

# APCS :: LAB 1

Due: **Tuesday, Sept. 19** – *print out your code to turn in at the beginning of class. Late assignments will not be accepted.*

When riding a bicycle the power you need to put into the pedals to go a certain speed is roughly proportional to the cube of the speed you want to go. Specifically, the power  $P$  (in watts) needed for a bike rider of Mr. Franke's size and weight to go velocity  $v$  (in m/s) on flat ground with no adverse wind, on his bike, at Chicago's altitude is given roughly by:

$$P = 0.276 * V^3 + 5.76926 * V$$

You will write a console application in Java that asks the user to input the speed (m/s) that she wants to go and display the amount of power in watts the rider would need to output to go that speed. The program should end after you output the number of watts.

## 1.) Here's how to start:

- Open BlueJ and create a new project. Call it `BikeWattage`.
- Make a new class, of type `empty class`
- Use the lecture notes from class to help you the rest of the way.

HINT: Use the method of incremental testing. Write a little bit of code, then run to the program to see if it works. Then go onto the next step.

As an initial test: use 9.611 m/s as a speed. You should get something in the neighborhood of 300 Watts.

## 2.) Want more?:

Modify your program to ask the user for the speed they want to go in MPH. Then convert that to m/s for use in the formula – there is no sneaky way to do it. Just use math.

## 3.) Yet more:

The equation can take into the consideration the weight of the rider as well. In this case the equation is given by:

$$P = 0.276 * V^3 + 0.0686 * V * W$$

Where  $w$  is the rider's weight in kg. Add code to your program to ask the user to input her weight as well. (NOTE: this is the weight of the rider + the weight of the bike – you can ask for them separately if you like.) Of course, you can also ask for the weight in lbs and convert it to kg before using it in the formula. Just be clear what you want the user to give you.