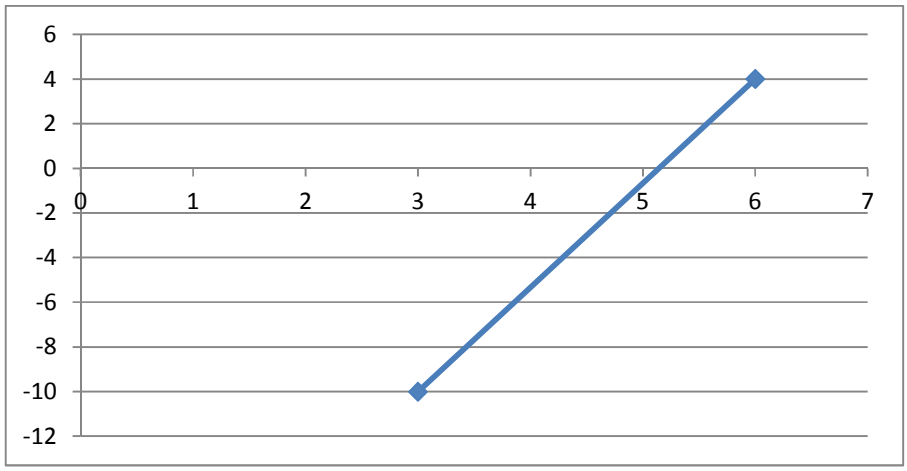
Week 3 Homework – CMSC405

1. Given the 2 end points shown on the graph below, determine the slope, y-intercept and give the slope-intercept formula. Determine one additional point that would be on that line using the slope-intercept formula where the x value would be greater than 6.



Slope:

P1 = (3, -10) and P2 = (6, 4);

m = (4-(-10))/(6-3) = 14/3;

y-intercept:

b = -10-14/3*3 = -14+10 = -24;

Slope intercept form:

y = 14/3x-24

Additional point:

for x = 9:

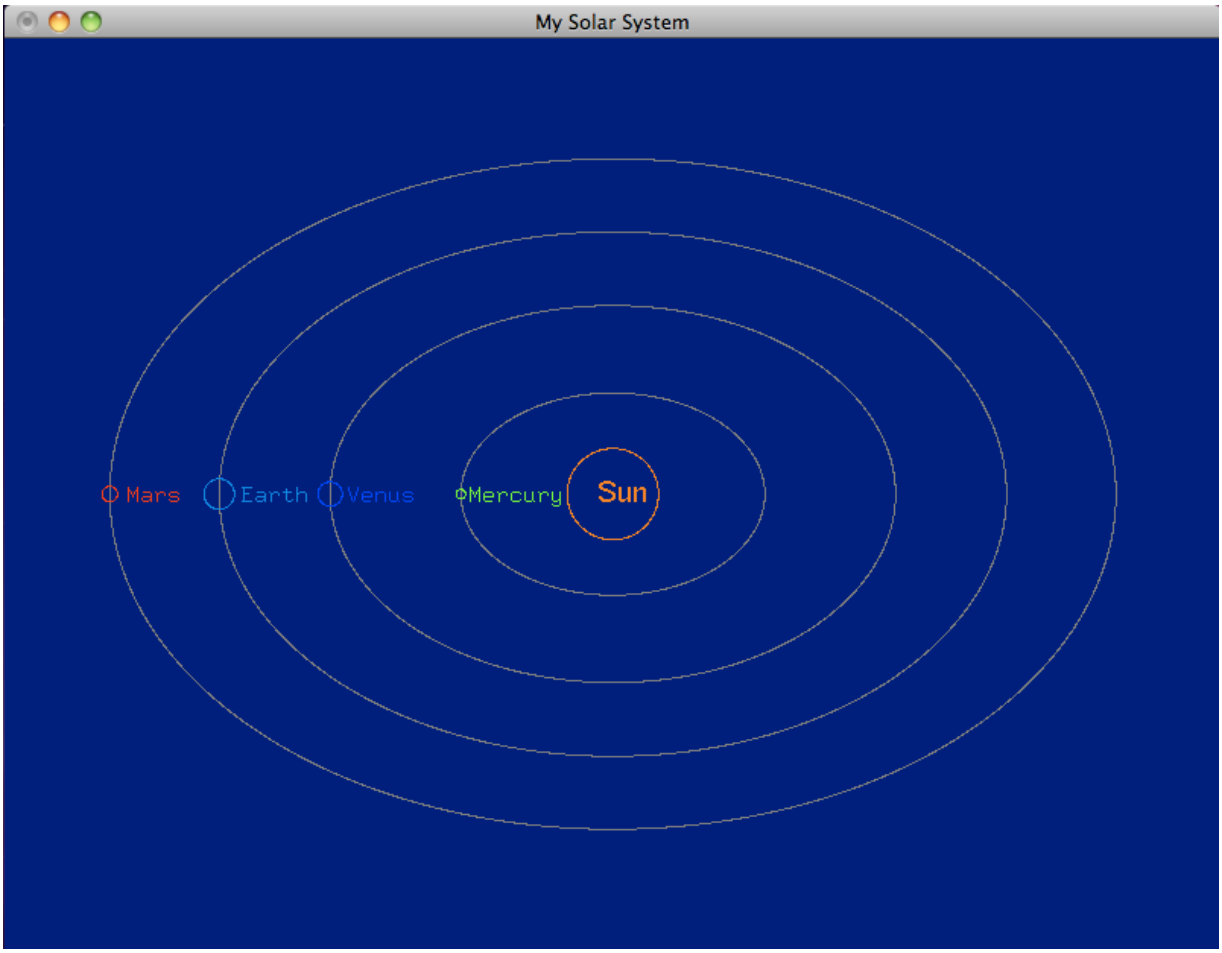
y = 14/3*9-24 = 18;

P3 = (9, 18);

2. Using Visual C++ and your OpenGL configured environment, write an application that displays a graphical scene that displays a top-down, 2-D (non-animated) view of the Sun and at least 4 planets of our solar system. You can assume elliptical orbits for all of the planets in your scene. Sizes of the ellipses should be scaled to the actual distances from the Sun. You should include

circles representing each of the planets and the Sun in your scene. Sizes of the objects should be scaled proportional to their actual size (with the exception of the Sun as it will be most likely too large to have other planet be visible). Be sure to label each of your planets and the Sun. In the submitted word document you submit, describe exactly how you scaled your planets and elliptical orbits. Be sure to reference your source for planet size, and distance from the Sun. (e.g. http://www.solarviews.com/eng/solarsys.htm)

My Solar System:



3. Using Visual C++ and your OpenGL configured environment, write an application that plots the 2D parabolic trajectories for an object whose starting position is p_1 = (500,400) with velocities, v = (30m/s,40 m/s), for at least 4 different planets including Earth. Plot the trajectories using different line colors and styles for values of time increments of 1 second. Plot the trajectories only up to the first negative Y value. For example for each, the last 3 plotted points (x,y) might be:

860	174.4
890	91.9
920	-0.4

Label the trajectories corresponding to the planets selected. Be sure to reference your source for gravity for the planets. A possible graphic display is shown below.

My parabolic trajectories: