

Programming Problems

Each of these problems should be solved in the starter file available on the course website. They should be submitted to the Gradescope assignment Hw1 - Programming to be autograded. Make sure to check the autograder feedback after you submit!

For each of these problems (unless otherwise specified), write the needed code directly in the Python file, under the comment and print statement that correspond to the problem. Do not delete the provided print statements- we're using them to autograde.

#1 - Variable Assignments - 15pts

Write Python code to do the following:

1. Assign the integer 15 to the variable **a**.
2. Assign the float 3.14 to the variable **b**.
3. Assign the string "22" to the variable **c**.
4. Assign the boolean True to the variable **d**.
5. Reassign the variable **a** to hold the value 45.
6. Convert **c** to an integer and assign it to variable **e**. Don't change the value in **c**.
7. Compute **a modulo e** and assign the answer to the variable **f**.

Feel free to print any of these variables to check your work.

#2 - Greeting Algorithm - 5pts

Write code to match the following algorithm.

1. Assign the string Kelly to **profK**.
2. Assign the string Dave to **profD**.
3. Write a single print statement that greets both Prof. Kelly and Prof. Dave by name. The statement must use the variables **profK** and **profD**, as well as at least one additional string.

#3 - Math Algorithm - 10pts

Write code to match the following algorithm, which finds the slope of a line between two points.

1. Create 4 variables; **x1**, **y1**, **x2**, and **y2**; and assign them each to different numerical values.
2. Compute the difference in y values (using subtraction) and assign it to the variable **diffY**.
3. Compute the difference in x values and assign it to the variable **diffX**.
4. Compute the slope (**diffY** divided by **diffX**) and assign it to the variable **m**.
5. Print the value in the variable **m**.

#4 - Functions - 10pts

Write two functions based on the prompts below. Each function is based on the idea of trying to fill egg cartons with eggs.

First, write the function `fullEggCartons` that takes an integer number of eggs as a parameter and returns the number of egg cartons that can be completely filled by that number of eggs. Note that egg cartons have 12 slots for eggs. For example, 11 eggs would completely fill 0 egg cartons, whereas 12 eggs would completely fill 1 carton.

Second, write a single print statement that calls the function three times on three values, 65, 43, and 96, and prints the answers all on one line.

Third, write the function `remainingEggs` that takes an integer number of eggs as a parameter and returns the number of eggs that will not fit in a full carton (that is, the eggs that are leftover from the previous function).

Finally, write a print statement that calls the function three times on three values, 23, 76, and 51, and prints the answers all on one line.

Hint: consider the special math operators we introduced in lecture. There are two operators that will make these functions very simple to write.

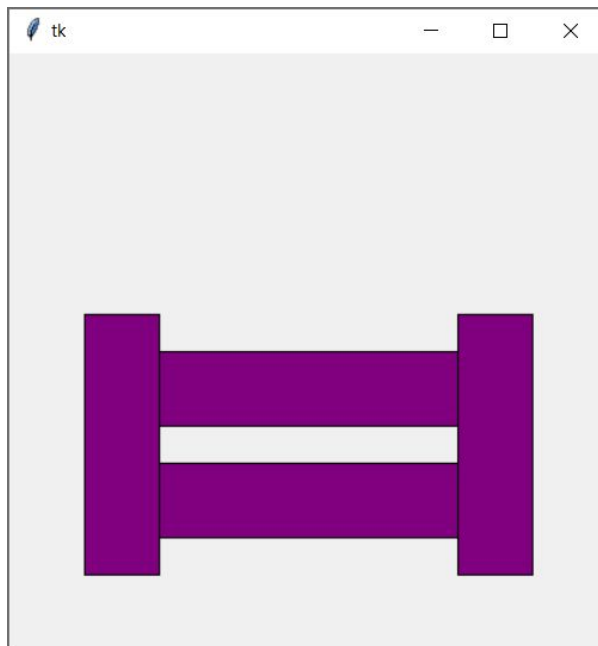
#5 - Graphics - 10pts

Finally, add code to the function `drawFence(canvas)` so that it draws a simple version of the CMU Fence on the canvas. If you have not yet heard of the Fence, learn more here: www.amusingplanet.com/2014/09/the-fence-of-carnegie-mellon-university.html

Your Fence must meet the following basic requirements, but otherwise you may customize it as much as you like. You can find bonus instruction on graphics here: www.cs.cmu.edu/~110/slides/week2-graphics.pdf Feel free to 'paint' your Fence too!

- The Fence must have at least two columns, with one column ending the left side of the Fence and one ending the right
- The Fence must have two cross-boards that connect all the columns
- There must be a gap above the top cross-board, between the cross-boards, and below the bottom cross-board

Here's an example of a simple Fence that meets the requirements:



Before you submit: uncomment the last line of code (`makeCanvas(400, 400)`) and click 'Run File as Script' to make sure your code runs without raising an error message. Any syntax or runtime errors left in the code will result in a deduction on the assignment grade. You should do this for all future programming assignments as well.