Problem A. Square Towels

Input file:	standard input
Output file:	standard output
Time limit:	1second
Balloon color:	Golden

Rahim is a textile factory manager. In response to a covid-19, he wanted to create a clean environment. So he thinks it's better to manufacture a square towel, his factory can manage to produce towels from a ream of L meters in length and W meters wide. Since He is so busy finding the ream-color to give it a good color, he wants you to calculate the minimum number of square towels that can be cut from the ream without wasting any cloth.

Input

The input will consist of a set of lines with the integer numbers L and W, separated with space

$(1 \leq L, W \leq 10000)$ till end of file.

Output

For each input line output the minimum number of square towels that can be manufactured.

Example

Sample Input 1	Sample Output 1
20 15 20 16	12 20

Problem B. Different Modulo

Input file:	standard input
Output file:	standard output
Time limit:	1second
Balloon color:	White

Radhi's PC can write only numbers meaning it can't write other characters, not even a modulo. Since you're a geek she wants you to help her with the assignment she has been given.

Input

The input will consist of a set of lines with string number $1 \leq n \leq 10^{54}$. The first number

a = n[0] – n[17], second b = n[18] – n[35], c = n[36]-n[54].

Output

The output contains a single integer.

Example

Sample Input 1	Sample Output 1
766839162858123050269960683575937821136699493968794277	8698

Hint

Use Modular Arithmetic

Problem C. How many zeros?

Input file:	standard input
Output file:	standard output
Time limit:	1second
Balloon color:	Black

A factorial is an operation defined for integers greater than or equal to zero by the following formula:

$$n! = \begin{cases} 1 & if\ n - 0 \\ n * (n-1)! & if\ n > 0 \end{cases}$$

n is a non-negative integer.

Input

There will be several inputs $1 \leq n \leq 50$ till the end of file.

Output

The output contains a single integer.

Example

Sample Input 1	Sample Output 1
0 5 7	0 1 1

Problem D. Binary Chop

Input file:	standard input
Output file:	standard output
Time limit:	1second
Balloon color:	Burgundy

Mathilda is chopping any list she gets in the below format. So when checking a key T she should print the current mid key. Since she hates recursive function, could you do it for her?

```
function binary_search (A, n, T)
   L: = 0
   R: = n-1

   while L <=R do
       mid:= floor(L+R)
       if A[mid] < T then
            L: = m+1
       else if A[m] > T then
            R: = m-1
       else:
            return m
   return unsuccessful
```

Write a program which solves Mathilda's problem.

Input

The input consists of, on the first line $1 \leq T < 100$, the second line consists of length of an array $1 \leq n \leq 100$ and key to be searched k, the last line consists of $1 \leq A[i] \leq 150000$.

Output

Output the result from Mathilda's given program print the current key and determine whether the key is found or not. If it's not found print "Key not found."

Example

Sample Input 1	Sample Output 1
2 3 65 89 18 46 65 12 54 69 75 2 3 5 4	54 69 65 Key found at index 4. 4 Key not found.

Problem E. Birthyear

Input file:	standard input
Output file:	standard output
Time limit:	1second
Balloon color:	Pink

Wendirad wanted to prepare a game in which he needs 2 people, the youngest and the oldest by birth year. Since he has an exam this week could you prepare a program for him? Write a program to identify the youngest person and the oldest person in the CSEC-ASTU lab.

Input

The number n ($1 \leq n \leq 100$) in the first line determines the number of people in a lab followed by each member name and year separated by space.

Suppose no one has the same name or the same birth year.

Output

The output contains a single integer.

Example

Sample Input 1	Sample Output 1
4 Natnael 1991 Mukerem 1988 Meaza 1993 Hana 1992	Meaza Mukerem

Problem F. Prime Sorting

Input file:	standard input
Output file:	standard output
Time limit:	1second
Balloon color:	Purple

Whenever we think of sorting integers, we tend to think of sorting them in ascending or descending order. However, we can play around a bit and define new sorting criteria. One criterion could be sorting numbers in terms of their summation of digits. Therefore in this sorting criterion, 13 would come before 9 as the sum of the digits of 13 is 4 and that of 9 is 9.

In this problem, given *n*, we are concerned with sorting numbers in the range *1* to *n* with the following sorting criteria. Numbers in this range must be sorted in terms of the number of factors in their prime factorization. In case of a tie, the smaller number will come first. For example, 20 = 2*2*5, so it has 3 numbers in its prime factorization. Similarly 35 = 5*7 has 2 numbers in its prime factorization. Therefore, 35 will come before 20 according to this criterion.

Input

The input contains multiple lines. The first line contains 2 integers n and q, where n is the upper limit of the range and q is the number that shows how many queries there are $1 \leq n \leq 300000$, $1 \leq q \leq 50000$. Then the following q lines contain a single integer x between 1 and n.

