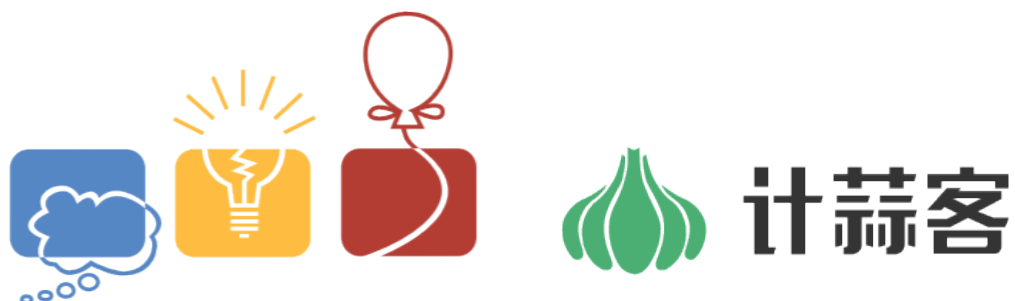


「计蒜客」杯
第十一届山东大学ACM/ICPC校赛
高年级组



Problem Set

April 8th, 2017

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0 注意事项

- 若对题目描述有任何疑问，请通过PC²发送Clarification。若设备出现任何问题，请举手咨询现场工作人员。
- 任何妨碍评测进行或者破坏比赛公平性的行为均可能导致取消资格。
- 评测时各语言的编译器版本以及所用的编译命令为：
 - C (gcc 6.3.0): `gcc -lm -o <executable> <source_code> -std=c99 -O2`
 - C++ (g++ 6.3.0): `g++ -lm -o <executable> <source_code> -std=c++11 -O2`
 - Java (OpenJDK 1.8.0_121): `javac <source_code>`
 - Python2 (python 2.7.13): `python2 <source_code>`
 - Python3 (python 3.5.3): `python3 <source_code>`
- 对于C/C++选手，使用printf输出64位整形时应使用的格式为"%lld"或"%llu"。
- 某些题目数据量可能较大。对于这些题目，请使用效率较高的IO方法（如scanf/printf(C/C++）或者BufferedReader/PrintWriter(JAVA)）。

1 Problem A: Scrambled II

Time Limit: 1000ms

Description

Oen of eth mmebre in teh lab is os faoums thta evne hte cosimc ledear Loki ksnw hmi. Loki commuicante tihw him uisng a squence of posiitev ingetres. Oen dya we inreetpcted a franmegt fo thrie comimutncaion. Btu smoe of teh ingetres aer niose picked up yb teh anntena. Fournattely we kown ttha all ingetres usde in thrie comimutncaion haev tow nno-oevrlpaping semgent 19 and 91. In odrer to anaylse theri comimutncaion, we haev to flitre out teh niose. Can yuo hepl us wiht tihs taks?

Input Format

The frist lien conaitns a sginel ingetre N .

The sceond lien conaitns N ingetres deontgin teh spcae-seepartde ingetres we inreetpcted.

Output Format

Prnit all nmubres ttha is patr of teh comimutncaion.

Sample Input

```
4
191 1991 1919 193491
```

Sample Output

```
1991 193491
```

Hint

$N \leq 1000$

Ohtre ingetres aer no grateer thna $1e10^5$.

The problem description was affected by cosmic rays and was scrambled.

2 Problem B: Bear and bags of food

Time Limit: 10000ms

Description

Limak the bear has N bags of food, labeled $1..N$. Each bag has its own size. For each meal, Limak select a range $[l, r]$ and have food from the bags in this range for that meal. Limak has the quirks that forces him to sort the bags by their size before having meal. Also after finishing the meal he must put the bags back to their original positions. Limak can only swap two adjacent bags when he sorts the bags. Limak has selected the ranges for several meals, can you help Limak find how many swaps he has to perform before having each meal?

Input Format

The first line contains a single integer T denoting the number of test cases.

For each test case, the first line contains a single integer N .

