Geometry (I)

We have two lines on a 2D Cartesian plane. These lines are labeled as AB and CD where first line goes through points A and B and second one goes through C and D. We are interested to know answers of the following three questions:

1) Are these parallel or same line?

2) Do these intersecting?

3) Are these perpendiculars?

You are given the four points A, B, C, D . Answer all three question mentioned above.

Input

There are multiple test cases. Each test case consists of four lines. Each line contains two integers representing a point on Cartesian plane. Sequence of points are A, B, C, D.

Output

For each test case output in the following format:

Case $X: ans1 ans2 ans3

Where “X” will be replaced by case number starting from 0. “ans1” , “ans2”, “ans3” will be either “yes” or “no” (without the quote).

Example

Input:

```
0 0
5 0
1 1
5 1
0 0
5 0
-1 -1
-1 1
```

0 0
5 0
-1 -1
1 1

Output:
Case $0: yes no no
Case $1: no yes yes
Case $2: no yes no