CS 201 Homework 3/13/2022

Submit your code in Google classroom.

This problem is adopted from CMIMC 2021, Optimization round.

Start with X = list(range(1, 401)).

Using the elements of X (that is, integers from 1 to 400), create two new lists, A and B, such that when you multiply elements of A by elements of B, all possible products are UNIQUE. That is, you cannot have duplicate products.

ALSO: A and B must be of equal size.

Your goal is to construct the largest possible A and B lists (that is, as many elements as possible). Write a Python script to construct A and B.

Some examples:

A = [1, 2, 3], B = [1, 5, 6, 7] – this is not a correct entry because A has 3 elements and B has 4 elements.

A = [1, 2, 11], B = [4, 8, 11] – this is not a correct entry because 1 * 8 = 8 and 2 * 4 = 8. Thus, there are products that are not unique.

A = [1, 2, 3, 4], B = [1, 5, 6, 7] – CORRECT entry. You can verify that all products are unique. And both A and B are of equal size. Since len(A) = 4, you get 4 points.

(Notice that 1 * 6 = 6 and 2 * 3 = 6. However, this is NOT a problem since 2 * 3 = 6 is the product when both numbers are the elements of A. We only require unique products when elements of A and multiplied by elements of B).