

Problem A. Double factorization

Input file: **standard input**
Output file: **standard output**
Time limit: 1 second
Memory limit: 256 megabytes

Askar loves prime numbers. He knows prime factorization is when you find the all prime divisors of that number. He came up with double factorization. Double factorization is when we first find the sum of all prime divisors of number and after that we find prime divisors of this sum for example, if $N = p_1^{a_1} * p_2^{a_2} * p_3^{a_3} ... p_k^{a_k}$ where p_i is prime, you need to find all prime divisors of this sum $a_1 * p_1 + a_2 * p_2 + a_3 * p_3 + ... + a_k * p_k$ and output should be sorted

Input

Given integer n , $2 \leq n \leq 10^9$

Output

Output single line all prime numbers and don't forget to sort the array, you can use the sort function of `c++` without implementing it

Examples

standard input	standard output
15	2 2 2
64	2 2 3

Note

In first case prime divisors of 15 is 3 and 5, after summing we get 8 and at the end prime divisors of 8 is 2 2 2

Problem B. Teachers and clues

Input file: `standard input`
Output file: `standard output`
Time limit: 1 second
Memory limit: 256 megabytes

Firstly, please go to the link and copy the template. <https://ideone.com/ViE12M>

It has one method: `ask(int t)`, where t represents some time in seconds. Teacher is always asked about clues on quiz. Sometimes, teachers are kind to students, and give them clues. So if student asks about clue at some moment t , teacher will give him a clue and give clue to every student that asked question in last 3000 seconds (50 minutes, e.g. answers to all questions in range $[t - 3000, t]$). You must return number of students that will be given a clue. You may think that always different students asks for clues (no student ask for a clue twice).

It is guaranteed that every call to `ask` uses a strictly larger value of t than before.

Input

Given integer T the number of queries $1 \leq T \leq 10^6$

Output

Output the T lines the answer for each query

Examples

standard input	standard output
4 1 100 3001 3002	1 2 3 3
4 1 2000 5001 6003	1 2 1 2

Problem C. Love at first sight

Input file: **standard input**
Output file: **standard output**
Time limit: 1 second
Memory limit: 256 megabytes

Go to the template and rewrite "invertTree" function. <https://paste.ubuntu.com/p/YGXbVJ7g6M/>

Adilkhan saw a binary search tree in the mirror. He fell in love with this tree and every day dreamed of seeing again. But he was afraid that the tree in reflection would not be what it was in reality. Help him, bring out the real appearance of a tree.

Input

The first line contains two integers n ($2 \leq n \leq 10^3$) — the number of elements in the tree.

Output

Print the inverted tree.

Examples

standard input	standard output
4 1 0 3 2	3 2 1 0
6 1 4 3 5 2 0	5 4 3 2 1 0

Problem D. Chessman

Input file: **standard input**
Output file: **standard output**
Time limit: 1 second
Memory limit: 256 megabytes

Assyl loves chess. One of the rules of chess players: "**the only way to improve your skill is to play with stronger opponent**". So there are N players each with some level $a[i]$, $1 \leq i \leq n$. Level of play of Assyl changes everyday, so you need to find the best opponent for him every day as his level varies. For each of Q days, print the minimal level among N players that is greater than or equal to X .

Input

The first line of the input contains an integer N - number of numbers in Assyl's opponents, Q - number of days. ($1 \leq N, Q \leq 10^5$) The second line contains N integers a_i . ($1 \leq a_i \leq 10^9$) Each of the next Q lines contains one number.

Output

Print minimal number that is greater or equal to X and which is level of some player.

Examples

standard input	standard output
7 1 4 5 14 61 32 7 5 7	7
7 2 31 70 52 32 47 49 35 14 37	31 47

Note

It is guaranteed that there exist number greater than or equal to X .

Problem E. K-th sum

Input file: `standard input`
Output file: `standard output`
Time limit: 1 second
Memory limit: 256 megabytes

Nurdana loves cookies! She stores all the cookies in separate boxes, but mom allows her to store only k boxes. Her dad is an assistant in this matter. He gives her a box in which there are n cookies. Help her calculate how many cookies she can have?

Input

The first line contains two integers q and k ($1 \leq q, k \leq 10^5$). Each of the following q lines contains one command.

Queries come in two forms: insert n or print n is a non-negative number less than 10^9 .

Output

For each print query print the sum (not more) k of the largest elements in the current heap.

Example

standard input	standard output
6 4	0
print	15
insert 9	25
insert 6	
print	
insert 10	
print	

Note

This problem must be solved using a heap. Use long long type for the sum of elements.
Hint: since k - fixed, you don't need to store all numbers, only k largest elements.