Codeforces Beta Round #76 (Div. 1 Only)

A. Frames

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Throughout Igor K.'s life he has had many situations worthy of attention. We remember the story with the virus, the story of his mathematical career and of course, his famous programming achievements. However, one does not always adopt new hobbies, one can quit something as well.

This time Igor K. got disappointed in one of his hobbies: editing and voicing videos. Moreover, he got disappointed in it so much, that he decided to destroy his secret archive for good.

Igor K. use Pindows XR operation system which represents files and folders by small icons. At that, m icons can fit in a horizontal row in any window.

Igor K.'s computer contains n folders in the D: disk's root catalog. The folders are numbered from 1 to n in the order from the left to the right and from top to bottom (see the images). At that the folders with secret videos have numbers from a to b inclusive. Igor K. wants to delete them forever, at that making as few frame selections as possible, and then pressing Shift+Delete exactly once. What is the minimum number of times Igor K. will have to select the folder in order to select folders from a to b and only them? Let us note that if some selected folder is selected repeatedly, then it is deselected. Each selection possesses the shape of some rectangle with sides parallel to the screen's borders.

Input
The only line contains four integers n, m, a, b ($1 \le n, m \le 10^9$, $1 \le a \le b \le n$). They are the number of folders in Igor K.'s computer, the width of a window and the numbers of the first and the last folders that need to be deleted.

Output
Print a single number: the least possible number of times Igor K. will have to select the folders using frames to select only the folders with numbers from a to b.

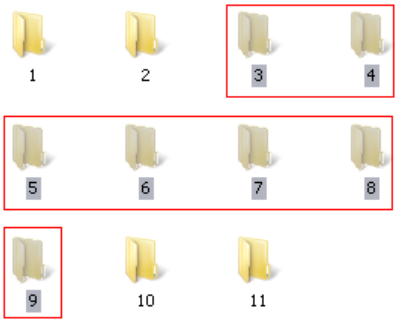
Sample test(s)

input
11 4 3 9
output
3

input
20 5 2 20
output
2

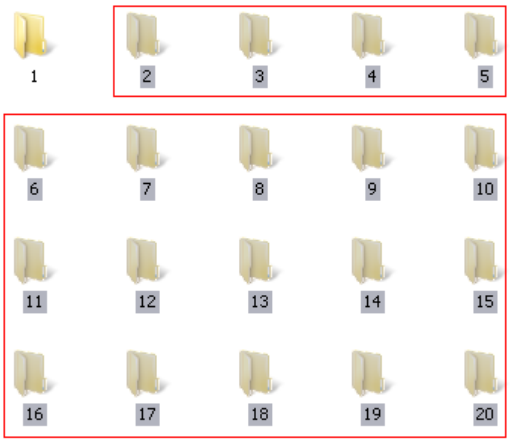
Note
The images below illustrate statement tests.

The first test:



In this test we can select folders 3 and 4 with out first selection, folders 5, 6, 7, 8 with our second selection and folder 9 with our third, last selection.

The second test:



In this test we can first select all folders in the first row (2, 3, 4, 5), then — all other ones.

B. End of Exams

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

Students love to celebrate their holidays. Especially if the holiday is the day of the end of exams!

Despite the fact that Igor K., unlike his groupmates, failed to pass a programming test, he decided to invite them to go to a cafe so that each of them could drink a bottle of... fresh cow milk. Having entered the cafe, the m friends found n different kinds of milk on the menu, that's why they ordered n bottles — one bottle of each kind. We know that the volume of milk in each bottle equals w.

When the bottles were brought in, they decided to pour all the milk evenly among the m cups, so that each got a cup. As a punishment for not passing the test Igor was appointed the person to pour the milk. He protested that he was afraid to mix something up and suggested to distribute the drink so that the milk from each bottle was in no more than two different cups. His friends agreed but they suddenly faced the following problem — and what is actually the way to do it?

Help them and write the program that will help to distribute the milk among the cups and drink it as quickly as possible!

Note that due to Igor K.'s perfectly accurate eye and unswerving hands, he can pour any fractional amount of milk from any bottle to any cup.

