

Functions: Parameters & Return Values

- Students learn how functions affect program flow, how functions use local variables, and how they use global variables.
- Students learn preferred means of communication with functions and how to incorporate them into their programs. Attention is also given to debugging programs that contain functions.

$$\underline{f(x)} = x^2 + 2x - 3$$

After we watch the video:

What is a function?
What is a parameter?
What are two types of parameters?

Arguments and return values

- Read [Python for Everybody](#) Chapter 4 Functions sections 4.1 to 4.3.
 - Define "argument"
 - Define "result"
- Visit this web page (<https://docs.python.org/2/library/functions.html>) that lists the built in functions in Python.
- Verify that the Python Version is 2.7.
- Ask, "How many built in functions are in Python 2.7?"
- Change the Python version to 3.4.1. How many built-in functions are in Python 3.4.1?
- Why do you think there are a different number of functions in Python 3.4.1 than in 2.7?

Compound Functions

- Open Runestone Interactive Functions page (<http://interactivepython.org/runestone/static/thinkcspy/Functions/functions.html>) and read about user defined functions in Python.
- Read through lines 1 and 2 that define the header and body of compound statements. Note the format of the compound statement used to define a function.
 - What color is used to highlight the keyword def?
 - What punctuation mark ends the first(header) line?
 - How far is the body indented?
 - What color is the name of the function?
 - What word is used for the value in parenthesis?

Function Definitions

- Run ActiveCode 1.
 - Change the number in line 15 and run the code to make a smaller square.
 - Change the number in line 15 and run the code to make a larger square.
- Run ActiveCode 2.
 - What are the two line numbers used to call or invoke the function drawSquare?
- Run ActiveCode 3.
 - Change the definition of drawMulticolorSquare to different colors.
 - What line would you change to draw smaller multi-color squares?

Return Values

- Some functions find and return values. Complete ActiveCode 5, 6 and 7.
- Change ActiveCode 7 so it prints the minimum values.

Line Numbers

- Run CodeLens 1.
 - What line is executed next after line 6?
 - What line is executed next after line 3?
 - How do you think Python knew what line to go to after line 3?
 - What keyword is used to tell Python to return a value from the function named square?
 - What do you think would happen if you run the program after removing the return statement from line 3?

Wrap Up

- Return to [Python for Everybody](#) Chapter 4 Functions Copy and paste the code from section 4.4 to Runestone ActiveCode 4.
- Run the code multiple times.
 - What do you note about the results?
 - What is the name of the function used?
 - Is the function on the list of the built-in Python functions or is it defined in the program?
 - Where do you think the function is defined?
- Add the number 1 as a parameter in the function call and run the program.
 - Explain the error message.
 - Write one thing to remember about functions in your journal.

