Chapter 4.1 summarizes the two-body motion and the Kepler's Laws. The example we used for the two-body problem is the Earth and Sun. To begin with, we assume the Earth is making a circular motion around the Sun, and the Sun is fixed at a point. We start with the attraction force $Fg=(G*Ms*Me)/r^2$. To simplify the calculation, we will break the force into the x and y components, where $Fg,x=-(G*Ms*Me)*x/r^3$, and $Fg,y=-(G*Ms*Me)*y/r^3$. As G and Ms can be hard to calculate, we can make this equation into, $Me*v^2/r = Fg = (G*Ms*Me)/r^2$. We can get $G*Ms = v^2*r = 4*\pi$ (AU^3/yr^2)

Chapter 4.2, in this section, we learned more about building the model of the motion of the earth moving around the sun. Since the actual orbit is elliptical and the orbit for each year, the orbits are not the same. So we will add different factors into the calculation to generate a more proper model.

Chapter 4.3 applied the content from the previous two sections to the system of the sun and the Mercury.

In Chapter 4.4, we see the three body problems of the Sun, the Earth, and Jupiter. In this case, we not only need to consider the relative position of the sun and Earth, the Sun and Jupiter but also the Earth and Jupiter.