



Bangladesh Army University of Engineering & Technology (BAUET)

Mind Strom 4.0

Organized by BAUET Computer Society

In association with Department of Computer Science and Engineering

Programming Contest, 11 March 2023



Mind Storm 4.0 Programming Contest, 2023

Problem:

A. Happy Birthday BAUET

Time Limit: 1 second
Memory Limit: 256 megabytes



Bristi and Rony were the best of friends. When Rony's birthday came around, Bristi decided to give him a surprise instead of just a simple birthday wish.

As a computer programmer, Bristi decided to create a program that would print Rony's birthdate uniquely and creatively. On his birthday, Bristi sent Rony a code that displayed Rony's birthdate in a fascinating format if he entered the Birth Year. Rony was overjoyed and could not believe the effort that Bristi had put in to make him feel special.

As time went on, another special occasion came up, BAUET Day. Rony remembered the special gift that Bristi had given him and decided to use the same program to print the birthdate of their university, BAUET.

INPUT

The first input line contains a single integer n ($2000 \leq n \leq 2020$) --- the Birth Year of Rony OR BAUET

OUTPUT

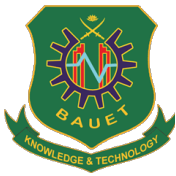
Print a single line --- the Birth Date of Rony OR BAUET in "DD-MM-YYYY" Format without the quotes

EXAMPLE

Sample Input
2001
Sample Output
14-10-2001

NOTE

In case-1, Rony's Birth Date is 14-10-2001. So, if $n=2001$ then the output will be " 14-10-2001" without the quotes



Problem: B. Least Beautiful Prime

Time Limit: 2 second
Memory Limit: 128 megabytes



Once upon a time, in a land far far away, there was a wise king who loved mathematics. One day, he challenged his subjects to find a way to predict the n th prime number. Many people came up with different ideas, but the king was not satisfied with any of them.

One day, a young girl named Bristi came to the king and presented him with an array of prime numbers, which he called "a". Bristi explained that the i th value in the array represented the i th prime number. The king was impressed with Bristi's knowledge and asked him to find the value of $b[a[i]]$ for the first n prime numbers.

Bristi knew that b represented an infinite array of prime numbers in ascending order, with no missing or duplicate primes. He also knew that the value of $b[a[i]]$ represented the $a[i]$ th prime number in the infinite array. Bristi used her mathematical skills to solve the problem, and he impressed the king with her solution.

The king was so impressed with Bristi's solution that he made him the court mathematician. From that day on, Bristi continued to solve many difficult mathematical problems for the king, and her fame spread throughout the land.

INPUT

The first (and the only) input line contains integer number n ($1 \leq n \leq 39$) - the number of prime numbers.

OUTPUT

Output the first n values of $b[a[i]]$ in order, separated by space.

EXAMPLE

Sample Input
3
Sample Output
3 5 11



Problem:

C. Most Beautiful Prime

Time Limit: 1 second
Memory Limit: 64 megabytes



Once upon a time, in a land far far away, there was a wise king who loved mathematics. One day, he challenged his subjects to find a way to predict the n th prime number. Many people came up with different ideas, but the king was not satisfied with any of them.

One day, a young girl named Bristi came to the king and presented him with an array of prime numbers, which he called "a". Bristi explained that the i th value in the array represented the i th prime number. The king was impressed with Bristi's knowledge and asked him to find the value of $b[a[i]]$ for the first n prime numbers.

Bristi knew that b represented an infinite array of prime numbers in ascending order, with no missing or duplicate primes. He also knew that the value of $b[a[i]]$ represented the $a[i]$ th prime number in the infinite array. Bristi used her mathematical skills to solve the problem, and he impressed the king with her solution.

The king was so impressed with Bristi's solution that he made him the court mathematician. From that day on, Bristi continued to solve many difficult mathematical problems for the king, and her fame spread throughout the land.

INPUT

The first (and the only) input line contains integer number n ($1 \leq n \leq 390,000$) — the number of prime numbers.

OUTPUT

Output the first n values of $b[a[i]]$ in order, separated by space.