Input

The only input data file contains three integers n, w and m ($1 \le n \le 50$, $100 \le w \le 1000$, $2 \le m \le 50$), where n stands for the number of ordered bottles, w stands for the volume of each of them and m stands for the number of friends in the company.

Output

Print on the first line "YES" if it is possible to pour the milk so that the milk from each bottle was in no more than two different cups. If there's no solution, print "NO".

If there is a solution, then print m more lines, where the i-th of them describes the content of the i-th student's cup. The line should consist of one or more pairs that would look like "b v". Each such pair means that v ($v > 0$) units of milk were poured into the i-th cup from bottle b ($1 \le b \le n$). All numbers b on each line should be different.

If there are several variants to solve the problem, print any of them. Print the real numbers with no less than 6 digits after the decimal point.

Sample test(s)

input

```
2 500 3
```

output

```
YES
1 333.333333
2 333.333333
2 166.666667 1 166.666667
```

input

```
4 100 5
```

output

```
YES
3 20.000000 4 60.000000
1 80.000000
4 40.000000 2 40.000000
3 80.000000
2 60.000000 1 20.000000
```

input

```
4 100 7
```

output

```
NO
```

input

```
5 500 2
```

output

```
YES
4 250.000000 5 500.000000 2 500.000000
3 500.000000 1 500.000000 4 250.000000
```

C. Azembler

time limit per test: 5 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

After the Search Ultimate program that searched for strings in a text failed, Igor K. got to think: "Why on Earth does my program work so slowly?" As he double-checked his code, he said: "My code contains no errors, yet I know how we will improve Search Ultimate!" and took a large book from the shelves. The book read "Azembler. Principally New Approach".

Having carefully thumbed through the book, Igor K. realised that, as it turns out, you can multiply the numbers dozens of times faster. "Search Ultimate will be faster than it has ever been!" — the fellow shouted happily and set to work.

Let us now clarify what Igor's idea was. The thing is that the code that was generated by a compiler was far from perfect. Standard multiplying does work slower than with the trick the book mentioned.

The Azembler language operates with 26 registers (eax, ebx, ..., ezx) and two commands:

- [x] — returns the value located in the address x. For example, [eax] returns the value that was located in the address, equal to the value in the register eax.
- lea x, y — assigns to the register x, indicated as the first operand, the second operand's address. Thus, for example, the "lea ebx, [eax]" command will write in the ebx register the content of the eax register: first the [eax] operation will be fulfilled, the result of it will be some value that lies in the address written in eax. But we do not need the value — the next operation will be lea, that will take the [eax] address, i.e., the value in the eax register, and will write it in ebx.

On the first thought the second operation seems meaningless, but as it turns out, it is acceptable to write the operation as

lea ecx, [eax + ebx],

lea ecx, [k*eax]

or even

lea ecx, [ebx + k*eax],

where k = 1, 2, 4 or 8.

As a result, the register ecx will be equal to the numbers eax + ebx, k*eax and ebx + k*eax correspondingly. However, such operation is fulfilled many times, dozens of times faster that the usual multiplying of numbers. And using several such operations, one can very quickly multiply some number by some other one. Of course, instead of eax, ebx and ecx you are allowed to use any registers.

For example, let the eax register contain some number that we should multiply by 41. It takes us 2 lines:

lea ebx, [eax + 4*eax] // now ebx = 5*eax

lea eax, [eax + 8*ebx] // now eax = eax + 8*ebx = 41*eax

Igor K. got interested in the following question: what is the minimum number of lea operations needed to multiply by the given number n and how to do it? Your task is to help him.

Consider that at the initial moment of time eax contains a number that Igor K. was about to multiply by n, and the registers from ebx to ezx contain number 0. At the final moment of time the result can be located in any register.

Input

The input data contain the only integer n ($1 \le n \le 255$), which Igor K. is about to multiply.

Output

On the first line print number p, which represents the minimum number of lea operations, needed to do that. Then print the program consisting of p commands, performing the operations. It is guaranteed that such program exists for any n from 1 to 255.

