```csharp
1    using System;
2    using System.Linq;
3    using System.Collections.Generic;
4    using Structures;
5    using static Program.Constants;
6    namespace Structures {
7            static class Examples {
8                    // Example bodies, elements, and systems
9                    public static Body sun {get; private set;}
10                   public static PlanetarySystem solar_system {get; private set;}
11                   public static List<OrbitalElements> solar_system_elements
     {get; private set;}
12                   public static List<Body> solar_system_bodies {get; private
     set;}
13                   public static PlanetarySystem inner_solar_system {get;
     private set;}
14                   static Examples() {
15                       sun = new Body() {
16                           name = "Sol",
17                           stdGrav = 1.32712440018e20,
18                           radius = 696342e3/5, // 5x smaller than
     normal for viewabilty
19                           position = Vector3.zero,
20                           velocity = Vector3.zero,
21                           color = new Vector3(1,1,0)
22                       };
23                       solar_system_elements = new List<OrbitalElements>() {
24                           // Taken from data at the J2000 Epoch
25                           // http://www.met.rdg.ac.uk/~ross/Astronomy/
     Planets.html
26                           new OrbitalElements() {
27                               // Mercury
28                               semilatusrectum = 0.37073084632655*AU,
29                               eccentricity = 0.20563069,
30                               inclination = 7.00487*deg,
31                               ascendingNodeLongitude = 48.33167*deg,
32                               periapsisArgument = 77.45645*deg,
33                               trueAnomaly = 252.25084*deg
34                           },
35                           new OrbitalElements() {
36                               // Venus
37                               semilatusrectum =
     0.723298805955343*AU,
38                               eccentricity = 0.00677323,
39                               inclination = 3.39471*deg,
40                               ascendingNodeLongitude = 76.68069*deg,
41                               periapsisArgument = 131.53298*deg,
42                               trueAnomaly = 181.97973*deg
43                           },
44                           new OrbitalElements() {
45                               // Earth
46                               semilatusrectum =
     0.999720878516836*AU,
47                               eccentricity = 0.01671022,
48                               inclination = 0.00005*deg,
49                               ascendingNodeLongitude =
     348.73936*deg,
50                               periapsisArgument = 102.94719*deg,
51                               trueAnomaly = 100.46435*deg
52                           },
53                           new OrbitalElements() {
54                               // Mars
55                               semilatusrectum = 1.51036704082126*AU,
56                               eccentricity = 0.09341233,
57                               inclination = 1.85061*deg,
58                               ascendingNodeLongitude = 49.57854*deg,
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59                                                  periapsisArgument = 336.04084*deg,
60                                                  trueAnomaly = 355.45332*deg
61                                          },
62                                          new OrbitalElements() {
63                                                  // Jupiter
64                                                  semilatusrectum =
     5.191177516718821*AU,
65                                                  eccentricity = 0.04839266,
66                                                  inclination = 1.30530*deg,
67                                                  ascendingNodeLongitude =
     100.55615*deg,
68                                                  periapsisArgument = 14.75385*deg,
69                                                  trueAnomaly = 34.40438*deg
70                                          },
71                                          new OrbitalElements() {
72                                                  // Saturn
73                                                  semilatusrectum = 9.50910488810135*AU,
74                                                  eccentricity = 0.05415060,
75                                                  inclination = 2.48446*deg,
76                                                  ascendingNodeLongitude =
     113.71504*deg,
77                                                  periapsisArgument = 92.43194*deg,
78                                                  trueAnomaly = 49.94432*deg
79                                          },
80                                          new OrbitalElements() {
81                                                  // Uranus
82                                                  semilatusrectum = 19.1485673429066*AU,
83                                                  eccentricity = 0.04716771,
84                                                  inclination = 0.76986*deg,
85                                                  ascendingNodeLongitude = 74.22988*deg,
86                                                  periapsisArgument = 170.96424*deg,
87                                                  trueAnomaly = 313.23218*deg
88                                          },
89                                          new OrbitalElements() {
90                                                  // Neptune
91                                                  semilatusrectum = 30.0667468812982*AU,
92                                                  eccentricity = 0.00858587,
93                                                  inclination = 1.76917*deg,
94                                                  ascendingNodeLongitude =
     131.72169*deg,
95                                                  periapsisArgument = 44.97135*deg,
96                                                  trueAnomaly = 304.88003*deg
97                                          },
98                                          new OrbitalElements() {
99                                                  // Pluto
100                                                 semilatusrectum = 39.48168677*AU,
101                                                 eccentricity = 0.24880766,
102                                                 inclination = 17.14175*deg,
103                                                 ascendingNodeLongitude =
     110.30347*deg,
104                                                 periapsisArgument = 224.06676*deg,
105                                                 trueAnomaly = 238.92881*deg
106                                         }
107                                 };
108                         solar_system_bodies = new List<Body>() {
109                                 (Body)sun.Clone(),
110                                 new Body() {
111                                         name = "Mercury",
112                                         stdGrav = 2.2033e13,
113                                         radius = 2439.7e3,
114                                         color = new Vector3
     (0.5604629613577541,0.5506810776290613,0.5615709550944886)
115                                 },
116                                 new Body() {
117                                         name = "Venus",
118                                         stdGrav = 3.24860e14,
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119                                                   radius = 6051.8e3,
120                                                   color = new Vector3
