Week 1 Practice Problems

#1. Write a program that simply prints "I am going to love this course" to the screen.

#2. Write a program that defines two integers, one being the largest 3-digit number and one being the smallest 5-digit number. Then, print these two values, and their sum to the screen.

#3. Write a program that calculates the final cost of a set of items. For example, if each item costs 1.43 and we need 9 of them. Then, print the final cost.

> Cost? 1.43
> How many? 9
> Total cost is $12.87.

First do it by "hard-coding" the numbers. Once you have that working, add the ability to ask the user to input the numbers. (Hint: Look up the `input()` function in your textbook.)

#4. Write a program that for a temperature in degrees Celsius, prints the equivalent temperature in degrees Fahrenheit (multiply C by 1.8, then add 32). For example:

> Celsius temperature: **30**
> Fahrenheit equivalent is: **86**

As with #3, first put the Celsius temperature in your program directly and get it working. Then add the functionality to prompt the user for the Celsius temperature.

#5. Write a program to evaluate y = 4x + 3 for any float number the user may pick. Ask a user to input any x, and then evaluate y, and present the result to two decimal places. For example:

> Input x: 3.69
> The value of y = 4x + 3 is 17.76

#6. Figure 1 presents a diagram that introduces the parameters required to calculate the deflection of a beam. The formula to calculate beam deflection (δ_{max}) is:

$$\delta_{max} = \frac{Pa^2}{6EI}(3l - a).$$

The meaning of the parameters is:

- *P* is the force applied in newtons
- *a* is the distance to the force applied in m
- *E* is Young's modulus: 2.0685×10^{11} Pa
- I is the area of the moment of inertia of the cross-section: $0.00528\ m^4$
- *l* is the beam length in m

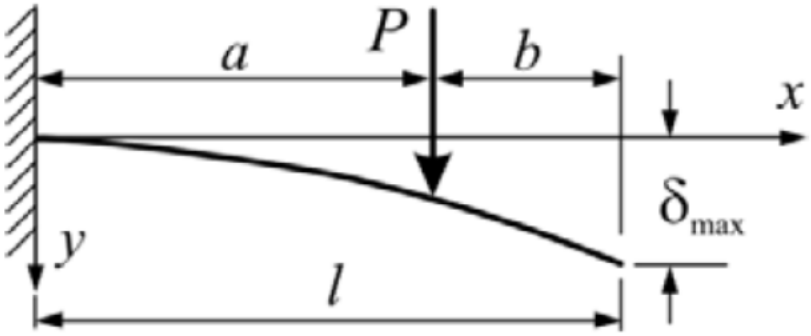

Figure 1. Diagram for the deflection of a beam.

Write a program to calculate δ_{max}. Create and assign variables for each relevant value. Check to make sure your code calculates the correct value.

#7. The Arrhenius equation to calculate the chemical rate constant, *k*, is:

$$k = Ae^{\frac{-E_a}{RT}}$$

Where:

- *A* is the "pre-exponential factor". You can assume it is 80.
- *e* is Euler's number: 2.718281828
- E_a is the activation energy: 108000
- *T* is the temperature in kelvin
- *R* is the universal gas constant: 8.3144598

Assume that you are given the temperature as 95 degrees Fahrenheit.

Write a program to calculate δ_{max}. Create and assign variables for each relevant value. Check to make sure your code calculates the correct value.