

# CSE 101: Introduction to Computational and Algorithmic Thinking

## Stony Brook University

### Lab Assignment #2

Spring 2018

Assignment Due: February 9, 2018 by 11:59 pm

#### Assignment Objectives

By the end of this lab you should be able to write short Python functions that use if-statements and relational operators to solve simple problems.

#### Part I: Compute the Value of a Formula (20 points)

Write a function `compute2()` that takes the following arguments, in this order:

1. `x`: the first value you need for the formula
2. `y`: the second value you need for the formula

Your function should return the value of the formula given below (using floating-point division):

$$f(x, y) = \begin{cases} x + 2y & x \leq 0 \\ \frac{1 - y}{x} & 0 < x \leq 8 \\ \frac{y^2}{x^3} & x > 8 \end{cases}$$

#### Examples:

Function Call	Return Value
<code>compute2(6.64, -5.02)</code>	0.9066265060240963
<code>compute2(-9.15, 6.53)</code>	3.91
<code>compute2(9.66, 3.8)</code>	0.016019015218925313
<code>compute2(-7.83, -9.59)</code>	-27.009999999999998
<code>compute2(-9.01, 7.45)</code>	5.8900000000000001
<code>compute2(-2.37, 1.62)</code>	0.8700000000000001
<code>compute2(-0.9, 0.22)</code>	-0.46
<code>compute2(9.08, 2.33)</code>	0.00725194157380947
<code>compute2(5.56, -3.61)</code>	0.829136690647482
<code>compute2(6.83, -4.12)</code>	0.7496339677891655

## Part II: Computer Price (20 points)

Write a function `computer_price()` that takes the following arguments, in this order, and computes the price of a computer:

1. `cpu`: the manufacturer of the CPU, which must be “Intel” or “AMD” (capitalized just so)
2. `ghz`: the gigahertz rating of the CPU, which must be a positive number
3. `disk_type`: the disk type, which must be “SSD” or “HDD” (capitalized just so)
4. `disk_size`: the disk’s size in gigabytes, which must be a positive number

The base price of the computer is \$1000. Components add to the computer’s price as follows:

- An Intel processor adds \$200.
- An AMD processor adds \$175.
- A CPU running at 2 GHz or higher adds \$150.
- A CPU running at 1 GHz or higher (but less than 2 GHz) adds \$80.
- A solid state disk (SSD) adds \$225.
- A hard disk (HDD) adds \$100.
- Each gigabyte of disk space costs \$2.

Based on the computer’s specifications, the function computes and returns the computer’s price. If any of the four arguments is invalid, the function returns the floating-point number `-1.0`.

### Examples:

Function Call	Return Value
<code>computer_price('AMD', -0.1, 'hdd', 16.7)</code>	<code>-1.0</code>
<code>computer_price('Intel', 0.0, 'SSD', 86.0)</code>	<code>-1.0</code>
<code>computer_price('AMD', 3.5, 'HDD', 53.8)</code>	<code>1532.6</code>
<code>computer_price('Intel', -0.1, 'HDD', 44.5)</code>	<code>-1.0</code>
<code>computer_price('AMD', 1.4, 'HDD', 1.8)</code>	<code>1358.6</code>
<code>computer_price('Intel', 2.8, 'SSD', 62.0)</code>	<code>1699.0</code>
<code>computer_price('intel', 1.1, 'SSD', 82.5)</code>	<code>-1.0</code>
<code>computer_price('AMD', 3.3, 'SSD', 63.9)</code>	<code>1677.8</code>
<code>computer_price('AMD', 3.4, 'HDD', 48.8)</code>	<code>1522.6</code>
<code>computer_price('Intel', 2.3, 'ssd', 97.9)</code>	<code>-1.0</code>

## Part III: Tracing Code Execution (10 points)

**Note:** the skills needed to complete this part of the lab assignment will be demonstrated in lecture on February 6th.

This problem is different from those you have done before. In this problem you will use the PyCharm Debugger to trace code and record in [Blackboard](#) the value of a variable at various points during execution of the code.

Begin by downloading `company.py` from [Piazza](#). In this file you are given a completed function called `company_policy()` that returns a string. The function takes these arguments:

1. `experience`: an integer that provides a measure of a person's experience
2. `base_pay`: an integer that represents the base pay of a person

Visit [Blackboard](#) and navigate to the "Assignments" section. Find the link marked "Lab 2 Part 1" and click on it. You will find five questions to answer. Now note the following lines towards the bottom of `company.py`:

```
experience_test = 18
base_pay_test = 26000
```

In order to answer the questions in [Blackboard](#) you will need to edit the lines noted above to change the arguments as indicated in the question. As an example, here is the first question on Blackboard:

Suppose `experience_test = 11` and `base_pay_test = 10000`. What is the value of `result` before the line marked Label 10 is executed?

In PyCharm, we would locate the line of code marked "Label 10" and click in the empty region just to the left of the line to create a *breakpoint*. (Recall that a breakpoint causes PyCharm to pause execution of a program at a line of code so that the programmer can inspect the values of variables.) We would then use the Run menu and select "Debug company" to start the debugger. See the Unit 3 lecture notes for more information about how to use the debugger in PyCharm.

Provide the answers to the following questions in [Blackboard](#):

1. Suppose `experience_test = 11` and `base_pay_test = 10000`. What is the value of `result` before the line marked Label 10 is executed?
2. Suppose `experience_test = 4` and `base_pay_test = 10000`. What is the value of `result` before the line marked Label 4 is executed?
3. Suppose `experience_test = 4` and `base_pay_test = 10000`. What is the value of `result` before the line marked Label 15 is executed?
4. Suppose `experience_test = 8` and `base_pay_test = 26000`. What is the value of `result` before the line marked Label 8 is executed?
5. Suppose `experience_test = 18` and `base_pay_test = 26000`. What is the value of `result` before the line marked Label 13 is executed?

## How to Submit Your Work for Grading

To submit your `.py` file for grading:

1. Login to [Blackboard](#) and locate the course account for CSE 101.
2. Click on "Assignments" in the left-hand menu and find the link for this assignment.
3. Click on the link for this assignment.

4. Click the “Browse My Computer” button and locate the .py file you wish to submit. Submit only that one .py file.
5. Click the “Submit” button to submit your work for grading.

***Oops, I messed up and I need to resubmit a file!***

No worries! Just follow the above directions again. We will grade only your last submission.

**Note:** Files uploaded to CodeLoad will **not** be graded! You must submit your work to Blackboard for grading.