

ESc101N Laboratory Assignment
Tuesday of week of 23/8/04

PLANETARY SYSTEM

PROBLEM: Write a program with 2 classes ? Planet and Director.
The aim is to draw a planetary system with 4 planets. At time zero, the planets would be aligned along the positive x-axis. Time would be taken as input from the user. Then, the position of the planets would be calculated based on the angular velocities of the planets and the planets would be displayed.

The orientation of a planet is the angle formed by its axis with the positive x-axis. Planet A (first from the sun) should be looking at planet B (the second from the sun). That means the axis of A must pass through the center of B. Similarly B should be looking at C, C at D, and D at A. See the figure.

Choose the radii of the orbits to be 100, 150, 200, and 250. The radius of each planet should be 10 and the length of the axis-bar should be 30. Angular velocities of the planets should be 40 degrees per unit time for A, 30 for B, 20 for C and 10 for D.

Planet Class

It would be used to draw the planet (Refer the figure).

The class would have 4 data variables :

- xPosition, yPosition : The co-ordinates of the center of the planet.
- Angle(Alpha) : Angle which the axis-bar forms with the positive x-axis.
- Angular Velocity(ω)

The Planet class would have 5 member methods

setX, setY, setAlpha, setOmega :To set the values of the class variables.

drawPlanet : To draw the planet using a Graphics object which will be received as an argument.

Note: See the program Clown.java in the class webpage under "sample programs" to see how to draw shapes using a Graphics object.

Director Class

This class would have only one function: main. The function of main would be:

- (1) Create a Graphics object.
- (2) Take the current `time` as input from the user.
- (3) Compute the orientation of the 4 planets.
- (4) Instantiate 4 planet objects. Draw the 4 planets on screen.

Refer to the following figure.