Output

The *x-th* number in the range *1 to n,* after sorting rule has been applied. It is guaranteed that *x-th* value is between *1* and *n.*

Example

Sample Input 1	Sample Output 1
10 5 1 2 3 4 5	1 2 3 5 7

Problem G. Represent Me

Input file:	standard input
Output file:	standard output
Time limit:	1second
Balloon color:	Silver

Jack learnt about the basics of graph last week and enjoyed it so much, but the part on graph representation confused him a little bit. So he decided he needed some kind of visualization to make graph representation clearer. He is just a beginner competitive programmer and asked you to help him with this task.

Given a list of edges with weights, your task is to display the graph representation in the form given in the sample output below.

Input

The input contains multiple lines of input. On the first line you will be given two integers and , where is the number of nodes and is the number of edges available. $1 \leq N,M \leq 50000$

Each of the following M lines contains 3 integers A, B, and W, where this line describes there is a two way edge between A and B with weight W. $1 \leq A,B \leq N, 1 \leq W \leq 100$

Output

Display n number of lines, each line contains a node then a list of all its neighbors with their respective weight, sorted lexicographically in the format given below.

node:<*space*>(node,<*space*>weight)<*space*>(node,<*space*>weight)…

Example

Sample Input 1	Sample Output 1
10 10 1 6 19 2 6 87 2 7 56 2 4 23 3 7 81 3 9 56 4 5 123 5 10 100 7 8 10 8 9 4	1: (6, 19) 2: (4, 23) (6, 87) (7, 56) 3: (7, 81) (9, 56) 4: (2, 23) (5, 123) 5: (4, 123) (10, 100) 6: (1, 19) (2, 87) 7: (2, 56) (3, 81) (8, 10) 8: (7, 10) (9, 4) 9: (3, 56) (8, 4) 10: (5, 100)

Problem H. Prime Twin

Input file:	standard input
Output file:	standard output
Time limit:	1second
Balloon color:	Red

Twin primes are pairs of primes of the form (*p, p*+2). The term "twin prime" was coined by Paul Stckel (1892-1919). The first few twin primes are (3, 5), (5, 7), (11, 13), (17, 19), (29, 31), (41, 43). In this problem you are asked to find out the least prime twin pair greater than or equal to *n.*

Input

First line will be the number of test cases t, $1 \leq t \leq 1000$, in each test case you will be given a single integer n. $1 \leq n \leq 200000$

Output

For each line of input you will have to produce one line of output which contains the least prime twin greater than or equal to *n*. The pair is printed in the form (*p*1,<space>*p*2). Here <space> means the space character (ASCII 32)

Example

Sample Input 1	Sample Output 1
3 4 5 12	(5, 7) (5, 7) (17, 19)

Problem I. Visit Plan I

Input file:	standard input
Output file:	standard output
Time limit:	1second
Balloon color:	Blue

There are N cities inside a country called Graphopolis and Jennifer wanted to go to all it's cities and there will always be a path from one city to any other city, but she can't decide in which order to visit all the cities. After much thought she came up with the idea that she can visit each city in the following manner: she will first select a city where she will start her visits and then go to that city, after getting to that city she then selects another city where she can go from that city, after she go to the city she chose she will then select another unvisited city she can go from the current city and she will continue to do that until all the cities are visited. Each city is given a number from *1* to *N* including *N*. The roads are bidirectional and all the cities are reachable. One last thing, when she picks a city between multiple options, she will always pick the one with a lower city number.

Input

The input contains multiple lines of input. On the first line you will be given two integers N and M , where N is the number of cities and M is the number of roads available inside Graphopolis, $1 \leq N,M \leq 100000$.

Following this there will be M number of lines with each line containing two integers and . This signifies that there is a road between the cities A and B, $1 \leq A,B \leq N$. Finally there is a line with a single integer S, which is the starting city for Jennifer, $1 \leq S \leq N$.

Output

The order of cities which she has visited on a single line with a single space in between.

Example

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

Problem J. Visit Plan II

Input file:	standard input
Output file:	standard output
Time limit:	1second
Balloon color:	Green

There are N cities inside a country called Graphopolis and Jennifer wan...oops this feels like a deja vu right?, yeah this is the same Jennifer from the previous problem with the same problem, but she thought there might be another way to visit all the cities and this idea is put forward in the following manner: she will first select a city where she will start her visits and then go to all the cities that can be visited from this city, after all the cities are visited from the current city she will go to the next one and visit all the unvisited cities that can be visited from that city as well and she will continue to do that until all the cities are visited. Each city is given a number from *1* to *N* including *N*. The roads are bidirectional and all the cities are reachable. You probably already know how she likes to visit the cities, but just in case you forgot, when she picks a city between multiple options, she will always pick the one with a lower city number.

Input

The input contains multiple lines of input. On the first line you will be given two integers N and M , where N is the number of cities and M is the number of roads available inside Graphopolis, $1 \leq N,M \leq 100000$.

Following this there will be M number of lines with each line containing two integers and . This signifies that there is a road between the cities A and B, $1 \leq A,B \leq N$. Finally there is a line with a single integer S, which is the starting city for Jennifer, $1 \leq S \leq N$.

Output

The order of cities which she has visited on a single line with a single space in between.

Example

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