Documentation for Programming Assignment M7: The N-Body simulation of the solar system

To start the program you can run: python Lab7.py There is an optional argument of –file or -f.

if the argument is used then the next argument is the file path of the csv file that holds the data for the solar system. It will then inter all the data from the file and do the 8+1 body simulation. It starts animating using the Euler-Cromer method and then animates using the Leapfrog method. The animation of the planets leave tails so make the planets easier to see.

If there is no argument it will ask for the mass of the sun, and earth. And the position of the earth in x and y coordinates. And the velocity in x and y coordinates. It will then do the 2-body simulation. It starts animating using the Euler-Cromer method and then animates using the Leapfrog method.The animation of the planets leave tails so make the planets easier to see.

1. For fun, what happens to the Earth's orbit in the 2-body case when you increase the initial velocity to 35 km/s?

the orbit gets larger it is still a complete orbit but is no longer centered on the sun. it starts at the same location so this is the closest location to the son. The other parts of the orbit are all further.

2. What is the behavior of your code if you alter the time step? That is, what happens when the time step is longer than necessary? What happens if it is shorter than necessary?

If the steps are longer the animation is faster but at the cost of accuracy. The planets also appear to jump great distances. If the time step is shorter than the animation takes longer. The more steps the slower it is.