The second line contains N integers denoting the size of the bags.

The third line contains the number of ranges M Limak has selectd.

Each of the following M lines contains a range $l r$.

Output Format

For each range Limak has selected, print the number of swaps he has to perform before having the meal.

Sample Input

```
1
4
1 4 2 3
2
1 2
2 4
```

Sample Output

```
0
2
```

Hint

$T \leq 25$

$N, Q \leq 50000$

Size of bags are positive integers not exceeding $2^{31} - 1$.

3 Problem C: Tank

Time Limit: 1000ms

Description

You have a capless tank whose dimension is $x\text{cm} \times x\text{cm} \times h\text{cm}$ (The bottom section is a square). There's L millilitre of water in the tank. We want to know the max tilt angle along a certain bottom edge that won't spill the water.

Input Format

The first line contains a single integer T denoting the number of test cases.
Each test case includes three float numbers x, h and L .

Output Format

The max tilt angle in radian rounded to two decimal places.

Sample Input

```
2
1 2 1
55 100 233
```

Sample Output

```
1.11
1.57
```

Hint

$$x, h, L \leq 1000, L \leq x^2 \times h$$

4 Problem D: Minesweeper

Time Limit: 1000ms

Description

You are writing a minesweeper game. However you are not very skilled in minesweeper so in order to debug your game, you have to put backdoors in it. After a field was generated, you want to know how many cells will be revealed if you click on a certain cell.

Input Format

The first line contains a single integer T denoting the number of test cases.

For each test case, the first line contains two integers X Y denoting the size of the field.

Each of the following X lines contains a string consisting of only 1 and 0 indicating whether there's a mine in that cell.

The next line consists of a pair px py denoting the position of the clicked cell.

Output Format

For each test case, print a single integer denoting the desired result.

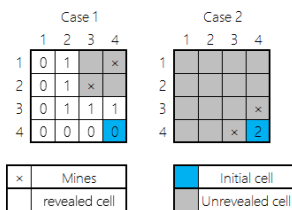
Sample Input

```
2
4 4
0001
0010
0000
0000
4 4
4 4
0000
0000
0001
0010
4 4
```

Sample Output

```
12
1
```

Hint



Explanation of the sample test data is shown above.

Coordinates start from 1.

$X, Y \leq 30$

If the initial cell has a mine in it, print -1 instead.

For those who doesn't know how to play minesweeper:

Each cell without a mine has a number denoting the number of mines in the cells around it. Obviously the number is 8 at max. When a cell with number 0 in it is revealed, the game will automatically reveal all eight cells (at most) around it.

5 Problem E: Cake

Time Limit: 1000ms

Description

You have a cake and you want to share it with your friends. You want to cut the cake exactly t times. Because you don't know the number of friends you have to serve in advance, you want to know how many different number of friends you can serve. As one of your disciplines, you never cut a cake horizontally.

Input Format

The first line contains a single integer T denoting the number of test cases.
Each of the following T lines contains a single integer t .

Output Format

Print T lines, each containing a single integer denoting the answer.

Sample Input

```
1
2
```

Sample Output

```
2
```

Hint

In the sample input, you can serve 3 or 4 friends so the answer is 2.

$t \leq 10^8$

Any two cuts cannot coincide. All cuts have to be straight lines through the whole cake.

6 Problem F: Ranking

Time Limit: 1000ms

Description

Once upon a time there was a popular game called "NRT!" which employs a "quantum quantity" (qq) system to reflect the skill of a player. There was a global ranking of players from all around the world. However the developer used an inefficient ranking algorithm. As the game became canonical for office workers, the server cannot process such amount of data and broke down. This incident had a great impact on the game and it phased out soon afterwards.

