A robot named “Sisyphus” rides on a cart moving around a circular track. The robot has one arm, consisting of an upper arm, a forearm and a hand. The upper arm is attached at the shoulder to a rectangular platform. The rectangular platform is supported by four wheels. The platform and wheels form the cart that the robot rides around the track. A sphere sits on the track directly in the path of the robot. Each time the robot encounters the sphere, it reaches out, picks up the sphere, and places the sphere directly behind itself on the track. Then the robot proceeds on its path around the track. Later on, the robot encounters the sphere again. It picks up the sphere and places the sphere directly behind itself on the track, and so on, over and over, forever.

In this assignment, you must write a program that models the structure of the robot, cart, track and sphere, and generates an animation of the scene and action. Your program should be organized in a fashion similar to the Planets program. This latter program models a solar system and animates the motion of a sun, a planet and two moons. In developing your program, you should start with the file Planets, remove the parts that involve modeling and animation of heavenly bodies, and replace them with code that models and animates the robot, cart, track and sphere. In deciding how to model the robot, you should look at the Robot program. You may use portions of the Robot program in your own program.

The Planets program includes an interface that allows the user to control the position, aim and orientation of the camera. You should include this user interface code in your own program. In particular, the user should be able to lock the camera onto either the robot, the sphere or the center of the track, so that the camera follows the object onto which it has locked. Likewise, the user should be able to set the camera to ride along with the robot, the sphere or the center of the track, as these objects move, or don't move. Finally, the user should be able to run the animation in either the forward direction or the backward direction.

Extra Credit (10%): Arrange for the robot to wander around a square array of $n^2$ circles. Each circle has its center at $(x,y)=(2i\cdot r, 2j\cdot r)$ for $(i=0..n-1, j=0..n-1)$. Each circle has radius $r$. Each circle is tangent to circles immediately North, South, East and West of it. If the robot is going clockwise (counterclockwise) around circle A, and it reaches the point where circle A is tangent to circle B, the robot may (under user control) switch to circle B, proceeding to go counterclockwise (clockwise) around circle B.