A – LONELY NUMBER

Time limit: 2s

Memory limit: 512MB

Minh has a very special sequence of N elements, each i-th element can form a pair with another j^{th} element with its same value (note that, if the j^{th} element is paired with the i^{th} element, it cannot be paired with other element).

See, even numbers have each other, so how about you, mate? Just kidding, I surely know that you are single, therefore, exists such a number in Minh's sequence. It is called the 'lonely number' (just like you, ahihi). The lonely number is the value of the only element in the sequence which cannot be paired with any other element. Your mission is to find out that number.

INPUT

The first line is a positive odd integer N.

The next line consists N positive integer which is Minh's special sequence.

Each value from the input does not exceed 10^5, guarantee that the given sequence contains only one lonely number (like you).

OUTPUT

A single number indicates the value of the lonely number.

SAMPLE INPUT	SAMPLE OUTPUT
9 1 1 2 3 3 2 1 3 1	3

B – THE VIDEO GAME

Time limit: 2s

Memory limit: 512MB

Khoa loves playing video games, one day Khoa finds an interesting 8-bit game on the Steam platform.

The game consists of a row of N cells where the tanks are. Khoa drives a plane from above to bomb down a cell chosen by him. A tank hit by the bomb in the first time will move to 1 of 2 adjacent cells (the tanks in the first cell can only go to the second cell and the tanks in N^{th} cell can only go to $N-1^{th}$ cell). The tanks that get hit by the bomb twice will be completely destroyed.

At a level with exceptional difficulty, Khoa's airplane flew so high that the map was obscured with clouds. Now, it is impossible for Khoa to know where the tanks are. Your task is to help Khoa plan a bombing tactic which uses the least number of bombs but still guarantees to destroy all tanks in any situation.

INPUT

A single integer N indicates the number of cells in the map. ($2 \leq N \leq 10^5$).

OUTPUT

The first line prints the least number of bombs.

The second line is the bombing plan, it consists integers which indicate cells need to be bombed respectively.

SAMPLE INPUT	SAMPLE OUTPUT
4	6 4 2 1 3 2 4

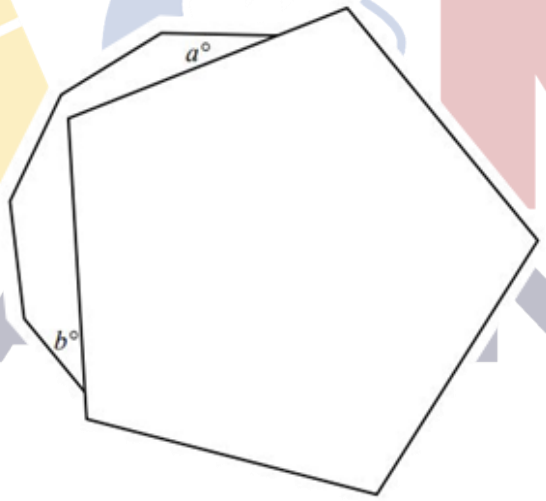
C – "BOTTOM" POLYGON

Time limit: 2s

Memory limit: 512MB

Image recognition is a fundamental problem in Computer Vision, Khánh is studying about this field so he is very interested in related problems. At the same time, Mathematics holds a great fascination for Khánh, so he decided to write a program to solve a geometric problem based solely on the given image, which will use image recognition algorithms and measurements accordingly.

The problem is as follows: A regular N-gon (a polygon with N identical sides and interior angles) covers part of another regular M-gon, such that, K sides of this M-gon are completely or partially visible, the rest is completely covered by the top polygon. Only one vertex of the top polygon lays in the area of the bottom polygon, two sides corresponding to this vertex cut the bottom polygon sides (not cutting vertices). Also, by using computer vision, Khánh was able to calculate the sum of the measures of the angles marked a^o and b^o (as follow).



Measured data include: top polygon with 5 sides,
bottom polygon with 5 sides visible, the sum of $a + b = 88^o$.

