1. **In alternative solar system,** is a star Nus with two planets Htrae and Sram. Htrae orbits Nus at a distance of 1AU, and it takes 3 of our years for Htrae to make one orbit. Sram orbits at a distance of 1.88 AU.

    a. (3 pts.) What is the mass of Nus compared with the mass of the Sun?

    b. (3 pts.) What is the period of Sram's orbit?

2. **At arms length**

    a. (2 pts.) Hold your fist at arm's length. Measure the width of your fist and the distance from your eye to your fist.

    b. (3 pts.) What is the angle between one side of your fist and the other? Express the angle in radians and in degrees.

    c. (2 pts.) With your naked eye, you are just able to see two points separated by 1mm at arm's length as two distinct points. What is the angle (in radians) between the two points?

3. **Simplicio says**, "The right ascension and declination of stars is always the same. If a star shifts because of parallax, its coordinates change. Therefore a star cannot have any parallax."

    a. (5 pts.) Explain the error in Simplicio's reasoning.

    b. (3 pts.) Edit Simplicio's statement so that it is addresses his misconception.

4. **The distance to star A** is 3.4 pc, and its coordinates are 21 hr + 0°. The distance to star B is 300 pc, and its coordinates are 21 hr + 0°. For this problem, assume the orbit of the earth is along the celestial equator.

    a. (5 pts.) Draw a picture to show the location of the star and the location of the earth on the solstices.

    b. (3 pts.) On which two dates is the parallactic shift between the two stars zero? On which two dates is the parallactic shift largest?

    c. (3 pts.) Sketch a plot to show how the parallactic shift changes with time over the course of a year.

    d. (2 pts.) How large is the greatest parallactic shift?