Use precisely the following format of commands (here k is equal to 1, 2, 4 or 8, and x, y and z are any, even coinciding registers):

lea x, [y]

lea x, [y + z]

lea x, [k*y]

lea x, [y + k*z]

Please note that **extra spaces at the end of a command are unacceptable**.

Sample test(s)

input
41
output

```
2
lea ebx, [eax + 4*eax]
lea ecx, [eax + 8*ebx]
```

input

```
2
```

output

```
1
lea ebx, [eax + eax]
```

input

```
4
```

output

```
1
lea ebx, [4*eax]
```

D. Flags

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

When Igor K. was a freshman, his professor strictly urged him, as well as all other freshmen, to solve programming Olympiads. One day a problem called "Flags" from a website called Timmy's Online Judge caught his attention. In the problem one had to find the number of three-colored flags that would satisfy the condition... actually, it doesn't matter. Igor K. quickly found the formula and got the so passionately desired Accepted.

However, the professor wasn't very much impressed. He decided that the problem represented on Timmy's Online Judge was very dull and simple: it only had three possible colors of flag stripes and only two limitations. He suggested a complicated task to Igor K. and the fellow failed to solve it. Of course, we won't tell anybody that the professor couldn't solve it as well.

And how about you? Can you solve the problem?

The flags consist of one or several parallel stripes of similar width. The stripes can be one of the following colors: white, black, red or yellow. You should find the number of different flags with the number of stripes from L to R, if:

- a flag cannot have adjacent stripes of one color;
- a flag cannot have adjacent white and yellow stripes;
- a flag cannot have adjacent red and black stripes;
- a flag cannot have the combination of black, white and red stripes following one after another in this or reverse order;
- symmetrical flags (as, for example, a WB and a BW flag, where W and B stand for the white and black colors) are considered the same.

Input

The only line contains two integers L and R ($1 \le L \le R \le 10^9$). They are the lower and upper borders of the number of stripes on the flag.

Output

Print a single number — the number of different flags that would satisfy the condition of the problem and would have from L to R stripes, modulo 1000000007.

Sample test(s)

input
3 4
output
23

input
5 6
output
64

Note

In the first test the following flags exist (they are listed in the lexicographical order, the letters B, R, W, Y stand for Black, Red, White and Yellow correspondingly):

3 stripes: BWB, BYB, BYR, RWR, RYR, WBW, WBY, WRW, WRY, YBY, YRY (overall 11 flags).

4 stripes: BWBW, BWBY, BYBW, BYBY, BYRW, BYRY, RWRW, RWRY, RYBW, RYBY, RYRW, RYRY (12 flags).

That's why the answer to test 1 is equal to $11 + 12 = 23$.

E. Lostborn

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Igor K. very much likes a multiplayer role playing game WineAge II. Who knows, perhaps, that might be the reason for his poor performance at the university. As any person who plays the game, he is interested in equipping his hero with as good weapon and outfit as possible.

One day, as he was reading the game's forum yet again, he discovered a very interesting fact. As it turns out, each weapon in the game is characterised with k different numbers: a_1, ..., a_k. They are called hit indicators and according to the game developers' plan they are pairwise coprime.

The damage that is inflicted during a hit depends not only on the weapon's characteristics, but also on the hero's strength parameter. Thus, if the hero's strength equals n, than the inflicted damage will be calculated as the number of numbers on the segment $[1, n]$, that aren't divisible by any hit indicator a_i.

Recently, having fulfilled another quest, Igor K. found a new Lostborn sword. He wants to know how much damage he will inflict upon his enemies if he uses it.

Input

The first line contains two integers: n and k ($1 \le n \le 10^{13}$, $1 \le k \le 100$). They are the indicator of Igor K's hero's strength and the number of hit indicators.

The next line contains space-separated k integers a_i ($1 \le a_i \le 1000$). They are Lostborn sword's hit indicators. The given k numbers are pairwise coprime.

Output

Print the single number — the damage that will be inflicted by Igor K.'s hero when he uses his new weapon.

Please, do not use the %lld specificator to read or write 64-bit integers in C++. It is preferred to use the cin, cout streams or the %I64d specificator.

Sample test(s)

input
20 3 2 3 5
output
6

input
50 2 15 8
output
41

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