

Bombs

SEASON 6 - FINAL



We are playing a game, in which you are a point in a bounded discrete plane with bottom left corner (0, 0) and upper right corner (100, 100). Each second you can move 1 unit up, down, left or right, or remain stationary, but you cannot exit the plane.

Each second a bomb with a center at some point and a radius R explodes. If at the time of explosion of a particular bomb, you are at a distance less than or equal to R from it, the game ends. In the beginning, the radius of all bombs is 10 and it increases periodically.

You have K bomb defusing kits, each of which can defuse at most 1 bomb. If a bomb explodes in second t , you can defuse it in any second $0 < s < t$, if at that moment you are positioned on its center.

Given the information about all bombs, your task is to devise a strategy, which will bring you the highest score.

Score calculation. Assume the game ends in second E . For each second $0 < s < E$ you are alive, you gain 10 points. If you have defused a bomb, which explodes in second t , and in second t you are within its reach, you will gain t additional points. For each second you spend at a distance no more than 25 from the centre of the plane (50,50) you gain 1 additional point. For each second you spend at a distance no more than 5 from the centre of the plane (50,50) you gain 2 additional points.

Note: The game ends automatically after 10^6 seconds.

Input

Read the input data from the file `bombs.in`. The first row contains an integer T (the period of expansion of the explosion radius) and the number K . 10^6 rows follow – the description of the bombs. Each row contains two integers x and y , each between 0 и 100. They describe a bomb with center (x, y) and radius R , starting with the bomb, exploding in second 1. At the start we have $R=10$ and every T seconds we increase R by 1 (at second $T, 2T, 3T, \dots$), until it reaches its maximum value of 142.

Clarification: if a bomb explodes in second s it has a radius $\min\{10 + s / T, 142\}$, where $/$ is integer division.

Output

Print your output to the file `bombs.out`. The output should begin with two integers – your coordinates at second 0. After that print E rows (E was the second, in which the game ends). Each row should begin with a character, specifying the direction of movement for the current second – U for up ($y++$), D for down ($y--$), L for left ($x--$), R for right ($x++$), S to remain stationary. After the symbol you can print any amount of unique numbers between 1 и 10^6 – the time of explosion of the bombs you want to defuse on the current turn. All of them must be centered at your current location and must not have exploded yet. You may not defuse more than K bombs during the game.

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Scoring

If your output for a given test case is valid, you will earn $(\frac{yours+1}{max+1}) * 100 \%$ of the points allotted to it. Your output is invalid if:

- The number of moves in the output does not correspond to the length of the game;
- You exit the plane;
- You perform an incorrect defuse – more than K defuses; defusing a bomb with a center different from your current coordinates; attempting to defuse an exploded bomb; defusing a bomb twice.

Constraints

$0 \leq K \leq 1000$

Time limit – 5 sec

Memory limit – 64 MB

Test generation

In the tests the interval T takes the values 20, 100, 500, 1000 or 5000, distributed evenly. For each test a random K is chosen, within the constraints. The center of each bomb is randomly generated.

Additional files

For use of the contestants the organizers have provided a test generator, a grader program for grading your solutions locally and a visualizer for visualizing your solutions. The files, along with usage instructions, can be found in the Tasks section. You can find an example test case in the Tests section.