

Practical Questions for CSCA08¹

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1. True or False, explain

- i) The value of "math.sqrt(2.0)*math.sqrt(2.0) == 2.0" is True. (Try it!)
- ii) Let L be a list, each element of which is a list of ints. In Python, the assignment statement L[0][0]=3 mutates the list L.
- iii) Typically, the use of functions in a program reduces the total number of lines of code.
- iv) Python is the best programming language.
- v) You are having fun!

2. Consider the implementations of compare1 and compare 2, where a and b are floats.

```
def compare1(a, b):
    if a < 0:
        a = -a
    if b < 0:
        b = -b
    res = (a == b)
    if res:
        print (a, 'and', b, 'have the same absolute value.')
```

```
def absolute_value(n):
    if n < 0:
        n = -n
    return (n)
```

```
def compare2(a, b):
    res = absolute_value(a) == absolute_value(b)
    if res:
        (print a, 'and', b, 'have the same absolute value.')
```

- i) Do compare1 and compare2 return the same value for all possible inputs? If not, give a pair of inputs for which they return a different value.
- ii) Do compare1 and compare2 print the same thing for all possible inputs? If not, give a pair of inputs for which they print different things.

3. Write the following functions using if-statements and loops given the comments

```
i) def largest_element(numlist):
    """ (list of nums) -> num
    Returns the largest value from a non-empty list
    >>> largest_element([1])
    >>> 1
    >>> largest_element([-1, 2, 5])
    >>> 5
    >>> largest_element([-1, 2, 5, 6.6])
    >>> 6.6
    """

ii) def second_largest_element(numlist):
    """ (list of nums) -> num
    Returns the second largest value from a list of more than 1 elements
    >>> second_largest_element([1, 2])
    >>> 1
    >>> second_largest_element([-1, 2, 5])
    >>> 2
    >>> second_largest_element([-1, 2, 5, 6.6])
    >>> 5
    """

iii) def even_vowels(string):
    ''' (str) -> bool
    Returns True iff the number of vowels (i.e. AEIOU aeiou) in string is even
    >>> even_vowels("")
    >>> True
    >>> even_vowels("Hello World")
    >>> False
    >>> even_vowels("Brian")
    >>> True
    """

iv) def remove_nums(string):
    """(str)-> str
    Returns a string stripped of all of its numbers and reversed
    >>> list_product ("")
    >>> ''
    >>> list_product("hello")
    >>> 'olleh'
    >>> list_product("I LOV3 CSCA08")
    >>> 'ACSC VL I'
    """
```

```

v) def list_product(L1, L2):
    """(list of ints, list of ints) -> list of ints
    Returns the element-wise product of L1 and L2. If the lists are of different length,
    it uses 1 for the missing coefficients.
    >>> list_product([], [1, 2, 3, 4])
    >>> [1, 2, 3, 4]
    >>> list_product([2, 3], [3, 3])
    >>> [6, 9]
    >>> list_product([2, 2, 3], [7, 5, 6, 7])
    >>> [14, 10, 18, 7]
    """

```

4. At McDonalds one can buy chicken nuggets in packages containing 6, 9 or 20 pieces. Write a Python function that accepts an integer, num, as an argument and decides whether or not it is possible to buy num nuggets at McDonalds.

Does the following code satisfy the conditions?

```

def func(num):
    rem = num % 6
    if (num < 6) or ((num > 6) and
                    ((rem == 1) or (rem == 2 and num < 15) or (rem == 4) or (rem == 5))):
        return False
    else:
        return True

```

Answers to Q1:

F. Try it! You will learn why in future CSC courses

F. It mutates the list L[0], NOT L! Think about it in terms of the memory model

T. Code reuse!

T/F. Depends on how you are using it

T. Because you are having so much fun!

¹Source: <https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/>