Recently a new company called CLU made a replica of "NRT!". The new game, called "PTV!", has a similar "quantum quantity" system but should have a much more efficient ranking system. However no programmer in CLU knows how to implement it. So they are now seeking for someone to finish the job. Anyone who manages to complete this task will be awarded with an apple pie. You want the apple pie very badly so you're trying to solve the problem. Namely you have to deal with three kinds of operations:

- **update** <name> <qq>: update the qq value of the given user. If the user doesn't yet exist, it is created first.
- **qrank** <user>: print the current ranking of the given user.
- **quser** <rank>: print the users starting from the given rank. In order to reduce the load of the servers, you should print at most 10 user names for each query of this kind.

For users with the same "qq" values, the user whose "qq" was updated most recently comes the last. See the sample input for details.

Input Format

The first line contains a single integer N denoting the number of operations you have to process. Each of the following N lines contains a single instruction in the format described above.

Output Format

For each **qrank** and **quser** instruction, print a line containing the desired result.

Sample Input

```
25
update A 1
update B 1
qrank A
update A 1
qrank A
update B 1
qrank A
update C 100
update D 1000
update E 200
update F 105
qrank C
update C 295
update G 1080
update A 998
update H 960
update I 654
qrank H
update J 232
update D 850
update K 221
quser 10
update L 1024
quser 2
qrank J
```

Sample Output

```
1
2
1
4
4
F B
L A H D I C J K E F
8
```

Hint

$N \leq 425000$

User names only consist of capital English letters and are no longer than 6 characters. qq values are positive integers that do not exceed 10^9 .

7 Problem G: Game

Time Limit: 1000ms

Description

Alice and Marisa play a game together. This time they have M numbers written on a piece of paper. They take alternate turn and as usual, Alice moves first. The one who makes the move choose an integer k ($k \geq 2$) and erases k leftmost numbers. Apparently if there are currently m numbers on the paper, k should be at most m . Then the player sums up the numbers she has erased and writes it at the left end. The game ends when there is only one number left and the score of a player is equal to the sum of all numbers she has erased during the play. The goal of each of them is to maximize the score difference between herself and her opponent. Given M and the sequence of numbers on the paper when the game starts. Find the score difference between Alice and Marisa if they both play optimally.

Input Format

The first line contains a single integer T denoting the number of test cases.

For each test case, the first line contains a single integer M .

The following line contains M integers denoting the initial number sequence.

Output Format

For each test case, print one integer denoting the answer.

Sample Input

```
1
4
1 -7 -2 3
```

Sample Output

```
-3
```

Hint

The value k selected by the players during the play is 3 and 2. Alice's score is -8, Marisa's score is -5. Therefore the difference is -3.

$2 \leq M \leq 200000$

The numbers on the paper are within the range $[-10^4, 10^4]$.

8 Problem H: Sum

Time Limit: 1000ms

Description

This problem is incredibly easy – you are given a list of numbers and find the sum of them.

Input Format

The first line contains a single integer T denoting the number of test cases.

For each test case, the first line contains a single integer N denoting the size of the list.

The following line contains N integers to be summed up.

Output Format

For each test case, print a line containing an integer denoting the sum of the numbers.

Sample Input

```
1
5
1 2 3 4 5
```

Sample Output

```
15
```

Hint

$N \leq 1000$

All integers to be summed up are within the range $[-1000, 1000]$.

Hint

$N, M \leq 1000$, all characters are printable ASCII characters.

The given frames always contains the full shape of the object, but it may not fully appear in the third frame (it may even disappear altogether, as shown in the first sample input). The object never overlaps in the two frames so that you can fully recover the background.

10 Problem J: Reverse

Time Limit: 1000ms

Description

Given a sequence of strings, you are asked to reverse each string in it. Print the reversed string in the original order that they appear in the sequence.

Input Format

The first line contains a single integer N denoting the number of sequences to be processed.

Each of the following N lines contains a sequence of strings to be processed. The strings are separated by a single space.

Output Format

Print N lines, each containing a processed sequence.

Sample Input

```
2
ab abc abcd
z yz xyz
```

Sample Output

```
ba cba dcba
z zy zyx
```

Hint

$N \leq 1000$

All strings in the sequences are no longer than 10000 characters. Each sequence consists of no more than 50 strings.