Problem K
L_∞ Jumps

Input: Standard Input
Time Limit: 3 seconds

Given two points (p, q) and (p', q') in the XY-plane, the L_∞ *distance* between them is defined as $\max(|p - p'|, |q - q'|)$. In this problem, you are given four integers n, d, s, t. Suppose that you are initially standing at point $(0, 0)$ and you need to move to point (s, t). For this purpose, you perform jumps exactly n times. In each jump, you must move exactly d in the L_∞ distance measure. In addition, the point you reach by a jump must be a lattice point in the XY-plane. That is, when you are standing at point (p, q), you can move to a new point (p', q') by a single jump if p' and q' are integers and $\max(|p - p'|, |q - q'|) = d$ holds.

Note that you cannot stop jumping even if you reach the destination point (s, t) before you perform the jumps n times.

To make the problem more interesting, suppose that some cost occurs for each jump. You are given $2n$ additional integers $x_1, y_1, x_2, y_2, \ldots, x_n, y_n$ such that $\max(|x_i|, |y_i|) = d$ holds for each $1 \le i \le n$. The cost of the i-th (1-indexed) jump is defined as follows: Let (p, q) be a point at which you are standing before the i-th jump. Consider a set of lattice points that you can jump to. Note that this set consists of all the lattice points on the edge of a certain square. We assign integer 1 to point $(p + x_i, q + y_i)$. Then, we assign integers $2, 3, \ldots, 8d$ to the remaining points in the set in the counter-clockwise order. (Here, assume that the right direction is positive in the x-axis and the upper direction is positive in the y-axis.) These integers represent the costs when you perform a jump to these points.

For example, Figure K.1 illustrates the points reachable by your i-th jump when $d = 2$ and you are at $(3, 1)$. The numbers represent the costs for $x_i = -1$ and $y_i = -2$.

Compute and output the minimum required sum of the costs for the objective.

Input

The input consists of a single test case.

n d s t
x_1 y_1
x_2 y_2
$\vdots$
x_n y_n

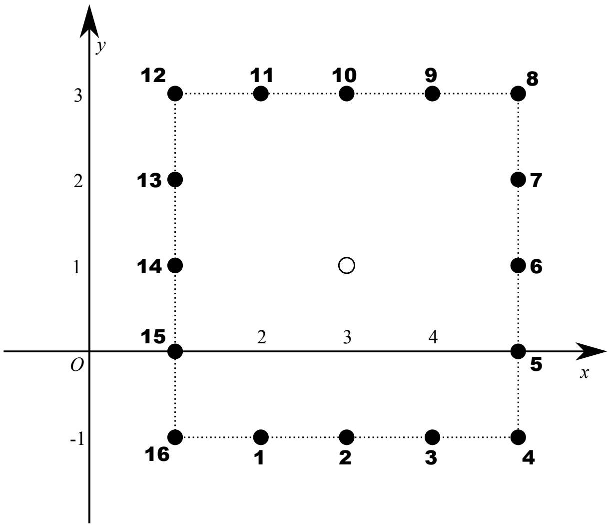

Figure K.1. Reachable points and their costs

The first line contains four integers. n ($1 \le n \le 40$) is the number of jumps to perform. d ($1 \le d \le 10^{10}$) is the L_∞ distance which you must move by a single jump. s and t ($|s|, |t| \le nd$) are the x and y coordinates of the destination point. It is guaranteed that there is at least one way to reach the destination point by performing n jumps.

Each of the following n lines contains two integers, x_i and y_i with $\max(|x_i|, |y_i|) = d$.

Output

Output the minimum required cost to reach the destination point.

Sample Input 1	Sample Output 1
3 2 4 0 2 2 -2 -2 -2 2	15

Sample Input 2	Sample Output 2
4 1 2 -2 1 -1 1 0 1 1 -1 0	10

Sample Input 3

```
6 5 0 2
5 2
-5 2
5 0
-3 5
-5 4
5 5
```

Sample Output 3

```
24
```

Sample Input 4

```
5 91 -218 -351
91 91
91 91
91 91
91 91
91 91
```

Sample Output 4

```
1958
```

Sample Input 5

```
1 10000000000 -10000000000 -2527532346
8198855077 10000000000
```

Sample Output 5

```
30726387424
```