20.12. Testing classes

To test a user-defined class, you will create test cases that check whether instances are created properly, and you will create test cases for each of the methods as functions, by invoking them on particular instances and seeing whether they produce the correct return values and side effects, especially side effects that change data stored in the instance variables. To illustrate, we will use the Point class that was used in the introduction to classes.

To test whether the class constructor (the __init__) method is working correctly, create an instance and then make tests to see whether its instance variables are set correctly. Note that this is a side effect test: the constructor method's job is to set instance variables, which is a side effect. Its return value doesn't matter.

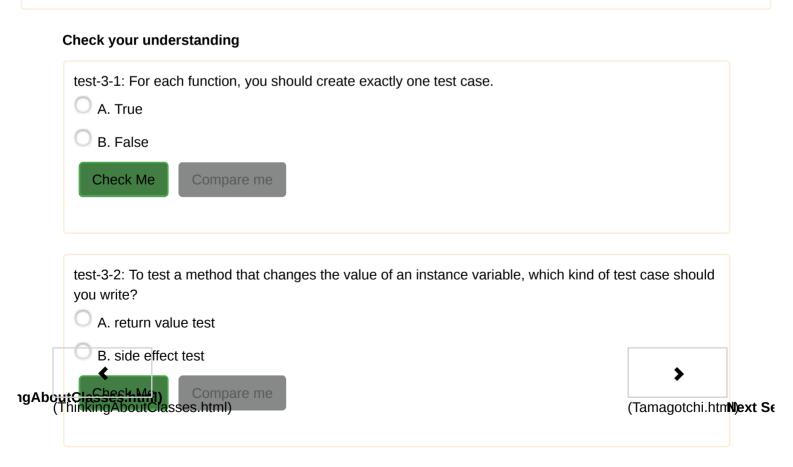
A method like distanceFromOrigin in the Point class you saw does its work by computing a return value, so it needs to be tested with a return value test. A method like move in the Turtle class does its work by changing the contents of a mutable object (the point instance has its instance variable changed) so it needs to be tested with a side effect test.

Try adding some more tests in the code below, once you understand what's there.

```
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       1 class Point:
             """ Point class for representing and manipulating x,y coordinates. """
       2
       3
             def __init__(self, initX, initY):
       4
       5
       6
                  self.x = initX
       7
                  self.y = initY
       8
             def distanceFromOrigin(self):
       9
      10
                  return ((self.x ** 2) + (self.y ** 2)) ** 0.5
      11
             def move(self, dx, dy):
      12
                  self.x = self.x + dx
      13
      14
                  self.y = self.y + dy
      15
      16 import test
      18 #testing instance variables x and y
      19p = Point(3, 4)
      20 tst.testEqual(p.y, 4)
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      23 #testing the distance method
      24p = Point(3, 4)
      25 test.testEqual(p.distanceFromOrigin(), 5.0)
```

```
26
27 #testing the move method
28 p = Point(3, 4)
29 p.move(-2, 3)
30 test.testEqual(p.x, 1)
31 test.testEqual(p.y, 7)
32

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test-3-3: To test the function maxabs, which kind of test case should y	ou write?
<pre>def maxabs(L): """L should be a list of numbers (ints or floats). e the maximum absolute value of the numbers in L.""" return max(L, key=abs)</pre>	The return value should b
A. return value test	
B. side effect test	
Check Me Compare me	
test-3-4: We have usually used the sorted function, which takes a li containing the same items, possibly in a different order. There is also (e.g. [1,6,2,4].sort()). It changes the order of the items in the lis None. Which kind of test case would you use on the sort method? A. return value test	a method called sort for lists
B. side effect test	
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