EXAMPLE

Sample Input
3
Sample Output
3 5 11

NOTE

Be careful about the constraints



Problem: D. Sindbad and Monster

Time Limit: 1 second
Memory Limit: 64 megabytes



Sindbad is a great sailor. He loves seas very much because seas are very mysterious. He is fond of sailing because he loves to take challenges. He enjoys situations which are uncertain. He sailed his ship once again for an archipelago with N sailors. When he reached the archipelago, a monster met him and threatened to kill all of his sailors. The monster gave him a challenge. He said that there are infinite islands of distinct sizes. There are islands of every size from 1 to infinity. The monster told Sindbad that he will leave Sindbad and all his sailors in island of size M with P stones. There are secret tunnels between some islands. If the size of an island is divisor of the size of another island, then there is a tunnel between those islands. Through this tunnel sailors can go from larger islands to smaller islands but can't go to opposite direction. The tunnels are protected with magical doors. To open a door Sindbad needs X stones where X is the size of smaller islands. The monster requires that there must be at least one sailors or Sindbad himself at every island which are reachable through tunnels from the island of size M . If it is not possible the monster will kill all of them.

INPUT

First line contain Q number of test case. $1 \leq Q \leq 10000$

Next Q lines of input contains N M and P .

$0 \leq N, M \leq 1000,000,000$

$0 \leq P \leq 1000,000,000$

OUTPUT

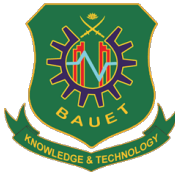
Print YES, if Sindbad and his sailors can stay safe. Otherwise print NO.

EXAMPLE

Sample Input
1
3 6 6
Sample Output
YES

NOTE(OPTIONAL)

For the example test case island of size 6 is connected with islands of size 3,2 and 1. Island 3 is connected with island of size 1. Island of size 2 is connected with island of size 1. So, there is a tunnel link to islands of size 6,3,2,1. Now Sindbad can stay at island of size 6 and send his three sailors to islands of size 3,2,1. To open the door to island of size 3 Sindbad needs 3 stones, to open the door to island of size 2 Sindbad needs 2 stones and to open the door to island of size 1 Sindbad needs 1 stone. So, with 6 stones and 3 sailors he can stay safe.

Mind Storm 4.0 Programming Contest, 2023

Problem: E. Temple Run

Time Limit: 1 second
Memory Limit: 64 megabytes



Cinderella lives in a very magical forest. Everyday there happens many surprising events. One of them is even more surprising. An unknown bear chases her. There is a den where the bear cannot enter. The den is N meters away from home. The road is divided in N segments numbered from 1 to N . There are obstacles at various segments on the magical road. Height of each obstacle is 1 meter. Cinderella jumps over the obstacles to reach the den. If there are Y obstacles at any segment, she has to jump Y meters at that segment. But she is wounded today. So, when she is at segment X , she can jump H meter if H divides both X and N . Today there are M obstacles on her way. She can transfer any obstacle from one segment to another segment on the road. Determine if she can reach the den safely or not.

INPUT

The first line contains number of test cases T .

Then the next T line contains two integer N and M . N is the distance of the den from home and M is total number of obstacles.

$0 \leq N \leq 1000,000$

$0 \leq M \leq 1000,000,000,000$

$0 < T \leq 1000,000$

OUTPUT

Print T lines of output. At each line print YES, if she can reach the den safely and NO in the opposite case.

EXAMPLE

Sample Input
3
6 5
6 16
6 15
Sample Output
YES
NO
YES

NOTE

For third case she can keep

1 obstacle at segment 1

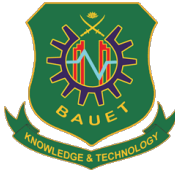
2 obstacles at segment 2

3 obstacles at segment 3

2 obstacles at segment 4

1 obstacle at segment 5

6 obstacles at segment 6



Problem:

F. Temple Run Once Again

Time Limit: 1 second
Memory Limit: 64 megabytes



Cinderella lives in a very magical forest. Everyday there happens many surprising events. One of them is even more surprising. An unknown bear chases her. There is a den where the bear cannot enter. The den is N meters away from home. The road is divided in N segments numbered from 1 to N . First time the bear tried to stop Cinderella by putting obstacles in her way. But Cinderella is very clever. So, she replaced all obstacles as her choice and jumped over them. But today the bear has a different plan. Today the bear dug holes at each segment. Each segment has h_i depth. The bear thought Cinderella will fall down in any of those holes. But Cinderella has made M cube of same height. She can put some cube in those holes to fill those holes and escape away. For example, if a hole has height h_i and she keeps x pieces of cubes and the cubes have height y then the hole is filled if $x*y \geq h_i$ otherwise the hole is not filled and Cinderella fall down in that hole. Here x and y are always integer. But as the height increase Cinderella needs more time to make those cube. So, before making those cube she calculated the minimum size of cube so that she can fill all those holes with her cube to escape. Now print the minimum size of those cubes.