Data from the computer consist of: N is number of sides of the top polygon, K is number of visible sides of the bottom polygon, sum of the angles $a + b$; your task is to find out M, in other words, find out how many sides does the bottom polygon have?

INPUT

The first line contains 2 integers N $(3 \leq N)$ and K $(2 \leq K)$.

The next line contains two positive integers X and Y, is an irreducible fraction indicates the sum $a + b = \left(\frac{X}{Y}\right)^{\circ}\left(0 < \frac{X}{Y}\right)$.

The input data guarantee that $N \times K \times \frac{X}{Y} \leq 10^6$.

The data ensures the problem always has solution with integer M, $N \times K \times X \times Y \leq 10^{18}$.

OUTPUT

A single integer M is the number of sides of the bottom polygon.

SAMPLE INPUT	SAMPLE OUTPUT
5 5 88 1	9

Explanation: The diagram above indicates sample testcase.

D – ODD INEQUATION

Time limt: 2s
Memory limit: 512MB

One day, Tú Anh has been given a peculiar problem.

Define function $S(x)$ of a positive integer x as the sum of the digits of x. For example: $S(15) = 6$.

Tú Anh has been given 2 integers N and M, her job is to solve the following set of inequations:

$$\begin{cases} S(a) \geq N \\ S(b) \geq N \\ S(a+b) \leq M \end{cases}$$

If the roots of the given inequation are **below 15000 digits** then she must print out (a, b) satisfying the inequation. She also only needs to print out 1 solution if there are more answers.

When the problem above has no solution, Tú Anh must print out "NO SOLUTION" (without quotes).

INPUT

A single line with 2 integers N and M $(0 \leq N, M \leq 5 \times 10^4)$.

OUTPUT

If there's a solution for the set of inequations, print out 2 numbers on 2 lines (not including any meaningless 0 at the front): a on the first line, b on the second.

If there are no solutions, print "NO SOLUTION" on a line (without quotes).

SAMPLE INPUT	SAMPLE OUTPUT
7 5	7 7

E – AREA SUM

Time limit: 2s

Memory limit: 512MB

A teacher has given Sáng the following geometrical problem: On a Cartesian plane ($x - y$ plane), draw N lines parallel to the y-axis and M lines parallel to the x-axis, find the sum of the areas of rectangles made out of said lines. To make Sáng calculates more proficiently, his teacher has given him Q amount of said problem. As Sáng doesn't want to put much effort into the same kind of problem, he asks you to help him out.

INPUT

First line has a Q ($Q \leq 10^3$) indicating the amount of problems that needs solving.

For each problem:

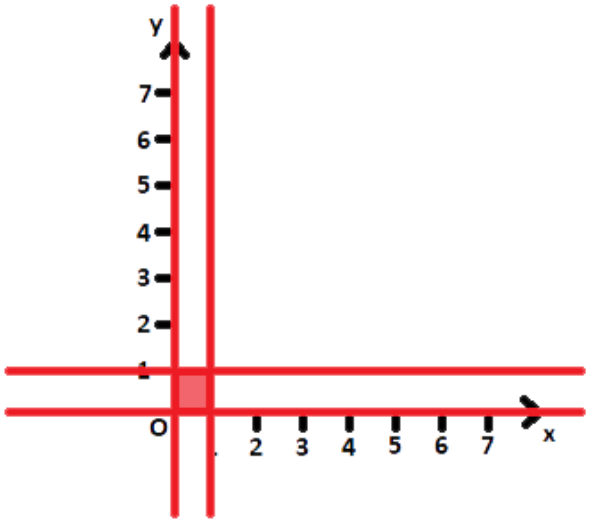
- On the first line, N and M ($N, M \leq 10^3$) are the amount of lines parallel to the y-axis and x-axis respectively.
- The second line has N integers, the integer x_i ($|x_i| \leq 10^3$) shows the i^{th} line satisfies $x = x_i$.
- The third line has M integers, the integer y_i ($|y_i| \leq 10^3$shows the i^{th} line satisfies $y = y_i$.

