Assignment 2
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Solution
A= sqrt (4+25+9)
A= 7

B = sqrt (25+25+9)
B = sqrt(59)

b) what are the unit vectors for each?

A = 2/7, 5/7, 3/7
B = 5/7.68, 5/7.68, 3/7.68

Write methods in the *Vector* class for magnitude and unit vector calculations.
Hint: myVector.magnitude should return a *scalar* and myVector.norm should return a *new* Vector.
Solution -

```
#
#
#
#########################
import math


class Vector():
        """docstring for Vector"""
        def __init__(self, x , y ,z ):
                super(Vector, self).__init__()
                self.x = x
                self.y = y
                self.z = z

        def get_info(self):
                print(self.x, self.y, self.z)


        def addVector(self, SecondVector):
                return Vector(self.x+SecondVector.x, self.y + SecondVector.y, self.z + SecondVector.z)

        def mult(self, s):
                return Vector(self.x*s, self.y*s, self.z*s)


        def magnitudeVector(self, SecondVector):

                x1 = self.x + SecondVector.x
                y1 = self.y + SecondVector.y
                z1 = self.z + SecondVector.z

                x2 = x1 * x1
```

```
                y2 = y1 * y1
                z2 = z1 * z1

                f = math.sqrt(x2 + y2 +z2)
                return (f, x2, y2, z2)

        def unitvector(self, magnitude):
                xUnit = self.x/magnitude
                yUnit = self.y/magnitude
                zUnit = self.z/magnitude

                return Vector(xUnit, yUnit, zUnit)


def main():
        """First vector """
        v = Vector(1,2,3)

        """Second vector """
        sv = Vector(2,3,4)

        """Resulting vector"""

        magnitude, x3 , y3, z3 = v.magnitudeVector(sv)

        nv = Vector(x3, y3, z3)

        UV = nv.unitvector(magnitude)

        UV.get_info()



main()
```

b) Press F to ~~pay respects~~ fire the apple launcher.
As-is, the apple launcher will miss the target. Change the values for the initial velocities in the *y* and *z* axies so that the apple hits the bullseye. What values did you use? Note - there's no single correct answer here.

Solution - I changed the Y value of velocity to -15.00 and z value to 15.00 to make the ball hit bullseye

c) Write an if statement inside the "physics" section of the code that will cause the apple to bounce off the target (the target is located at y = -24.0 m). This can be done in just a few lines of code. Provide your solution (copy and paste).

Solution -

```
 a = pos.y
   b = -24.00
   if a == b :
      vely.y = -vely.y
```

3. Change the z velocity to 0.0 and y velocity to -50.0.
- Fire the projectile and wait for it to fall out of sight.
- Locate the *cannonData.txt* file located either within the blender directory or your home directory. Copy and paste this into a spreadsheet.
- Change the y-velocity to 0.0 and repeat.
a) Compare the z velocities and positions. What do you notice?
b) The only thing that changed between the first and second case was the velocity along the y-axis. What effect does a change in the y-velocity have on the z-velocity?

Solution -
A -
We noticed the changing the y-velocity does not have any effect on z-velocity and they are independent of each other and ball is free falling due to gravity.

B-
Changing the velocity in in y direction will not affect the velocity in z direction as both are independent of each the other.