

# While Loops

# Overview

- In this part we will learn another mechanism to control the flow of your program, the while loop. While loops are like for loops that they run while the specific condition is true. We will learn how to:
  - Implement while loops
  - Use active flag variables to control while loops
  - Perform modulo division
  - Use break and continue statements to alter the flow of a while loop
  - Use empty or populated lists or dictionaries as Boolean values
  - Use the bool() function to convert values to their Boolean equivalent
  - Nest while loop for more complex control flow
  - Use the time library to time processes in our program

# Data Types

- Strings: A collection of characters
- Integers: Whole numbers
- Float: 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 Structures

- If
- For loops
- if Statements
- if/else Statements
- if/elif/else Statements
- break
- pass
- Continue
- while

# Operators

## Assignment Operators

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

## Algebraic Operators

- + Addition
- - Subtraction
- \* Multiplication
- / Division
- \*\* Exponentiation
- // Absolute Division
- % Modulo Division

# Logical 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()
- 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

# Challenges (Assignments)

- Factor Generator App
- Even Odd Number Sort App
- Prime Number App
- Guess My Word App
- Powerball Lottery Simulation App