# CSI31 Introduction to Computer Programming I

Dr. Sharon Persinger
October 29, 2018

# More on Functions

- Scope of variables
- Getting values from a function
- Modularity

# Scope of a variable

- The part of a program where a variable is accessible is called the <u>scope</u> of the variable.
- A variable that is defined in a function definition is <u>local</u> to that funcion. The parameter names in the function definition are local variables, but they get values from the function call.   In both cases, the scope of these variables is the function.

# Scope of a variable

- A variable which is defined in the main body of a file, outside any function definition, is called a <u>global variable</u>. That variable will be visible in the entire file. Best practice is to avoid using global variables. Pass values into a function using parameters.

# Examples of global and local variables

```python
# This is a global variable
a = 0

def my_function(c):
    # this is a local variable
    d = 3
    print(c)
    print(d)

# Now we call the function, passing the value 7 as the first and only
parameter
my_function(7)

# a and b still exist
```

# Examples of global and local variables

```python
# This is a global variable
a = 0

def my_function(c):
    # this is a local variable
    d = 3
    print(c)
    print(d)

# Now we call the function, passing the value 7 as the first and only parameter
my_function(7)
```

# Examples of global and local variables

```
# a and b still exist
print(a)


# c and d don't exist anymore -- these statements will give us name
errors!
print(c)
print(d)
```

# Getting values back from a function

- Two ways
  - Return a value
  - Modify a parameter

# Functions that return a value

- Write a function that computes the square of its parameter and returns it.

- Write a function that computes the cube of its parameter and returns it.

- Write a function that takes two Point objects as parameters and returns the distance between the two points.  You will need to import everything from the graphics module and you will need to use the sqrt function from the math module.

# Python functions can return multiple values

- Write a function that returns the perimeter and the area of a square of side s.

- Assign the return value to one variable.

- Assign the return value to two variables.

▶

# Modifying a parameter

- Examples: addinterest1, addinterest2, addinterest3

- Python passes parameters by value.

- Mutable objects, for instance lists, can have their state modified and the changes are reflected in the calling program.

# How does this work?

# Functions for modularity

- Modularity simplifies the structure of a program.
- The tasks of the program are thought of as function calls.
- The details of the program are hidden in the function definitions.

- Example: futval_graph4.py