

SelfAssessment76

October 18, 2015

1 Exercise 7.6

The list below contains 4 rectangles defined by width and height. Sort the list based on the area of each rectangle using an appropriate comparison function.

rects = [(5,2), (7,13), (9,4), (17,4)]

Answer appears after one blank page (so you don't peek).

Are you sure you're ready to peek?

2 Possible Solutions

```
In [7]: def rectArea(x):
        # Not necessary, but I want to print out the areas so we can see the changes
        return x[0] * x[1]

        def sortRect(a,b):
            # Sorting from smallest to largest:
            if a[0]*a[1] > b[0]*b[1]: return 1
            elif a[0]*a[1] < b[0]*b[1]: return -1
            else: return 0

        rects = [ (5,2), (7,13), (9,4), (17,4)]
        print 'The rectangles', rects, 'have areas of', map(rectArea,rects)
        rects.sort(sortRect)
        print '\nNow the areas are all like',map(rectArea,rects),'and rects is sorted this way:',rects
```

The rectangles [(5, 2), (7, 13), (9, 4), (17, 4)] have areas of [10, 91, 36, 68]

Now the areas are all like [10, 36, 68, 91] and rects is sorted this way: [(5, 2), (9, 4), (17, 4), (7,

You can see how we've written the sort here, it's all based on the product of the first and second argument in each tuple within the list. One thing you haven't see yet is the `map` function. You can look it up, but effectively, you can use `map` to apply a function to each element within a list, in this case we are applying `rectArea` to each tuple in `rects`.

We made a note when we started talking about lists that tuples were a special type of list. We see them here, as members of the list `rect`. Why might we be using them in this case? Maybe these represent the bounding boxes of lake polygons and we've decided that the first element is always the x distance (in km) and the second element is the y distance. In this case we would not want these objects to become lists, because as lists we could possibly re-sort the values, and make a terrible mess of everything.