Zach Pomper

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Dr. David Kosbie, Mentor Joyce (Xinyi Wang)

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Competitive Analysis: SolarSim

Comparable Projects:

* <https://www.thanassis.space/gravity.html>
* <http://firsttimeprogrammer.blogspot.it/2014/12/and-here-comes-whole-solar-system.html>
* <http://www.petercollingridge.co.uk/blog/solar-system-simulation>

Project 1:

This project is essentially as barebones a simulator as you’d be able to find anywhere. It uses RK4 integration, plane physics, a hardcoded Star object, and essentially no U.I. of any description. Even as far as simulation goes, the initial conditions are randomized, so this project really only models n-body gravitation. That said, users can toggle trajectory traces, zoom in/out, and restart the simulation with new starting conditions, so it isn’t completely autonomous. It also features rudimentary collisions via mass/volume/momentum combination, and parameters for things like the number of planets to be simulated. In general, lots of hard-cody and global-variable-solutions are used in this project, so not the best guide on the whole stylistically at least. In terms of modules, this project uses pygame, so nothing too crazy going on there.

Project 2:

Another example of plane physics, this project does a great job at showing the basic mechanics of a simulation in Python--It plots the trajectories of planets in a system using initial conditions, a data structure for planets, and some step integration of newtonian gravity. From the user experience perspective, however, this project is arguably even less noteworthy than the previous one: It literally has none--the only way to interface with the simulation’s mechanics is by editing values in the file. It also calculates rotational velocities, which is something that the other examined projects were definitely missing. This project actually uses matlibplot, which is impressive as it’s execution looks at least somewhat like actual planets’ orbits.

Project 3:

While this project is only somewhat similar to the other two, it’s ability to model gravitation of a large number of bodies is very impressive. The cool, part, however, is that it can simulate the creation of stars from many smaller bodies with accurate collision detection. With regards to the user experience, this project is again very simple--Planets/particles are placed randomly, and there isn’t much room for user input outside of modifying file parameters. Unfortunately, this project makes no use of angular mechanics and thus can’t be generalized to three dimensions accurately. This project is probably the most basic of the three.