



Computer Programming for CS, Sem 1 (Aug-Dec) 2022

Assignment 1

Assigned:	Friday, October 21 st
Due:	Wednesday, October 26 th , before class
Submission format:	Code and test results uploaded to Canvas. A test result is basically any code you use to test that the code you have written works. Keep them in your program.

Instructions

Complete this task individually. Complete each problem in a separate python file.

Kindly employ good programming style, paying attention to aspects such as how you name your variables; how you structure your code; and the use of comments. Your programming style will factor into your grade for the assignment.

Problem 1 [3 points]

One semester, there were 62 students in the Computer Programming for CS class. The following semester, there were 133 students registered for Computer Programming for CS. What is the percentage increase in the number of students that took programming in the second semester, compared to the first semester?

Store the result in a variable named **percent_increase**. Also display your answer.

Problem 2 [3 points]

I have 213 bars of chocolate that I would like to share evenly among the students registered for Computer Programming for CS in the second semester (see problem 1). How many bars of chocolate will each student receive, and how many will be left over?

Store the number of bars each student will receive in a variable called **chocolate_per_student** and the number of chocolates that will remain in a variable called **remaining_chocolates**. Also display your answers.

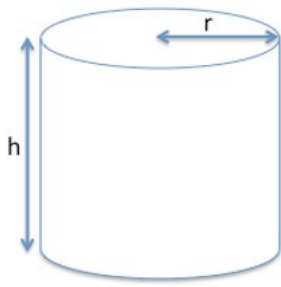
Problem 3 [5 points]

What is the volume of a cone with radius $r = 2.5$ cm and height $h = 4$ cm?

Store the answer in a variable called **sphere_volume**. Also display the answer.

Problem 4 [7 points]

Mr. Mensah has just moved to a new house. However, water does not flow in his area, so he needs to buy water to fill the cylindrical polytank on the roof of his house. The water company sells water by volume. Write a program to help Mr. Mensah determine the volume of water to order, given the dimensions of his polytank. The program should prompt Mr. Mensah to enter the height and radius of his polytank.



(To test your code, please note, for example, that the expected volume of water for a tank of height 1.5m and radius 0.7m is about 2.31m^3)

Problem 5 [7 points]

The age of babies and young children are often given in months, rather than years. For example, a mother might say that her toddler is 18 months old, or 24 months old. Write a program that takes the age of a person in months, and reports the age in the corresponding number of years and months. For example, a person who is 57 months old is actually 4 years 9 months old.

Problem 6 [15 points]

This page on the Ashesi website (<http://www.ashesi.edu.gh/academics/academic-registrar/grading-policies.html>) shows how **numerical scores** are translated into letter grades and grade points in Ashesi's grading system.

Furthermore, upon graduation, students can receive the following honours based on their **cumulative GPA**:

- *Summa Cum Laude* for GPAS in the range 3.85 to 4.0,
- *Magna Cum Laude* for GPAS in the range 3.70 - 3.84,
- *Cum Laude* for GPAS in the range 3.50 - 3.69.

Using what we have learned about multi-way decision structures (if, elif, etc.):

- Write a **function** that takes a **numerical score** (out of hundred) as a **parameter**, and **returns** the corresponding letter grade as well as the grade point (out of 4)
- Write a **function** that takes a **cumulative grade point average** (out of 4) as a **parameter**, and **returns** which of the following honour categories the student falls into: *Summa Cum Laude*, *Magna Cum Laude*, *Cum Laude* or *none*.

Next, write a **program** that allows a student **to enter** the **numerical score** they earned in a number of courses (ask the user how many courses they would like to enter information for). For each numerical score entered, your program should report the letter grade and grade point obtained by the student for that course.

After all the data has been entered, your program should report the *number* of each letter grade received (number of As, number of B+s, number of Bs, etc.). Your program should also report the students' cumulative grade point average (GPA), and finally, which honours the student has earned (if applicable).

Note that, assuming each course is a full-credit course, the cumulative GPA is computed as the average of the grade points of all the courses taken by the student.

Extra credit: Allow the student to indicate, for each course, the credit weighting of the course. In this case, the cumulative GPA is computed as the weighted average of the grade points of all the courses taken by the student. For example, if the student took two full-credit courses in which he/she earned grade points of 3.7 and 4.0 respectively, and two half-credit courses where he/she earned grade points of 4.0 and 2.0 respectively, the cumulative GPA is computed as follows:

$$\text{Cumulative GPA} = (1 * 3.7 + 1 * 4.0 + 0.5 * 4.0 + 0.5 * 2.0) / 3.0 = 3.57$$

In this case, the 3.0 in the denominator is the total credit weighting of all the courses taken (1+1+0.5+0.5).