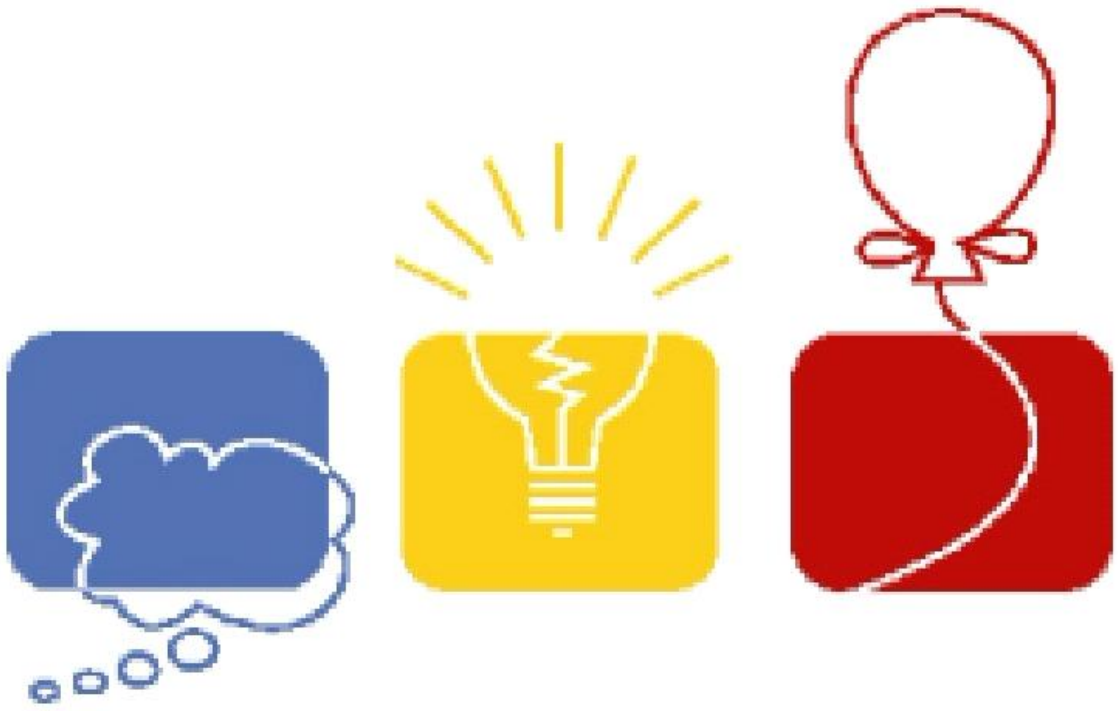

2015 ACM South China Normal University Collegiate Programming Contest Final Round

Problem A. Goddess Hunter

It is well known that *Great Master* is a **pickup artist**.

Therefore N boys ask *Great Master* to help them to fall in love with the girls they admire. If they fall in love, they will give a large number of money to *Great Master*. Obviously, one girl can only fall in love with one boy, and one boy can only fall in love with one girl. Now there are M girls. Because Great Master is good at love, he clearly know which boy and which girl can fall in love with each other. Because not all boys can find his girlfriend, *Great Master* want to know how much money he can get at most. Can you help him?

In addition, If *Great Master* think two people can fall in love with each other, Great Master always has way to help them to go together.

Input

The first line is a positive integer $T(1 \leq T \leq 20)$, represents the number of case. The next T blocks follow each indicates a case.

Each case starts with two positive integers N and M, which indicates the number of boys and girls respectively. Boys are numbered from 1 to N. Girls are numbered from 1 to M.
In the next line, contains N positive integers c, the i^{th} integer indicates the money that the boy with number i will give to Great Master if he can fall in love with a girl.
In next N lines, each line contains M integers, which is 0 or 1. If the number of the j^{th} integer in i^{th} line is 1, it means the boy i can fall in love with girl j. Otherwise, they will never go together.

For 80% of cases, $0 < N, M \leq 100$.
For 100% of cases, $0 < N, M \leq 300$, $c \leq 100000$.

Output

For each case, output the number of money that *Great Master* can get at most.

Sample input and output

Sample Input	Sample Output
2 2 100000 1 1 0 1 0 2 100000 1 1 0 0 1	100000 100001

Problem B. No Title

Give you a sequence $a_1, a_2, \cdots, a_n$.

You can divided a integer into two pairs, but one integer should be divided only once and each pair of it must be greater than 0. For example, you can divide 3 into (1 | 2), but you can't divide it into (1 | 1 | 1) or (0 | 3). Dividing an integer x cost x unit of money.
After all you dividing operator, all the adjacent integer will merge into one integer and become a new sequence b. If one integer divided into two pairs, they are considered non-adjacent.

For example, sequence 2 5 3 7. We split 3 and 2, cost 5 unit of money. And it become 1 | 1 5 2 | 1 7, and then become sequence b : 8 8 2. If the maximum integer of b must be smaller than or equal to a given integer M, what's the minimum cost? If it's no valid solution, output -1 as the answer.

Input

The first line is a positive integer $T(T \leq 20)$, represents the number of case. The next T blocks follow each indicates a case.

Each case starts with two positive integers n and M.
In the next line contains n positive integers indicate the sequence of a.

For 80% of cases, $n \leq 100$ and $a_i \leq 100$.
For 100% of cases, $n \leq 1000$ and $a_i \leq 1000$, $M \leq 1000000000$.

Output

For each case, output one line contains the answer of the problem.

Sample input and output

Sample Input	Sample Output
2 4 8 2 5 3 7 3 2 3 3 3	5 -1

Problem C. Rank of Sum

Give you a sequence $a_1, a_2, \cdots, a_n$.
We define $sum(i, j) = \sum_{x=i}^{j} a_x, i < j$
If we put all of $sum(i, j)$ in a sequence B with $\frac{n(n-1)}{2}$ elements and sort them from small to large.
Now give you a positive integer K. Can you tell me the K^{th} element in B?

Input

The first line is a number $T(1 \leq T \leq 20)$, represents the number of case. The next T blocks follow each indicates a case.

Each case starts with two positive integers n and K.
In the next line, contains n integers $a_1, a_2, \cdots, a_n$.

For 80% of cases, $N \leq 1000$, $-1000 \leq a_i \leq 1000$
For 100% of cases, $N \leq 50000$, $1 \leq K \leq \frac{n(n-1)}{2}$, $-10000 \leq a_i \leq 10000$

Output

For each case, output the K^{th} smallest number of B in a line.

Sample input and output

Sample Input	Sample Output
2 5 15 1 2 3 4 5 2 2 -1 -2	15 -2

Problem D. String Counter

You are given a string s with N lower case letters. The index of s starts with 0.
Your task is to deal with M operations of 2 types:
1. Given an integer p and a lower case letter q, you should change the p^{th} character of the string s to q.
2. Given a lower case letter q, you should print the number of q in string s.

Input

The first line is a positive integer $T(1 \leq T \leq 20)$, which represents the number of case. The next T blocks follow each indicates a case.

Each case starts with a string s.
In next line contains an integer M.
In next M lines, each line begin with an integer $op(1 \leq op \leq 2)$.
If $op = 1$, there are an integer p and a lower case letter q after op, means that you should change the p^{th} character of s to q.
If $op = 2$, there is a lower case letter q after op, means that you should print the number of q in string s.

For 70% of cases, the length of $s \leq 1000$, $M \leq 1000$.
For 100% of cases, the length of $s \leq 100000$, s only contains lower case letter, $0 \leq M \leq 100000$, $0 \leq p < N$, q must be lower-case letter.

Output

For every operation 2 in the input, print the answer in a line.

Sample input and output

Sample Input	Sample Output
2 acmer 2 2 a 2 b greatmaster 5 2 a 2 t 1 4 a 2 a 2 t	1 0 2 2 3 1

Problem E. String Game

You are given n string $s_1, s_2, \cdots, s_n$, which only contain 'a' $\cdots$ 'e'. String s_i has a value v_i. There are three kinds of operation:
1.Cv x v': change v_x into v'
2.Cs x a': change s_x into a'
3.Q: calculate $ans = \max \sum_{x=1}^{pn} s_{p_x}$, satisfying that s_{p_x} is a prefix of $s_{p_{x+1}} (1 \leq i < n)$. Please note that $pn \leq n$, $1 \leq p_i \leq n$ and $p_i \neq p_j (i \neq j)$

String $a = a_1 a_2 \cdots a_{an}$ is a prefix of $b = b_1 b_2 \cdots b_{bn}$ if and only if $an <= bn$ and $a_i = b_i (1 \leq i \leq an)$.

The memory limit of this problem is 64MB

Input

The first line is a positive integer $T (T \leq 2)$, which represents the number of cases. The next T blocks follow each indicates a case.

Each case starts with two positive integers n and m.
In the next n lines, the i^{th} line contains a string s_i.
In the next line, contains n integers. The i^{th} integer indicates v_i.
In next m lines, each line contains a operation. There are three kinds of operation whose means is shown in description.

Please note that some operation of input are encrypted. If the last operation Q print *last-ans*(you can assume that *last-ans* is equal to 0 in the beginning), all a' in operation Cs must add *last-ans*(from 'a' to 'e' circulation).
For example, the operation is "Cs 1 abcde". If *last-ans* is 1, You must translate it into "Cs 1 bcdea". If *last-ans* is 2, You must translate it into "Cs 1 cdeab".

For 100% of cases, $n \leq 50000$, $m \leq 100000$, $0 \leq v_i < 100000$, $\sum s_i + \sum a' \leq 1000000$.

Output

For every operation Q in the input, print ans in a line.

Sample input and output

Sample Input	Sample Output
2 5 5 aba ab babb abaa abab 0 1 4 2 3 Q Cv 1 2 Q Cs 3 eaeea Q 1 2 aa bb 1 2 Cv 2 aa Q	4 6 9 3

Problem F. Villa Builder

Yuki wants to build a villa. She find a rectangle field. It can see as a rectangle with $N * M$ cells, with bottom-left (1,1) and upper-right cell (N, M). The villa *Yuki* want to build must cover a rectangle with $W * H$ cells. However, some cells of the field are broken that villa can't be built on it. And the villa rectangle's edge must parallel to the rectangle field's edge.
There are K broken cells and the coordinates of these broken cells. Please tell *Yuki* how many ways to select a $W * H$ rectangle on this field without broken cells. Two ways are considered different if and only if two villa's bottom-left coordinate or upper-right coordinate are different respectively.

Input

The first line is a positive integer $T(T \leq 20)$, which represents the number of case. The next T blocks follow each indicates a case.

Each case starts with four integers N, M, W and H.
The next line contains a integer K.
In the next K lines, each line contains two positive integers x, y indicates a broken cell's coordinate (x, y). Two broken cells may have same coordinate.

For 80% of cases, $0 < N, M, W, H \leq 1000$.
For 100% of cases, $0 < N, M, W, H \leq 50000$, $0 \leq K \leq 50000$, $0 < x \leq N$, $0 < y \leq M$.

Output

For each case, output the number of ways to select the rectangle.

Sample input and output

Sample Input	Sample Output
2 3 3 2 3 2 1 1 1 1 3 3 1 2 1 2 2	2 8