

Practice problems
ISYS90088 Introduction to Application
Development
Semester 2, 2016

-- adapted from dept. resources --

Exercises

1. What is wrong with the following code, and how can you fix it?

```
eggs == 3
if eggs = 5:
    print('spam')
else:
    print('not spam')
```

2. Given the assignment `mylist = [3, ["green", "eggs"], True, "computing"]`, evaluate the following statements and provide: (a) the value the expression evaluates to; and (b) the value of `mylist` after the code statement has been executed. Assume that `mylist` is reassigned to its original value for each sub-question:

- (a) `mylist[2]`
- (b) `mylist[3:]`
- (c) `mylist[1][1][: -1]`

3. Rewrite the following code using a `for` loop:

```
count = 0
items = ['eggs', 'spam', 'moreeggs']
while count < len(items):

    print("We need to buy {0}!".format(items[count]))
    count += 1
```

4. Rewrite the following code using a `while` loop:

```
for i in range(1,6):
    print("The square of {n} is {nsq}.".format(n=i, nsq=i*i))
```

Problems

5. [Note: this problem contains no Python. Instead, it serves two purposes: to build your algorithmic thinking, and to prepare you for Project 1.]

Euclid was a great mathematician of Ancient Greece. Among his many achievements was a simple algorithm for determining the **greatest common divisor** (gcd) of two non-negative integers m and n . The algorithm goes like this:

- **Step 1:** If $n = 0$, return the value of m and stop; otherwise go to Step 2.
- **Step 2:** Divide m by n , and assign the value of the remainder to r
- **Step 3:** Assign the value of n to m , and the value of r to n . Return to Step 1.

Let's walk through the algorithm, with $m = 15$ and $n = 6$:

Step	m	n	r	Action
1	15	6	–	$n \neq 0$, so go to Step 2.
2	15	6	3	Divide m (=15) by n (=6), assigning remainder to r .
3	6	3	3	Swap values according to algorithm, go to Step 1.
1	6	3	3	$n \neq 0$, so go to Step 2.
2	6	3	0	Divide m (=6) by n (=3), assigning remainder to r .
3	3	0	0	Swap values, go to Step 1.
1	3	0	0	$n = 0$, so return m (=3).

Thus, $\text{gcd}(15, 6) = 3$. Determine the gcd of the following inputs:

- (a) $m = 60, n = 12$
- (b) $m = 34, n = 3$
- (c) $m = 105, n = 30$

6. Write a function `num(obj)` that takes a single object `obj` as an argument, and returns `True` if `obj` is an `int` or a `float`, and `False` otherwise.
7. Write a function `sqsum(n)` that takes a single positive integer `n` as an argument, and returns the sum of the squares of the integers from 1 to `n` inclusive, i.e. $\sum_{i=1}^n i^2$.