INTRODUCTION

This exam is about determining some geometric properties of **four** distinct points in a plane represented in the 2-D Cartesian coordinate system.

You will be determining whether these four points are on

- a line,
- a circle,
- a rectangle,
- or a triangle.

If no such property can be detected, then you ought to output the trivial answer: 'arbitrary quadrilateral'.

PROBLEM & SPECIFICATIONS

In this problem, you are going to write a function in Python with name `geo_wizard` that takes a single argument, namely a list of 2-D coordinates of 4 points:

$$[[x_1,y_1],\ [x_2,y_2],\ [x_3,y_3],\ [x_4,y_4]]$$

where x_i's and y_i's are numeric values.

The `geo_wizard` function that you will code shall return one of the strings

1. `'line'`
2. `'circle'`
3. `'triangle'`
4. `'rectangle'`
5. `'arbitraryquadrilateral'`

Note the following:

- None of your decisions shall refer to a degenerate geometric shape.
- If more than one geometric entity go through the four points, you should return the topmost one (according to the enumerated list above). *(e.g. if your decision is that these four points match a 'circle' and a 'rectangle', you should return 'circle' only)*
- There is no ordering among the points in the input list.
- The four points are distinct.
- Use floating point arithmetics. If you need to do an equality test on floating points, do not use the '==' comparison operator. You should consider two values x and x' to be equal if

$$|x - x'| \leq 10^{-3}.$$

- You are allowed to define helper functions.
- Your program will enter a black-box test. Do not print anything on screen. The string to be returned from the `geo_wizard` function that you will be defining have to be exactly one of the five above.

EXAMPLE RUN

```
>>> geo_wizard([[1.75,-1.918698582794336],[3.1,4.948187929913334],
... [0.5,4.372281323269014],[5.5,-0.30277563773199456]])
'circle'
```