Functions

Unit Overview

- In this unit we will introduce functions. By defining our own functions, we can make our programs more efficient. By defining a function with a specific purpose and scope, we can call that function anywhere in our programs to perform the task it was designed to do. We will learn how to:
  - Use the def statement to define our own functions.
  - Define function parameters including default value cases.
  - Differentiate between function parameters and function arguments.
  - Use function calls with appropriate arguments.
  - Use the return statement to send the results of a function back to the user.
  - Use local and global variables appropriately.
  - Investigate how mutable and immutable data types work with functions.
  - Use the pyplot library from matplotlib to make graph visualizations of data sets.

Data Types

- Strings: A series of characters
- Integers: Whole numbers
- Floats: Decimal numbers
- Lists: A mutable collection
- Tuples: An immutable collection
- Ranges: A sequence of integers
- Booleans: A True or False value
- Dictionaries: A collection of associated key-value pairs

Control Flow

- For Loops
- If Statements
- If/Else Statements
- If/Elif/Else Statements
- Break
- Pass
- Continue
- While Loops
- Def
- Return

Operators

Assignment Operators

- = Assignment
- += Compound Assignment
- -= Compound Assignment
- + Concatenation (strings)

Algebraic Operators

- + Addition (ints and floats)
- - Subtraction
- * Multiplication
- / Division
- ** Exponentiation
- % Modulo Division

Operators

Logical Operators

- And
- Or
- Not

Membership Operators

- In
- Not in

Comparison Operators

- == Equal to
- != Not Equal to
- < Less than
- > Greater Than
- <= Less Than or Equal
- >= Greater Than or Equal

Built In Functions

- print()
- type()
- str()
- int()
- float()
- input()
- round()
- sorted()
- len()
- range()
- list()
- min()
- max()
- sum()
- zip()
- bin()
- hex()
- set()
- bool()

Methods

Strings:

- .upper()
- .lower()
- .title()
- .strip()
- .count()
- .join()
- .startswith()
- .replace()
- .split()

Lists:

- .append()
- .insert()
- .pop()
- .remove()
- .sort()
- .reverse()
- .copy()
- .index()

Dictionaries:

- .items()
- .keys()
- .values()
- .most_common()

External Libraries

- math
- datetime
- cmath
- random
- collections
- time
- matplotlib

Challenge Problems

- The Python Dice App
- The Python Calculator App
- Bank Deposit and Withdrawal App
- Head to Head Tic Tac Toe App
- Loan Calculator App