

## CS302 Scoping for Success

*The goal of this exercise is to write two simple instantiable classes used by a main program provided.*

Babcock Ice Cream has noticed a steady decline in the number of people served per tub of ice cream. They suspect that some of their student workers are helping themselves to unauthorized ice cream cones when no one is watching. To verify their suspicion, they have hired you to complete the program below that will tell them how many ice cream cones can be produced per tub assuming each cone has two scoops.

The main method contains the following:

```
final int SCOOPS_PER_CONE = 2;// the number of scoops per cone
double   cones           = 0;// the number of cones per tub

// Get user input for size of tub and scooper
MainWindow mw = new MainWindow("Scoping for Success");
mw.show();
InputBox in   = new InputBox(mw);
double quarts = in.getDouble("Enter number of quarts in the tub.");
double radius = in.getDouble("Enter the radius (in inches) of your scooper.");

// Construct the tub and scooper
Tub      tub      = new Tub      (quarts);// the tub of ice cream
Scooper scoop = new Scooper(radius);// the scooper for serving ice cream

// calculate how many cones can be taken from a tub
cones = tub.getVolume() / scoop.getVolume() / SCOOPS_PER_CONE;

// display the results
OutputBox out = new OutputBox(mw);
out.println("You can get " + cones + " cones from your tub.");
out.show();
```

**Problem Statement:** Write two instantiable classes, `Tub` and `Scooper`, that meet these requirements:

- Your classes must be compatible with the main method provided.
- The `Tub` class stores the volume in quarts, and has a constructor and two methods. One method is private and converts volume in quarts to volume in cubic inches (It's good practice). The other method returns the volume in cubic inches.
- The `Scooper` class stores the radius in inches (assume the scoop is spherical), and has a constructor and a method that returns the volume of the scoop in cubic inches.

Hints:

- The volume of a sphere is given by  $V = \frac{4}{3}\pi r^3$
- To convert from quarts to cubic inches, multiply by 57.75