

# Engineering 195H – Fall 2012

## Post-Activity 8.2.1

**INDIVIDUAL ASSIGNMENT:** See the course syllabus for a definition of what this constitutes.

### TASK 1

**OBJECTIVE:** To gain experience writing Python programs with basic commands.

Suppose you are a co-op student and you have just started your first tour of duty at Mho-ROM Electronic Components, Inc., a large manufacturer of semiconductors and integrated circuits. Your first assignment is to develop a program which will help to model capacitance in a circuit.

Since you have already completed ECE 201, you know that resistance can come from anywhere in a circuit: wires, board traces, components within the circuit, or resistors themselves.

You have determined that you will need to accommodate two types of resistance: series and parallel. Additionally, you know that they are computed differently. Looking back at your ECE 201 notes, you find the following equations for parallel and series resistance:

$$\frac{1}{R_{total}} = \frac{1}{R_1} + \frac{1}{R_2} + \dots + \frac{1}{R_n} \quad (\text{Parallel Resistance})$$

$$R_{total} = R_1 + R_2 + \dots + R_n \quad (\text{Series Resistance})$$

Additionally, you know that any network of resistance can be calculated by inputting two resistances at a time (the superposition principle) until the entire network has been accounted for. Thus, one only has to deal with two resistances at any time. For this assignment, you will need to write two Python functions. The first one will calculate parallel resistance, and the second will calculate series resistance. Each function will take 2 input values, one for each resistance and it will return one value, namely the total or equivalent resistance.

Additionally you are asked to write a python program to test the functions. The main program should ask the user for 2 inputs and the inputs should be given in TWO separate lines (i.e. user MUST hit ENTER after typing first input, before it can move onto the second input). The test program should then call the series function first and use the inputs already provided followed by the parallel function. The main program will output the result for both series AND parallel calculation. You have been given some test cases by your supervisor to make sure you functions are outputting correct values:

Type of Network	First Resistance	Second Resistance	Equivalent Resistance
Parallel	10Ω (ohms)	10Ω	5Ω
Parallel	15 Ω	20 Ω	8.57 Ω
Series	10 Ω	50 Ω	60 Ω
Series	22.2 Ω	5.64 Ω	27.84 Ω

Save your functions\* in a module called:

`PA_8_2_1_functions_login.py`

\*Note. Functions within module should be called `series` and `parallel`.

Save your main program as:

PA\_8\_2\_1\_main\_login.py

## TASK 2

**OBJECTIVE:** To practice simple operations in Python using different data types and implementing functions.

In this task, you will perform some simple operations dealing with character strings, integers, and floating-point values. When you are done with this exercise, you should have some familiarity with programming in Python, and you should be able to write a simple program which can perform input, output, and arithmetic operations as well as utilize functions.

Write a python program that prompts the user to input their last name, first name, an integer representing their age in years, and an integer representing the number of days elapsed since their most recent birthday. Each of these inputs will be followed by a return (i.e. should be done in SEPARATE lines). Given this data, your program should calculate the user's total present age in years since their last birthday then use a user-defined function to calculate and return the user's age in whole minutes. Your program should then output the user's name (first then last name), a real number representing their total present age in years, and the number of whole minutes that have elapsed in this time and was calculated in a function. Assume that there are 365.242199 days in a year. The input and output of the program should follow this example as closely as possible:

```
Enter your last name:
Purdue
Enter your first name:
John
Enter your age in whole years:
201
Enter the days elapsed since your last birthday:
77
John Purdue
You are 201.210819013 years old.
You are 105826582 minutes old.
```

Note that your program will be graded based upon the output, namely the last three lines of this example. You do not need to worry about any errors in the input; however your program must not produce any errors when running. The program should be named:

PA\_8\_2\_1\_Task2\_login.py.

The user-defined function used in this program should be included within the module.

**Make sure you include your INDIVIDUAL HEADER as in your file(s) and submit it to the appropriate turn-in box on Blackboard.**