Lecture 11 - Exercises

11A - Docstrings, Preconditions, Postconditions

1. Which of the following belongs in a function's docstring? List all that apply.
    1. Preconditions
    2. Postconditions
    3. The steps the function takes to accomplish its task
    4. Information about side-effects the function has
    5. Information about the meaning of the arguments passed to the function
2. Consider the following function:

```
def print_squares(n):
  """ docstring missing! help! """
  i = 0
  while i < n:
    i += 1
    print(i, i**2)

  return i**2
```

    1. Which of the following should be included in the docstring? List all that apply.
        a. The function prints the square of each number from 1 through `n`
        b. The function uses a `while` loop
        c. The function returns the square of `n`
        d. The function returns the square of `i`
        e. The function uses a counter variable called `i`
    2. Even with the correct subset of the above, the function could result in an error. Write a **precondition** that can be included such that as long as the precondition is satisfied, the function cannot cause an error.

11B - Parameters, Local Variables, and Scope

3. Consider the following program, noticing that several points in the code are marked with comments (e.g., `M1`). **Important:** the markers refer to the lines they're **on**, not the lines following them.

```
# M1
def a(v1, v2):
    # M2
    v3 = v1 + v2
    # M3
    print(v3)

# M4
a(4, 6)
# M5
```

    1. In which lines (among `M1` through `M5`) is `v2` in scope? List all that apply.
    2. In which lines (among `M1` through `M5`) is `v3` in scope? List all that apply.
4. Consider the following program:

```
def print_rectangle_area(width, height):
    """ Print the area of a width-by-height
        rectangle. Pre: width and height are numbers. """

    area = width * height
    print(area)

w = 4
h = 3
a = w * h
print_rectangle_area(w, h)
```

Which of the following could replace the last line of the program and leave its behavior unchanged? List all that apply.

a. `print(h*w)`

b. `print(width * height)`

c. `print(w * h)`

d. `print_rectangle_area(h, w)`

5. What does the following program print?

```
def f(x):
    g(3 * x)

def g(x):
    print(x + 2)

f(4)
```

6. What does the following program print?

```
x = 4

def f(x):
    return 3 * x

def g(x):
    return x + 2

print(f(g(x)))
print(g(f(x)))
```

Problems

There are no new Problems for today - continue the Peer Review process from last class if you need more time to finish, then work on the Problems from L10.