**physics experiment simulator**

The simulator will involve four major experiments.

Experiment 1

**Projectile motion.**

The user can input the initial velocity and angle of elevation of the projectile. My code will trace the path of the projectile. Many important parameters such as maximum height, range and time of flight will be also displayed on the screen.

The special feature of this experiment would be that the user will be able to move along the parabolic curve and will be able to know the horizontal and vertical velocity at that instance along with the time at which the ball will be at that point.

Experiment 2

**Collision**

There will be two special cases in this experiment.

Elastic collision- user will be able to decide the mass of the balls and their velocities. The simulator will show the collision of the two balls.

Inelastic collision- user will be able to decide the mass of the balls and their velocities. The simulator will show the collision of the two balls.

The user can also provide the coefficient of restitution. the simulator will then show the collision depending on the coefficient of restitution.

In each case the loss of kinetic energy will be displayed on the screen

Experiment 3

**Behaviour of an image in front of a convex lens**

When an object is placed in front of the convex lens there is a formation of the image.

This experiment will simulate how the image would change when you place the image at different positions (eg:- focus) in front of the convex lens

Experiment 4

**Motion of a ball in vertical circle**

Depending on the velocity provided to the ball and the length of the string to which it is connected, the simulator will show the trajectory of the ball.

Depending on the velocity given to the ball the simulator will response with whether the ball will cross the first quarter, complete the circle.

There will be a case in which the string would slack.

The libraries I could use

1)Tkinter or pygames

2)math

3)random

4)pylab

5)numpy

6)matplotlib.pyplot

7)ImageWriter

The user interface will comprise a main window which will give you the options of simulating the four experiments. By clicking the respective buttons, we can open a new window for a particular experiment which will ask for input and then simulate the experiment.

By first milestone date of November 13, I plan to finish the GUI and the first two experiments completely.