OUTPUT

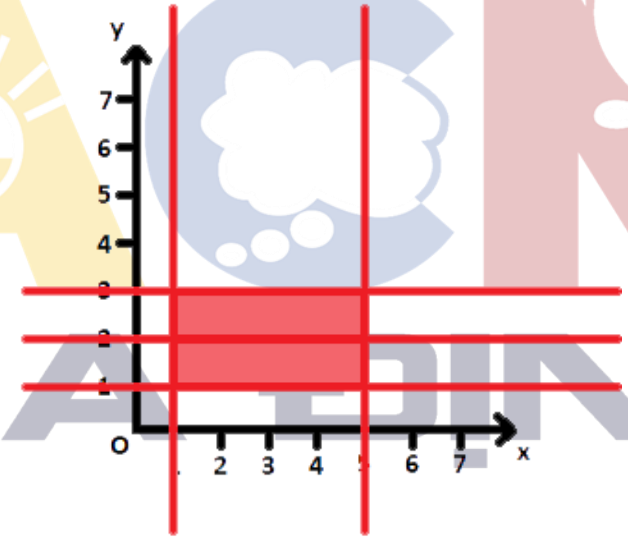
With each problem, print out on 1 line the sum of areas of every possible rectangles.

SAMPLE INPUT	SAMPLE OUTPUT
2 2 2 0 1 1 0 2 3 1 5 1 2 3	1 16

Explanation:
Problem 1 graph:



Problem 2 graph:



F – SKETCH

Time limt: 2s

Memory limit: 512MB

Phúc is practicing drawing and one of the first steps is to sketch. There's a saying: "To succeed, you have to act like a successful person". Ergo, Phúc decides to rent a cast of models to practice.

Out of N rented models, there's A male model(s), B handsome model(s) and C well-built model(s). Although Phúc is just practicing, he has high standards, Phúc only accepts handsome and well-built male models. Hence, the models have to in turn go into Phúc's studio. The question is: What is the minimum and the maximum number of models Phúc need to greet before meeting the desired model.

INPUT

There's only a line contains an integer N ($1 \leq N \leq 10^9$) and 3 integers A, B, C ($0 \leq A, B, C \leq N$).

OUTPUT

Print out on the same line respectively the minimum and the maximum amount of models required for Phúc to see before meeting the fitting model.

SAMPLE INPUT	SAMPLE OUTPUT
3 2 2 3	1 2

Explanation: In the best-case scenario, there will be 2 models fit Phúc's requirements, therefore he only needs to meet 1 unfit model before meeting the right one. In the worst-case scenario, there will only be 1 model fit Phúc's standards, which implies that he needs to meet 2 models not up to standard before meeting the correct person.

G – VOTE

Time limit: 2s

Memory limit: 512MB

After a year of being the class monitor… catastrophically, the whole class decides to demote Nam and vote for someone else. The process is very exciting, each individual in Nam's class can only vote for 1 amongst the N candidates. Right now the i^{th} candidate has received A_i vote(s) and there are K more people that haven't vote for anyone. With the voting rule above, Nam deduces that there's a possibility for all N candidates to have the same number of votes. Can you help Nam to confirm his belief, given the current status?

INPUT

The first line contains 2 integers N và K ($2 \leq N \leq 100$, $0 \leq K \leq 10^5$).

The next line includes N integers: $A_1, A_2, \dots, A_N$ ($0 \leq A_i \leq 100$).

OUTPUT

If you think he's correct, print out "YES" (without quotes). Otherwise, print out "NO" (without quotes).

SAMPLE INPUT	SAMPLE OUTPUT
5 3 1 2 2 0 2	YES

Explanation: With the 3 remaining votes, you can put 1 vote for the first candidate and 2 votes for the fourth.