INPUT

The first line contains N and M .

Next line contains N integers h_i .

$0 < N, M \leq 100,000$

$0 \leq h_i \leq 1000,000,000$

OUTPUT

Print minimum size of those cubes so that Cinderella can fill all the holes. And if filling all those holes is impossible then print -1.

EXAMPLE

Sample Input
3 7
3 7 8
Sample Output
3

Mind Storm 4.0 Programming Contest, 2023

Problem:

G. Best Friend Again

Time Limit: 1 second
Memory Limit: 256 megabytes



Last year in Mind Storm 3.0, you had successfully solved the best friend problem. This year my best friend joined a software company called “Headless Technologies Limited” as a content writer. But writing unique content is so much more challenging for a fresher. In beginning days, she tries to write all the content using ChatGPT. But the problems start when Google detects all the content as AI-generated content and rejects them immediately.

Now the only solution is if she can generate all the content by using a **paraphrasing tool**, then Google detects it as fully Human content. Paraphrasing refers to the process of restating a text or speech in your own words while retaining its original meaning. These tools can use various strategies to reword the text, as an example changing synonyms with matching words in a given input paragraph. But the lack of developing skills, my friend faces a serious problem in developing such kind of paraphrasing tool for her. Now as a programmer, you have to develop a paraphrasing tool for my best friend to help out with this serious problem.

INPUT

The first line contains a single integer **n** ($1 \leq n \leq 10000$) — the number of words and synonyms that you can use in your paraphrasing tool.

The next **n** line contains two strings. The first string is a word and the second one is a corresponding synonym. All words and synonyms have specific English meaning. Also, words and synonyms are separated using a single space and the length of words and synonyms are **m** ($1 \leq m \leq 14$). All words and synonyms are in a lowercase letter. Synonym can be repeated more than one for a same word and in that case, you have to take the last updated synonym for paraphrasing.

The last line contains a paragraph. The total numbers of words are **p** ($1 \leq p \leq 10^5$).

OUTPUT

At first you have to match the given word with input paragraph and replace them with corresponding synonym. The first line of output contains total numbers of replacing words **k** ($0 \leq k \leq 1000$). The last lines print the updated paragraph after performing the paraphrasing.

EXAMPLE

Sample Input
5
dynamic powerful
critical demanding
technology automation
process action
growing developing

Programming is a dynamic and constantly evolving field that requires critical thinking, problem-solving skills, and attention to detail. With the growing demand for technology and digital solutions, programming has become an essential skill in many industries, making it a valuable career path for those interested in technology and innovation.

Sample Output

5

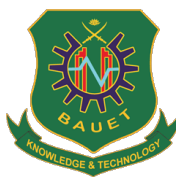
Programming is a powerful and constantly evolving field that requires demanding thinking, problem-solving skills, and attention to detail. With the developing demand for automation and digital solutions, programming has become an essential skill in many industries, making it a valuable career path for those interested in automation and innovation.

EXPLANATION

In the first line, the word “**dynamic**” replaced by “**powerful**” and “**critical**” replaced by “**demanding**”. In the second line “**growing**” replaced by “**developing**” and the word “**technology**” replaced twice by “**automation**”. Total five times replacement happened.

NOTE

Please avoid counting plural or changing tense for given words while performing the matching task. For example, the given word “**skill**” cannot be matched with “**skills**”.



Problem: H. CG Code and Life

Time Limit: 1 second
Memory Limit: 64 megabytes



There is a myth that one cannot maintain both CG Code and Life. If there is a distance between CG to Code and Code to Life and Life to CG then according to the myth the sum of two distance will always be greater than the another.

If anyone has a distance greater in one than other two then he is said to be the legendary GM and he has a lifespan of "0" (Zero Without the quotes)

If there are distance between CG to Code is "X" and Code to Life is "Y" and Life to CG is "Z" then a lifespan of an ordinary person will be

Lifespan= $\text{SQRT}\{S*(S-X)*(S-Y)*(S-Z)\}$ [Where $S=(X+Y+Z)/2$]

INPUT

The first (and the only) input line contain 3 integer number X, Y, Z ($1 \leq X, Y, Z \leq 10^9$)

OUTPUT

Output the lifespan of one person

EXAMPLE

Sample Input
3 4 5
Sample Output
6.00
Sample Input
3 4 6
Sample Output
5.33
Sample Input
37 23 12
Sample Output
0