

## Problem Set 6

### Booleans and Conditionals

Complete each of the exercises below. Be certain to include all components of the Design Recipe when writing each program.

1. **Circle** - Develop the function **within?**, which consumes three numbers representing the  $x$  and  $y$  coordinates of a point and the radius  $r$  of a circle centered around the origin. It returns true if the point is within or on the circle. It returns false otherwise. The distance of the point to the origin is given by  $\sqrt{x^2 + y^2}$ .
2. **Paycheck** - Develop the function **net-pay**, which consumes the number of hours worked and the hourly pay rate and produces the net pay of the employee. For a gross pay of \$250 or less, the tax is 0%; for a gross pay between \$250 and \$750, the tax rate is 15%; and for any pay over \$750, the tax rate is 28%.
3. **Discounts** - A local discount store has a policy of putting labels with dates on all of its new merchandise. If an item has not sold within two weeks the store discounts the item by 25% for the third week, 50% for the fourth week, and 75% for the fifth week. After that no additional discounts are given. Develop the function **new-price**, which takes the initial price of an item and the number of days since the item was dated and produces the selling price of the item.
4. **Tire Pressure** – Develop a function **tire-pressure** that consumes the pressure of all four tires of a car and displays a message that says if the inflation is OK or not. The pressures must meet all of the following conditions to be determined OK.
  - a) All tires should have a pressure between 35 and 45 psi.
  - b) The two front tires must have a pressure within 3 psi of each other.
  - c) The two rear tires must have a pressure within 3 psi of each other.
5. Develop an animation of an image that starts in the center of an 800 by 600 pixel window. Each time the “D” key is pressed, the image moves to the right and each time the “A” key is pressed the image moves to the left. Pressing the space bar should return the image back to the center of the window. Pressing the “Q” key should quit the animation. If the animation is moved off the right side of the window, it should appear on the left side of the window and vice versa.