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Kangaroo



by wanbo

Problem

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There are two kangaroos on an x-axis ready to jump in the positive direction (i.e, toward positive infinity). The first kangaroo starts at location x_1 and moves at a rate of v_1 meters per jump. The second kangaroo starts at location x_2 and moves at a rate of v_2 meters per jump. Given the starting locations and movement rates for each kangaroo, can you determine if they'll ever land at the same location at the same time?

Input Format

A single line of four space-separated integers denoting the respective values of x_1 , v_1 , x_2 , and v_2 .

Constraints

- $0 \leq x_1 < x_2 \leq 10000$
- $1 \leq v_1 \leq 10000$
- $1 \leq v_2 \leq 10000$

Output Format

Print YES if they can land on the same location at the same time; otherwise, print NO.

Note: The two kangaroos must land at the same location *after making the same number of jumps*.

Sample Input 0

```
0 3 4 2
```

Sample Output 0

```
YES
```

Explanation 0

The two kangaroos jump through the following sequence of locations:

- $0 \rightarrow 3 \rightarrow 6 \rightarrow 9 \rightarrow 12$
- $4 \rightarrow 6 \rightarrow 8 \rightarrow 10 \rightarrow 12$

Thus, the kangaroos meet after 4 jumps and we print YES.

Sample Input 1

```
0 2 5 3
```

Sample Output 1

```
NO
```

Explanation 1

The second kangaroo has a starting location that is ahead (further to the right) of the first kangaroo's starting location (i.e., $x_2 > x_1$). Because the second kangaroo moves at a faster rate (meaning $v_2 > v_1$) and is already ahead of the first kangaroo, the first kangaroo will never be able to catch up. Thus, we print NO.

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Submissions: 66485



Max Score: 10



Difficulty: Easy

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Current Buffer (saved locally, editable)  

C++  

```
1 #include <map>
2 #include <set>
3 #include <list>
4 #include <cmath>
5 #include <ctime>
6 #include <deque>
7 #include <queue>
8 #include <stack>
9 #include <string>
10 #include <bitset>
11 #include <cstdio>
12 #include <limits>
13 #include <vector>
14 #include <climits>
15 #include <cstring>
16 #include <cstdlib>
17 #include <fstream>
18 #include <numeric>
19 #include <sstream>
20 #include <iostream>
21 #include <algorithm>
22 #include <unordered_map>
23
24 using namespace std;
25
26
27 int main(){
28     int x1;
29     int v1;
30     int x2;
31     int v2;
32     cin >> x1 >> v1 >> x2 >> v2;
33     if (v1 > v2) {
34         while (x2 > x1) {
35             x1 += v1;
36             x2 += v2;
37         }
38         if (x1 == x2) cout << "YES"; else cout << "NO";
39     } else {
40         while (x1 > x2) {
41             x1 += v1;
42             x2 += v2;
43         }
44         if (x1 == x2) cout << "YES"; else cout << "NO";
45     }
46     return 0;
47 }
48
```

Line: 1 Col: 1

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