

# CSCI-SHU 210 Data Structures

## Assignment 1 Python Review

### Problem 1: Anagram

An anagram is a word or a phrase made by transposing the letters of another word or phrase; for example, "parliament" is an anagram of "partial men," and "software" is an anagram of "swear oft." Write a function that figures out whether one string is an anagram of another string. The program should ignore white space and punctuation.

Return True if param1 is an anagram of param2.

Return False if param1 is not an anagram of param2.

Example 1:

Input: "software", "swear oft"  
Output: True

Example

2:

Input: "parliament", "partial men"  
Output: True

### Problem 2: Palindrome

A palindrome is a word or a phrase that can be read both from left to right and from right to left. Write a function that checks whether a string is a palindrome.

**\*\* You may not use any string built in functions for this one. Except finding the length of the string.**

Return True if user input is a palindrome.

Return False if user input is not a palindrome.

Example 1:

Input: "WASITACARORACATISAW"  
Output: True

Example 2:

Input: "shanghaisnow"  
Output: False

### Problem 3: Greatest common divisor (GCD)

Program Euclid's algorithm for computing the greatest common divisor (GCD) of two positive integers A and B. Please search internet to find Euclid's algorithm to find GCD.

Return the greatest common divisor (GCD) of param1 and param2.

Example 1:

Input: 15, 45  
Output: 15

Example 2:

Input: 49, 50  
Output: 1

### Problem 4: Add One

Given a non-negative integer represented as a non-empty List of digits, add one to that integer.

You may assume the integer do not contain any leading zero, except the number 0 itself. The digits are stored such that the most significant digit is at the head of the list.

Example 1:

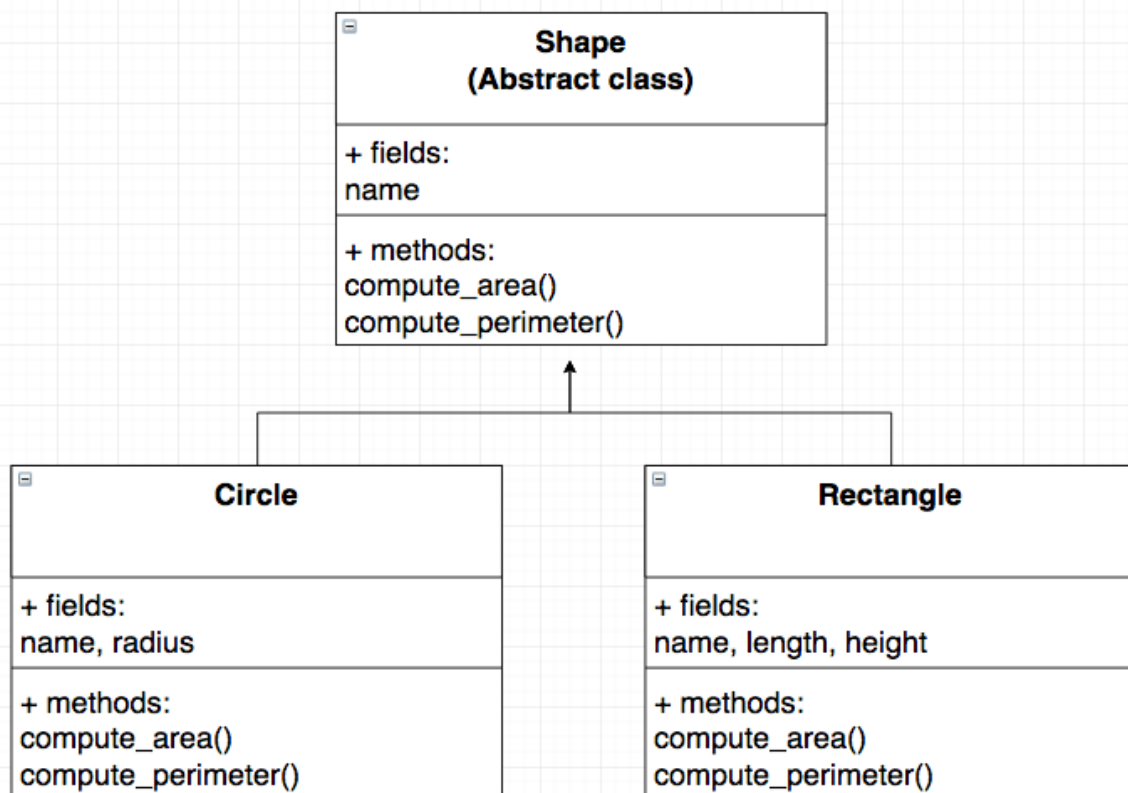
Input: [1, 2, 3]  
Output: [1, 2, 4]

Example 2:

Input: [9, 9, 9]  
Output: [1, 0, 0, 0]

## Problem 5: OOP with Inheritance

In this question, we are going to implement the following class hierarchy:



- The starting point of this problem is provided in the assignment. Please check the attachment.
- Make sure your Shape class is Abstract. (I already marked Shape class Abstract by using `pass` keyword.)
- Make sure your Circle & Rectangle classes inherits Shape class.
  - When inheriting parent class, what do you need to do in constructor?
- `compute_area()` function returns the area of the shape.
- `compute_perimeter()` function returns the perimeter of the shape.