O. Help Koko

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

Yesterday morning Koko came back from college not happy because his mentor gave him a problem and he didn't solve it.

His mentor gave him a list of numbers and asked him to do one of two operations on each number in the list :

1^{st} operation is to check if the number is prime or not, if it's not a prime number then he should print −1, and if it's a prime number he should multiply it by 5^X then multiply it by 3^X and print the last digit of the result.

2^{nd} operation is multiplying the number by 2^X then multiplying it by 5^X and print the last digit of the result.

Koko needs your help to solve this problem.

Input

Input consists of 3 lines, first line consists of N and X $(1 \leq N \leq 10^5),(1 \leq X \leq 1000)$ — the size of the list and the exponent mentioned in the problem.

Second line consists of N space-separated integers $a_1,a_2,\ldots,a_n$ $(1 \leq a_i \leq 10^6)$ — the numbers in the list.

Third line consists of N space-separated integers op1,op2,…,opn and opi is {1 or 2} —

1 is the first operation, 2 is the second one.

Output

For the i_{th} number in the list apply the i_{th} operation and print the answer to the problem with a space separating each answer.

Examples

input Copy

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

output Copy

```
0 0 5
```

input Copy

```
1 1
10
1
```

output Copy

```
-1
```


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→ Group Contests

- Sheet #10 (General Hard)
- Sheet #9 (General medium)
- Sheet #8 (General easy)
- Sheet #7 (Recursion)
- Sheet #6 (Math - Geometry)
- Sheet #5 (Functions)
- Sheet #4 (Strings)
- Contest #3.1
- Sheet #3 (Arrays)
- Contest #2
- Sheet #2 (Loops)
- Contest #1
- Sheet #1 (Data type - Conditions)

Sheet #10 (General Hard)

Finished

Practice

→ About Time Scaling

This contest uses time limits scaling policy (depending on a programming language). The system automatically adjusts time limits by the following multipliers for some languages. Despite scaling (adjustment), the time limit cannot be more than 30 seconds. Read the details by the link.