

```

1. parsenbody.py
2. #!/usr/bin/python3
3.
4. import numpy as np
5.
6. datafile = "figure8.out"
7.
8. def parseNBodyData(datafile):
9.     """
10.    Returns a dictionary with the following fields:
11.    'n': number of particles
12.    'time': a 1d array of times
13.    'm': a 1d array of length 'n' with the masses of each planet
14.    'planets': a 2d array where the first index goes up to 'n' and
15.               and the second index is '0' for positions and '1' for 'velocities'.
16.               Both positions and velocities are arrays where each element is an
17.               array with 3 points representing the x, y and z components respectively.
18.    """
19.    with open(datafile) as f:
20.        numPreLines = 2
21.        numParticles = int(f.readline())
22.        time = []
23.        masses = [0 for _ in range(numParticles)]
24.        positions = [[] for _ in range(numParticles)]
25.        velocities = [[] for _ in range(numParticles)]
26.
27.        linenum = 2
28.        for lineTerminated in f:
29.            line = lineTerminated.rstrip()
30.            if line.count(',') == 0:
31.                if (linenum % numParticles) == 2:
32.                    time.append(float(line))
33.                    linenum += 1
34.            elif line.count(',') > 0:
35.                objectId = (linenum - (numPreLines + 1)) % numParticles
36.                for i, entry in enumerate(line.split(',')):
37.                    if i == 0:
38.                        masses[objectId] = float(entry.split(' ')[0])
39.                    elif i == 1:
40.                        pos = []
41.                        for val in entry.split(' ')[:-1]:

```

```
42.         pos.append(float(val))
43.         positions[objectId].append(pos)
44.
45.         elif i == 2:
46.             vel = []
47.             for val in entry.split(' '):
48.                 vel.append(float(val))
49.             velocities[objectId].append(vel)
50.         linenum += 1
51.     if line == "===":
52.         linenum = 1
53.
54. planets = [[] for _ in range(numParticles)]
55. for i in range(0, numParticles):
56.     planets[i].append(positions[i])
57.     planets[i].append(velocities[i])
58.
59. return {
60.     'n': numParticles,
61.     'time': np.array(time),
62.     'm': np.array(masses),
63.     'planets': np.array(planets)
64. }
```