Homework Assignment #2
Spring 2020
Due Date: 03-21

Problem 1 Python Lambda Function

Write a Python function named *calc_poly_func* to calculate the following mathematical formulas:

$$\sum_{i=1}^{N} \left(\frac{a_i}{r} x_i^n y_i^m \right)$$

The function will take the following 6 parameters:

r, n, m – constants used to calculate the above formula
a_list – a list object the i-th element of which is a_i (i = 1,2, …, N)
x_list – a list object the i-th element of which is x_i (i = 1,2, …, N)
y_list – a list object the i-th element of which is y_i (i = 1,2, …, N)

Follow the following steps to implement calc_poly_func(…):

1. Implement a lambda function which take three parameters a, x, y. The lambda function will calculate the term $\left(\frac{a}{r} x^n y^m \right)$ with r, n, m considered as constants and defined by the calling function (in step 2).
2. Implement cal_poly_func() with the following logic
    a. Create a list the i-th element of which is calculated by applying the lambda function (in step 1) on the i-the element of three input lists.
    b. Apply the Python *reduce* function on the list created in step a.

Problem 2 Python Decorator

You have implemented two functions that have been called in many places in your application:

1. *combine_with_list(list_obj, list2_obj)* -
   The function takes two list objects (list_obj and list2_obj) as parameters. The function appends the elements of list2_obj to the end of list_obj
2. *combine_with_set(list_obj, set_obj)* -
   The function takes one list (list_obj) and one set object (set_obj) as parameters. It appends the element of set_obj to the end of list_obj

You are asked to apply the following the following logic to the elements of list2_obj and set_obj objects prior to every invocation of any of the above functions:

1. For number objects in the list/set object, remove them from the list/set object if they are less than 4.
2. If an object in the list/set is a str object, then split it using ',' as the delimiter.
3. For objects of any other types, remove them from the list/set object.

To minimize the number of code changes, please use decorator function approach for your implementation. In this assignment, please do the following:

1. Define the decorate function
2. Demonstrate how the decorator is used

You might need to use the following statement to find out the class name of a given object: ***type(obj).__name__***.

Problem 3 Python File Processing

Change the specification for the script you implemented for HW #1:

1. Use a file to prepare the input data. Each line in the file defines the data for one student.
2. Change the script to read the input data from the file in a line-by-line fashion. For each line of data, apply the logic implemented in step 3-6 in HW #1.