

# Week 1: Python Basics

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# Outline

1 Overview of Python

2 Python Basics

# Basic Types

- Numbers
  - Integers
  - Floating point numbers
- Strings
  - String additions and multiplications

# Indexing and Slicing

```
Index from rear:    -6  -5  -4  -3  -2  -1
Index from front:   0   1   2   3   4   5
                   +---+---+---+---+---+---+
                   | a | b | c | d | e | f |
                   +---+---+---+---+---+---+
Slice from front:   :   1   2   3   4   5   :
Slice from rear:    :  -5  -4  -3  -2  -1  :
```

- Lists
  - Indexing and slicing
  - Sorting
  - Removing
- Dictionaries
  - Keys
  - Values

- Arithmetic operators
  - $+$ ,  $-$ ,  $*$
  - Powers
  - Division
  - Negation
- Comparison operators

# Flow Control

- Branches
  - if
  - elif
  - else
- Loops
  - for loops

# User-Defined Functions

- A function is a block of reusable code that is used to perform a specific action. The advantages of using functions include:
  - reducing duplication of code
  - decomposing complex problems into simpler pieces
  - improving clarity or readability of code
  - reuse of code
  - information hiding



# Modules and Packages

- A module is a file containing Python definitions and statements. The file name is the module name with the file extension `.py` appended.
- A package is a way of structuring Python's module namespace by using “dotted module names”. For example, the module name `A.B` designates a module named `B` in a package named `A`.