       (0.7290057613658241,0.7163768245238121,0.6791579213171579)
121                                           },
122                                           new Body() {
123                                                   name = "Earth",
124                                                   stdGrav = 3.986004419e14,
125                                                   radius = 6371.0e3,
126                                                   color = new Vector3
       (0.36141510867913057,0.3805593555251558,0.4684865790976585)
127                                           },
128                                           new Body() {
129                                                   name = "Mars",
130                                                   stdGrav = 4.282837e13,
131                                                   radius = 3389.5e3,
132                                                   color = new Vector3
       (0.5128845217545257,0.3367414685964679,0.2022838932412694)
133                                           },
134                                           new Body() {
135                                                   name = "Jupiter",
136                                                   stdGrav = 1.26686535e17,
137                                                   radius = 69911e3,
138                                                   color = new Vector3
       (0.7189596667682617,0.6638891549711422,0.6361916372766723)
139                                           },
140                                           new Body() {
141                                                   name = "Saturn",
142                                                   stdGrav = 3.7931188e16,
143                                                   radius = 58232e3,
144                                                   color = new Vector3
       (0.8246372253577235,0.7470193676770795,0.59518943574319)
145                                           },
146                                           new Body() {
147                                                   name = "Uranus",
148                                                   stdGrav = 5.793940e15,
149                                                   radius = 25362e3,
150                                                   color = new Vector3
       (0.565224110171928,0.7359458915531022,0.8092590995342418)
151                                           },
152                                           new Body() {
153                                                   name = "Neptune",
154                                                   stdGrav = 6.836530e15,
155                                                   radius = 24622e3,
156                                                   color = new Vector3
       (0.5525244704623422,0.7383866805149026,0.868736820570925)
157                                           },
158                                           new Body() {
159                                                   name = "Pluto",
160                                                   stdGrav = 8.72e11,
161                                                   radius = 1186e3,
162                                                   color = new Vector3
       (0.732870760490961,0.6071190239708979,0.4988704626052213)
163                                           }
164                                   };
165                           solar_system = new PlanetarySystem(new List<Body>() {
166                                           // All radii are multiplied by 100
167                                           // Colors from https://
       planetarium.madison.k12.wi.us/planets-true.htm
168                                           // Radii from https://en.wikipedia.org/wiki/
       List_of_Solar_System_objects_by_size
169                                           (Body)sun.Clone(),
170                                           new Body(sun, solar_system_elements[0]) {
171                                                   name = "Mercury",
172                                                   stdGrav = 2.2033e13,
173                                                   radius = 2439.7e3,
174                                                   color = new Vector3
```

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                                (0.5604629613577541,0.5506810776290613,0.5615709550944886)
175                                 },
176                                 new Body(sun, solar_system_elements[1]) {
177                                         name = "Venus",
178                                         stdGrav = 3.24860e14,
179                                         radius = 6051.8e3,
180                                         color = new Vector3
     (0.7290057613658241,0.7163768245238121,0.6791579213171579)
181                                 },
182                                 new Body(sun, solar_system_elements[2]) {
183                                         name = "Earth",
184                                         stdGrav = 3.986004419e14,
185                                         radius = 6371.0e3,
186                                         color = new Vector3
     (0.36141510867913057,0.3805593555251558,0.4684865790976585)
187                                 },
188                                 new Body(sun, solar_system_elements[3]) {
189                                         name = "Mars",
190                                         stdGrav = 4.282837e13,
191                                         radius = 3389.5e3,
192                                         color = new Vector3
     (0.5128845217545257,0.3367414685964679,0.2022838932412694)
193                                 },
194                                 new Body(sun, solar_system_elements[4]) {
195                                         name = "Jupiter",
196                                         stdGrav = 1.26686535e17,
197                                         radius = 69911e3,
198                                         color = new Vector3
     (0.7189596667682617,0.6638891549711422,0.6361916372766723)
199                                 },
200                                 new Body(sun, solar_system_elements[5]) {
201                                         name = "Saturn",
202                                         stdGrav = 3.7931188e16,
203                                         radius = 58232e3,
204                                         color = new Vector3
     (0.8246372253577235,0.7470193676770795,0.59518943574319)
205                                 },
206                                 new Body(sun, solar_system_elements[6]) {
207                                         name = "Uranus",
208                                         stdGrav = 5.793940e15,
209                                         radius = 25362e3,
210                                         color = new Vector3
     (0.565224110171928,0.7359458915531022,0.8092590995342418)
211                                 },
212                                 new Body(sun, solar_system_elements[7]) {
213                                         name = "Neptune",
214                                         stdGrav = 6.836530e15,
215                                         radius = 24622e3,
216                                         color = new Vector3
     (0.5525244704623422,0.7383866805149026,0.868736820570925)
217                                 },
218                                 new Body(sun, solar_system_elements[8]) {
219                                         name = "Pluto",
220                                         stdGrav = 8.72e11,
221                                         radius = 1186e3,
222                                         color = new Vector3
     (0.732870760490961,0.6071190239708979,0.4988704626052213)
223                                 }
224                             });
225                     }
226             }
227 }
```