**Zander Poole Lab 9 EE361 4/24/23**

**1.**

**SolarSystem:**

Constructors:

\_\_init\_\_(self, width, height)

Accessors:

showPlanets(self)

Mutators:

addPlanet(self, aPlanet)

addSun(self, aSun)

movePlanets(self)

freeze(self)

**Sun:**

Constructors:

\_\_init\_\_(self, iName, iRad, iM, iTemp)

Accessors:

getMass(self)

getXPos(self)

getYPos(self)

Mutators:

None

**Planet:**

Constructors:

\_\_init\_\_(self, iName, iRad, iM, iDist, iVx, iVy, iC)

Accessors:

getXPos(self)

getYPos(self)

getXVel(self)

getYVel(self)

Mutators:

moveTo(self, newX, newY)

setXVel(self, newVx)

setYVel(self, newVy)

**2.**

 → Before \_\_repr\_\_

 → After \_\_repr\_\_

Before 

After



Before the \_\_repr\_\_ method was implemented, when the planet was printed the memory location was displayed. Once the \_\_repr\_\_ method was added to the Planet class, the output of printing the planet was as intended. The same is try for the list of planets except it is printed as contents of a list.

**3.**

Without the \_\_lt\_\_ method implemented, the following is outputted when the sort is run: “TypeError: '<' not supported between instances of 'Planet' and 'Planet'”. This happens because there is no specified way to compare in Planet. But when the \_\_lt\_\_ method is added to the Planet class, following is outputted:

“[Name:Mercury,Mass:1000,Distance:0.25,Radius:19.5, Name:Earth,Mass:5000,Distance:0.3,Radius:47.5, Name:Mars,Mass:9000,Distance:0.5,Radius:50, Name:Jupiter,Mass:49000,Distance:0.7,Radius:100]”

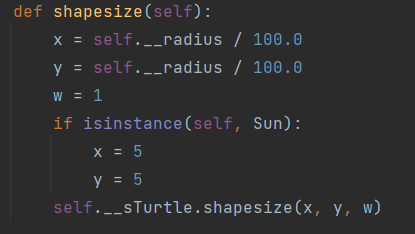
This Output is as expected as the list of planets is now sorted by mass.

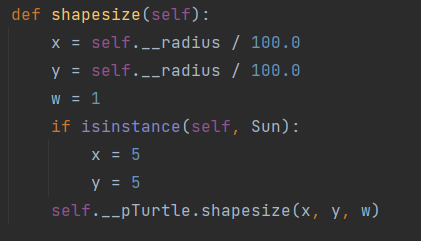
**4.**

When the mass of the Sun is increased, it causes the planets that orbit it to go very fast when closer to it. It also caused the orbits to change, which seems to be caused by the planets being pulled closer and closer to the Sun. When the mass of the Sun is decreased, it causes the planets to lose attraction to it. This causes the orbits to be longer, slower, and eventually non existent as the planets just move out of frame away from the Sun.

When the planet's vY is increased the planet seems to be less attracted to the sun causing its orbit to tail off, where the planet just drifts out into space. When the planets vY is decreased, the opposite occurs, the planets move slowly and drift toward the sun causing its orbit to be very close to it.

**5.**

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