

# CS 115 - Introduction to Programming in Python

## Lab 01

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**Lab Objectives:** Input/output, arithmetic and conditional expressions

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1. Write a Python script, `Lab01_Q1.py` that calculates and displays the answers to the following questions. All data should be stored in variables. All formatted results should be displayed with a single decimal place.
  - a. Input the mass of a battery and the mass of the battery cables. What is the mass of the battery cable assembly? (battery and cable)
  - b. If one of the cables is removed, what is the mass of the leftover assembly?
  - c. What is the battery mass if we have 2 batteries?
  - d. If the battery has a mass of 5000 g and a volume of 2500 cm<sup>3</sup>, what is the density of the battery? The formula for density:  $D = m/v$ , where  $D$  is density,  $m$  is mass and  $V$  is volume.
  - e. The length, width, and height of a battery is 3 cm. What is the area of the base of the battery (assume battery is square prism)?
  - f. What is the volume of the battery with length, width, and height of 3 cm?
2. Write a program, `Lab01_Q2.py`, that inputs a string containing the date of an exam(dd/mm). You may assume the day and month is always 2 digits. If the month is before the current month, display 'Exam finished', if the month is the current month print the number of days until the exam (unless it has not already passed). If the month is after the current month, display the number of months until the exam. The sample runs below assume the current date is 02/07.

Sample Runs:

Enter date of exam: 09/11  
4 months until exam

Enter date of exam: 01/07  
Exam finished

Enter date of exam: 08/07  
6 days until the exam

Enter date of exam: 25/05  
Exam finished

3. Write a program, `Lab01_Q3.py` that does the following. You are going on a holiday and you would like to pack bottles of hand-sanitizer and packages of wipes in your suitcase. Each bottle of hand sanitizer is 5 kilograms and wipes are 1 kilogram. Your program should input the amount of extra space (in kilograms) in the suitcase, as well as the number of bottles of hand sanitizer and packages of wipes available.

Assume that you will always pack as much hand sanitizer as possible before the wipes. Your program should calculate and display how many **wipes** to pack to fill exactly the extra space. If you cannot fill the extra space **exactly**, print: 'Cannot fill extra space exactly'. For example, if the extra space in your suitcase is 9 kg, but you only have 1 hand sanitizer and 1 package of wipes (5 + 1) your program should print 'Cannot fill extra space exactly'. Hint: look at the sample runs below and identify the different cases.

**Sample Runs:**

Enter extra space (kg): 9  
Enter number of hand sanitizer: 1  
Enter number of wipes: 4  
4 packages of wipes

Enter extra space (kg): 9  
Enter number of hand sanitizer: 1  
Enter number of wipes: 3  
Cannot fill extra space exactly

Enter extra space (kg): 12  
Enter number of hand sanitizer: 3  
Enter number of wipes: 1  
Cannot fill extra space exactly

Enter extra space (kg): 12  
Enter number of hand sanitizer: 1  
Enter number of wipes: 10  
7 packages of wipes

Enter extra space (kg): 10  
Enter number of hand sanitizer: 3  
Enter number of wipes: 4  
0 packages of wipes