

#### Nick Walker

### 23 February 2013

#### V 1.0

This program creates a solar system and uses Newton's Law of gravitation to animate motion. It allows the user to manipulate and explore the system at will.

## Requires:

- \* OpenGL a graphics library
  http://pyopengl.sourceforge.net/
- \* numpy a math library
  http://www.numpy.org/

## Features:

- \* Gravitation between multiple astrological objects
- \* Adding and subtracting objects from the system
- \* Camera rotation about the center of the system with keyboard input
- \* Scene traversal with keyboard input
- \* Scene traversal with mouse input

# **Future Features:**

\* Eccentricity in orbits

- \* More variation in mass and density
- \* Better collisions (debris)
- \* Larger systems
- \* Generation of high speed, high mass external astrological objects
- \* N number of stars
- \* Coloring
- \* Texturing
- \* Lighting control
- \* Bugfixes for movement
- \* Smoother motion

## Controls:

- \* w: move forward
- \* s: move backward
- \* a: turn left
- \* d: turn right
- \* e: turn up
- \* q: turn down
- \* i: rotate camera up
- \* k: rotate camera down
- \* j: rotate camera left
- \* 1: rotate camera right
- \* ]: add astrological object
- \* [: remove astrological object

\* mouse: changes camera facing

\* left click: move forward

\* right click: move backward

\* middle click: stop moving forward or backward

# Credits:

\* Nick Walker