Preliminary Contest 1

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0 A to the B

In math class, Greg is learning about radical functions and their inverse. In order to sharpen his mathematical rigour, he has decided to exercise his computational skills by determining A to the B; however, he quickly realizes that this problem is much too difficult. Thus, he needs your help to determine A to the B. Rescue Greg from mathematical damnation!

Input Format

The first line of input will contain an integer t denoting the number of computations Greg needs to do. The next t lines contain two space-separated integers A and B.

Output Format

For each computation, output the value of A^B

Sample I
Input   2   2 4   -8 6
Output   16   262144

1 Annuity

In order to save up for the holiday season, Jacob deposits K dollars into an account that pays r percent per month. This is known as an annuity—the sum of a series of regular payments made at **equal** time intervals into an account which pays interest. The investment amount for Jacob's i-th deposit can be expressed as

$$A_i = K(1 + \frac{r}{100})^{N-i}$$

where A_1 is the first payment and A_N is the last payment.

Help him determine the amount of money in his account (the annuity) after he has made N deposits.

Input Format

The first line of input will contain two space-separated integers K and N denoting the amount of the regular payment and the amount of regular payments respectively. The next line of input will contain a single integer r denoting the interest rate of the account.

Output Format

Output the value of Jacob's account after N deposits rounded to two decimal places.

Sample I
Input
500 4
4
Output
2123.23

2   Holiday Shopping

The holidays have finally arrived, meaning it's Boxing Day season! Shon has m dollars in his bank account and proceeds to make n purchases of values $a_1, a_2, \ldots, a_n$. Determine the state of Shon's bank account (deficit, zero, or surplus), along with the amount of the balance after the shopping spree.

Input Format

The first line of input will contain the integer m, denoting the balance of Shon's bank account. The second line of input will contain the integer n, the number of purchases Shon has made. The third line of input will contain n integers a_1, a_2, $\ldots$, a_n representing the cost of purchase i, separated by a single space.

Output Format

The first line of input should contain his bank account state: ``Deficit'', ``Even'', or ``Surplus''. The second line of input should contain the balance after the shopping spree.

Sample I
Input
400
4
150 200 90 35
Output
Deficit
-75

3 Present Delivery

Every year, the night before Christmas, Santa's elves are hard at work preparing Father Winter's sleigh. An important component of their job is ensuring that Santa delivers the correct amount of presents in a neighbourhood—to verify that no presents were lost. In order to verify present delivery, for each house i, the elves track the amount of presents that should be delivered, $d_1, d_2, \ldots, d_N$, and the amount of presents that were delivered, $p_1, p_2, \ldots, p_N$ where p_i and d_i represent the respective present amount for house i.

Help the elves determine whether Santa delivered the correct amount of presents from house l to house r. Specifically, present delivery is valid if and only if the total amount of presents that should be delivered from l to r is the same as the total amount of presents that were delivered from l to r; that is, $p_l + p_{l+1} + \cdots + p_r = d_l + d_{l+1} + \cdots + d_r$. In particular, you will answer Q of these queries.

Input Format

The first line of input contains two space-separated integers N and Q denoting the number of houses and the number of queries. The next line of input contains N space-separated integers representing the amount of presents that should be delivered to house i, d_i. The next line of input contains N space-separated integers describing the amount of presents that were delivered to house i, p_i. The next Q lines of each contain a sequence of two positive integers, l and r

Constraints

For all subtasks, $1 \le d_i, p_i \le 10^9$ and $1 \le l < r \le N$

Subtask 1 [20%]
$1 \le N \le 10^3$
$1 \le Q \le 10^3$

Subtask 2 [30%]
$1 \le N \le 10^5$
$1 \le Q \le 10^5$

Subtask 3 [50%]
$1 \le N \le 10^6$
$1 \le Q \le 10^6$

Output Format

For each query, if the present delivery is valid, print ``WOOHOO!'', otherwise, print ``BOOHOO!''

Sample I

Input

```
4 2
6 9 1 2
7 8 2 2
1 4
2 3
```

Output

```
BOOHOO!
WOOHOO!
```

4 Every Mother's Nightmare

Every year, in the weeks leading up to the holidays, mothers around the world take on the difficult task of buying their children gifts in order to keep them satisfied for the holidays. One particular mother has K dollars, and walks into a store with N gifts, each with a cost of c and a satisfaction amount of s. She wants to ensure that she maximizes the combined satisfaction of her gifts, without spending more than K dollars. Determine the maximum amount of combined satisfaction possible.

Input Format

The first line of input will contain two integers K, and N. The next N lines will contain c_i, and s_i, the cost and satisfaction amount of gift i.

Constraints

For all subtasks, $1 \leq c_i \leq 10^5$ and $-10^5 \leq s_i \leq 10^5$.

Subtask 1 [20%]
$1 \leq N \leq 100$
$1 \leq K \leq 100$

Subtask 2 [80%]
$1 \leq N \leq 5,000$
$1 \leq K \leq 5,000$

Output Format

Ouptut the maximum amount of satisfaction attainable.

Sample I
Input
50 3
10 60
20 100
30 120
Output
220