followed by $N$ lines of input text.

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## Output:

$N$ lines of output text containing the input lines in reverse order and where each line contains the words in reverse order as illustrated above.

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## Constraints:

- $1 \leq N \leq 10000$.
- There are at most 80 characters in each line

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## Sample input

2

This is a sample piece of text to illustrate this

problem.  If you are smart you will solve this right.

## Sample output

right this solve will you smart are you If problem

this illustrate to text of piece sample a is This

Problem-7

The game of billiards involves two players knocking 33 balls around on a green baize table. Well, there is more to it, but for our purposes this is sufficient.
The game consists of several rounds and in each round both players obtain a score, based on how well they played. Once all the rounds have been played, the total score of each player is determined by adding up the scores in all the rounds and the player with the higher total score is declared the winner.

The Siruseri Sports Club organises an annual billiards game where the top two players of Siruseri play against each other. The Manager of Siruseri Sports Club decided to add his own twist to the game by changing the rules for determining the winner. In his version, at the end of each round the leader and her current lead are calculated. Once all the rounds are over the player who had the maximum lead at the end of any round in the game is declared the winner.

Consider the following score sheet for a game with 55 rounds:

| Round | Player 1 | Player 2 |
|---|---|---|
| 1 | 140 | 82 |
| 2 | 89 | 134 |
| 3 | 90 | 110 |
| 4 | 112 | 106 |
| 5 | 88 | 90 |

The total scores of both players, the leader and the lead after each round for this game is given below:

| Round | Player 1 | Player 2 | Leader | Lead |
|---|---|---|---|---|
| 1 | 140 | 82 | Player 1 | 58 |
| 2 | 229 | 216 | Player 1 | 13 |
| 3 | 319 | 326 | Player 2 | 7 |

| | | | | |
|---|---|---|---|---|
| 4 | 431 | 432 | Player 2 | 1 |
| 5 | 519 | 522 | Player 2 | 3 |

The winner of this game is Player 11 as he had the maximum lead (5858 at the end of round 11) during the game.
Your task is to help the Manager find the winner and the winning lead. You may assume that the scores will be such that there will always be a single winner. That is, there are no ties.

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## Input:

The first line of the input will contain a single integer N (N≤10000N≤10000) indicating the number of rounds in the game. Lines 2,3,...,N+12,3,...,N+1 describe the scores of the two players in the NN rounds. Line i+1i+1 contains two integer SiSi and TiTi, the scores of the Player 11 and 22 respectively, in round ii.

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## Output:

Your output must consist of a single line containing two integers WW and LL,
where WW is 11 or 22 and indicates the winner and LL is the maximum lead attained by the winner.

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## Constraints:

- 50%50% of test data satisfy N≤1000N≤1000.
- 1≤N≤100001≤N≤10000
- 1≤Si≤10001≤Si≤1000
- 1≤Ti≤10001≤Ti≤1000

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## Sample input:

5

140 82

89 134

90 110

112 106

88 90

---

## Sample output:

1 58

Problem-8

*Ish* and *Govi* are playing with strings. In this game *Ish* gives *Govi* two strings, aa and bb. *Govi* has to modify the string aa, such that it doesnot contain any character from string bb. *Govi* has to go to meet *Omi*. Help *Govi* to modify the string aa.

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## Input:

- First line will contain TT, number of testcases. Then the testcases follow.
- Each testcase contains two lines representing string aa and bb respectively.

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## Output:

For each testcase, output in a single line answer, the modified string aa such that it doesnot contain any character from string bb.

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## Constraints

- $1 \leq T \leq 100$
- $1 \leq a \leq 10^5$
- $1 \leq b \leq 10^5$
- Both string are of *Uppercase English Alphabets*

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## Sample Input:

1

IKAIPOCHE

ISH

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## Sample Output:

KAPOCE

Problem-9

One of the things JEC is known for is its GR (Group Recreation) where juniors and seniors do friendly interaction ;P

As for the new session of 2020 seniors decided to have their first GR and give them some treat. Juniors were excited about it they came to college canteen aligned in a line and counted themselves one by one from left to right so that every junior gets his/her treat. But seniors played a game and they will treat only the ones who passes in this game. Game is simple all they need to

do is to alternate their language (between Hindi and English) while telling their positions that is if the junior just before you told 2 in English you need to say 3 in Hindi . You do not want to be the one left without a treat.

You are the junior standing at position $X$ from left and the counting could start from left or right you have to predict which number you have to speak and in which language when your turn comes.

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## Input:

- First line will contain $T$, number of testcases. Then the testcases follow.
- Each testcase contains 2 lines first consist 2 space separated integers, $N$ (total count) , $X$ (your position from left), next line consist of 2 space separated characters L or R (Direction from which counting starts L-left, R-Right) and H or E (the language to start counting).

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## Output:

For each testcase, output a single line consisting space seperated Integer P and Character L where P is the number you will speak and L is the language (H or E).

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## Constraints

- $1 \leq T \leq 1000$
- $1 \leq N \leq 120$
- $1 \leq X \leq N$

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## Sample Input:

2

15 5

L H

20 14

R E

*try to trim extra white spaces like new line during input in case of wrong answer

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## Sample Output:

5 H

7 E

## EXPLANATION:

1. When counting starts from left with H it alternates like H E H E H….. on the fifth position H comes
2. When Count starts from right with E it alternates like E H E H E H E….. with E on the position of 14th student from right.

Problem-10

Little Praneet loves experimenting with algorithms and has devised a new algorithm. The algorithm is performed on an integer as follows:

- if the rearmost digit is $0$, he will erase it.
- else, he will replace the rearmost digit $d$d with $d-1$.

If a point comes when the integer becomes $0$0, the algorithm stops.
You are given an integer n. Praneet will perform the algorithm on it $a$a times. You have to print the result after $a$a operations.

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## Input:

- The first and only line of input contains two integers $n$ — initial number, and a —the number of operations.

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## Output:

- Print one integer — the result of performing the algorithm on $n$n $a$a times.

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## Constraints

- $2 \le n \le 10^9$
- $1 \le a \le 50$

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## Sample Input 1

1001 2

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## Sample Input 2

5 2

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## Sample Output 1

100

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## Sample Output 2

3

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## Explanation

- In the first example, the transformation is as follows: $1001 -> 1000 -> 100$.
- In the second example, the transformation is as follows: $5 -> 4 -> 3$.