Preliminary Note

Until further notice, we will keep the 48-hour time from the end of class until the due date, even though the exercise(s) are designed to take the average student an hour or less.

Problem

Given a 3x3 array how can you determine the simplest type of 2d transformation it describes? Is it rigid? Is it a similarity? Is it affine? Or, is it homogeneous? The rules for these can be determined from today's lecture.

You are to write a short python script, starting from the provided template, that takes a series of 3x3 arrays and for each outputs one of five different words: `rigid`, `similarity`, `affine`, `homography` or `none`. You may assume that the last entry (lower right corner) of the array is 1. To avoid numerical issues, if any values a and b are such that $|a - b| < 1e - 6$ then the values should be considered equal.

I know in class I said that we would not consider the case of `none` but it is simple enough that I wanted to include it: if the matrix is not full rank then `none` is the correct answer. I used the determinant (`np.linal.det`) to check.

As examples, for the input

```
1.4  0.6 -1244
-0.6 1.4 989
0   0   1

2.6  0.6 244
-0.6 1.4 90
0   0   1

 0    0    114
 0    0    255
0.1 0.4    1

 0.82533561  0.56464247  163
-0.56464247  0.82533561  -45
  0          0           1

 1    0    114
 0    0    255
0.01 0.04    1
```

the script should output

```
similarity
```

```
affine
none
rigid
homography
```