Lab Assignment 7

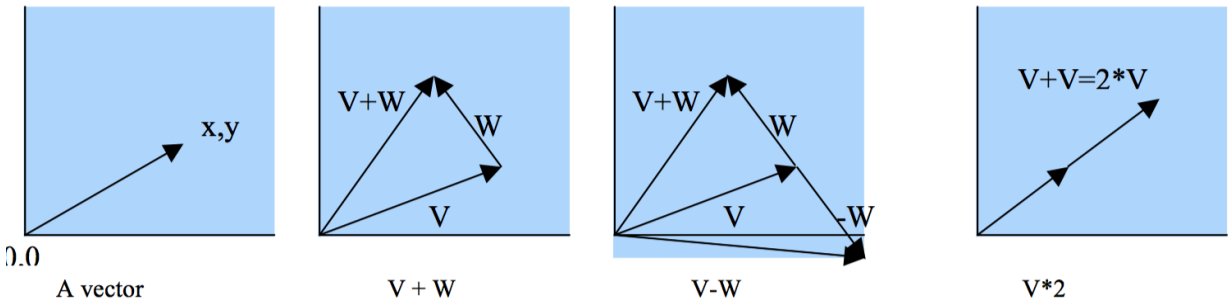
Classes

Assignment Overview

We are going to experiment with overloaded operators and making our own class. We are going to make a 2D vector class.

Background

So if you don't remember, here is a little background on two-dimensional vectors. A vector is basically an arrow that has a magnitude (a length) and a direction (an angle with respect to typically the x axis). It usually is represented as an x,y pair, where the origin of the vector is a 0,0 and the head of the vector is at the listed pair.



Here are some of the operations you can perform on a vector:

- Vector addition: If V1 is (x,y) and V2 is (a,b), the V+W is (x+a,y+b), a vector.
- Vector multiplication by a scalar: If V1 is (x,y), the V*n is (x*n,y*n) a vector.
- Vector subtraction: V-W is the same as V+(W*-1) a vector.
- Vector multiplication with another vector: There are two possibilities, dot product or cross product. We'll do dot product. If V=(x,y) and W=(a,b), then V*W = x*a + y*b, a scalar. Thus the dot product yields a scalar, not a vector.
- Vector magnitude: The magnitude based on the Pythagorean theorem for a V=(x,y) says that the magnitude is $\sqrt{x^2 + y^2}$. You might look at math.hypot for this.

Assignment Description / Specification:

Make a vector class. Provide the operators

__init__ # constructor, takes 3 args: self,x,y . No return

__str__ # for printing, takes 1 arg self. Returns a string

__add__ # vector + vector. Takes 2 args, self and vector. Returns a new #vector

__sub__ # vector – vector. Takes 2 args, self and vector. Returns a new #vector

__mul__ # two possibilities. vector*integer or vector*vector (dot #product). Get it to do just one of # the two at first, then see if #you can use introspection to do both

magnitude # magnitude of the vector. One arg, self. Returns a float

Deliverables

1. Submit your `lab07.py` through svn – your source code solution (remember to include your name, section as comments in this file).
2. Also submit a txt file in Blackboard.