

D. Running with Obstacles

time limit per test: 2 seconds

memory limit per test: 256 megabytes

input: standard input

output: standard output

A sportsman starts from point $x_{start} = 0$ and runs to point with coordinate $x_{finish} = m$ (on a straight line). Also, the sportsman can jump — to jump, he should first take a run of length of not less than s meters (in this case for these s meters his path should have no obstacles), and after that he can jump over a length of not more than d meters. Running and jumping is permitted only in the direction from left to right. He can **start** and **finish** a jump only at the points with integer coordinates in which there are **no obstacles**. To overcome some obstacle, it is necessary to land at a point which is strictly to the right of this obstacle.

On the way of an athlete are n obstacles at coordinates x_1, x_2, \dots, x_n . He cannot go over the obstacles, he can only jump over them. Your task is to determine whether the athlete will be able to get to the finish point.

Input

The first line of the input contains four integers n, m, s and d ($1 \leq n \leq 200\,000$, $2 \leq m \leq 10^9$, $1 \leq s, d \leq 10^9$) — the number of obstacles on the runner's way, the coordinate of the finishing point, the length of running before the jump and the maximum length of the jump, correspondingly.

The second line contains a sequence of n integers a_1, a_2, \dots, a_n ($1 \leq a_i \leq m - 1$) — the coordinates of the obstacles. It is guaranteed that the starting and finishing point have no obstacles, also no point can have more than one obstacle, The coordinates of the obstacles are given in an arbitrary order.

Output

If the runner cannot reach the finishing point, print in the first line of the output "IMPOSSIBLE" (without the quotes).

If the athlete can get from start to finish, print any way to do this in the following format:

- print a line of form "RUN X" (where "X" should be a positive integer), if the athlete should run for "X" more meters;
- print a line of form "JUMP Y" (where "Y" should be a positive integer), if the sportsman starts a jump and should remain in air for "Y" more meters.

All commands "RUN" and "JUMP" should strictly alternate, starting with "RUN", besides, they should be printed chronologically. It is not allowed to jump over the finishing point but it is allowed to land there after a jump. The athlete should stop as soon as he reaches finish.

Examples

input
3 10 1 3 3 4 7
output
RUN 2 JUMP 3 RUN 1 JUMP 2 RUN 2

input
2 9 2 3 6 4
output
IMPOSSIBLE