COP3035 - Intro to Programming in Python
Lab Guide 7

Instructions

- Follow each step/objective in sequential order.
- Practice the skills from each objective to ensure mastery.
- After completing this guide, mark your attendance by submitting your progress using the provided form with the TA.
- *Remember, practice makes perfect!*

Objective: Practice functions

Exercise 1:
Write a function to calculate the area of a triangle given its three sides a, b, and c using Heron's formula.
Input: a, b, c
Output: area

Exercise 2:
Implement a function to calculate the future value of monthly savings replaced from an expense into a savings account over x years at an annual interest rate of i, compounded monthly.
Input: Monthly savings amount (P), annual interest rate as decimal (i), number of years (x)
Output: Future value (VP)
Tip: You can use the formula FV = P * (((1 + i/12) ** (12*x) - 1) / (i/12))

Exercise 3:
Create a function that estimates the number of communicative extraterrestrial civilizations in the Milky Way galaxy based on the Drake Equation parameters.
Input: Use input statements to ask the user for: R_star, f_p, n_e, f_l, f_i, f_c, L
Output: Number of communicative extraterrestrial civilizations in our galaxy (N)

Exercise 4:
Develop a function that reads a text file and returns the total word count.
Input: filename
Output: total word count

Exercise 5:

a) Develop a function that calculates how many Rubik's cubes fit in a box of dimensions *x*, *y*, *z*.
   Input: e, x, y, z (e: length dimension of the Rubik cube)
   Output: number of cubes
b) Develop a function that calculates how many boxes of dimensions *x*, *y*, z fit into a standard 40-foot-long shipping container.
   Input: x, y, z
   Output: number of boxes
c) Develop a function that integrates the previous two functions to find out how many Rubik's cubes fit in a large ship that holds x containers.
   Input: x containers
   Output: number of cubes