CMPUT 274 - Tangible Computing
Morning Problem: Parallel Postulate

Description

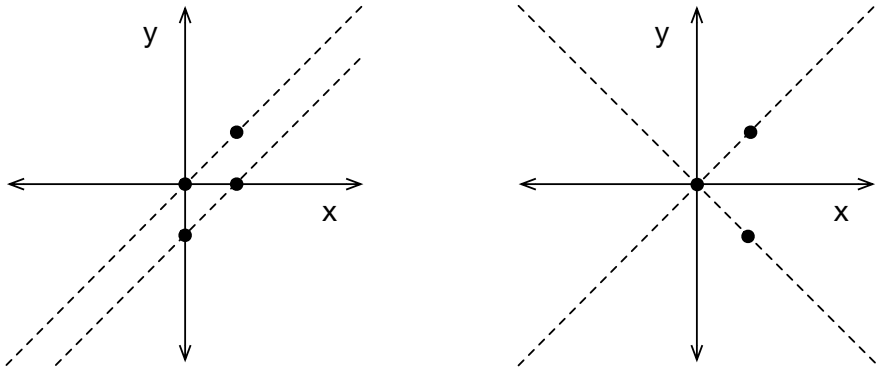
After spending most of her summer learning about projective geometry, Natali has decided to return to Euclidian geometry with an ambitious goal. Natali has decided that she will prove the parallel postulate (also known as Euclid's fifth postulate) using only Euclid's first four postulates.

Unfortunately, after all her work in projective geometry, Natali has forgotten what it means for two infinite lines to be parallel on a Euclidean plane. Given any two infinite lines, she needs you to tell her whether or not the lines are parallel.

Note: For this problem, we say two infinite lines are **not** parallel if they intersect at exactly one point somewhere on the Euclidean plan. In particular, two infinite lines that coincide (i.e. are the same infinite line) are considered parallel.

Caution: Floating point equality sometimes doesn't work the way you think it will! When testing two floats for equality, it is often better to test if they are within some small value (i.e. 0.000001) of each other than to directly test equality.

The first two sample input cases are depicted below.



sample input 1
`parallel`

sample input 2
`not parallel`

Input

There are two lines of input.

The first line of input contains 4 space-separated integers $-10,000 \leq x_1, y_1, x_2, y_2 \leq 10,000$ where (x_1, y_1) and (x_2, y_2) guaranteed to be distinct points. These are points the first infinite line passes through.

The second line of input is similarly given by 4 space-separate integers describing two distinct

points that the second line passes through.

Output

Output should be one of `parallel` or `not parallel` depending on whether or not the lines are parallel (according to our definition of parallel).

Sample Input 1

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

Sample Output 1

```
parallel
```

Sample Input 2

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

Sample Output 2

```
not parallel
```

Sample Input 3

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

Sample Output 3

```
parallel
```

Sample Input 4

```
0 1 0 2
0 1 0 3
```

Sample Output 4

```
parallel
```