Class starts at 6 PM

Introduction to Python

DeltaWomen - UNOV
2019-06-28

Class details

- Class time: **Fridays 5pm - 7pm (GMT+1)**
  - Lecture: 5pm - 6:15pm
  - Q&A: 6:15pm - 7:00pm
- Instructor details:
  - Name: Aslamah
  - Contact: **arahman.vol@gmail.com**
- All course material will be available on GitHub
  - **https://github.com/aslamahrahman/Python-UNOV-2019**

Topics for today

- Lists / Arrays
- Tuples
- Dictionaries
- Comments in code
- If else elif statement
- Demo - Coding a calculator
- Loops & iterations
- Functions
- Calling functions
- Function parameters
- Calculator demo with functions
- Parts of a function
- Variable scope
- Recursive functions / Recursion

Lists / Arrays

- Stores a sequence of values: [1,2,3], [‘a’,’f’], [2, ‘f’, 0, [‘g’, 1]]
- Can have mixed datatypes
- Starts with [and ends with]
- Accessing an element of a list
- List operations: index, insert, delete, append, push, pop, sub-list / slicing, reverse etc
- https://www.geeksforgeeks.org/python-list/
- Numpy Library

Tuples

- Stores sequence of values just like lists BUT can not be changed once created
- Can have mixed datatypes. Eg: (1, 2, “good”, “t”, ‘r’, 6)
- Accessing tuple values
- Cannot update tuple value
- Cannot delete tuple value
- Tuple operations:
  - Length len()
  - Concatenation +
  - Repetition *
  - Checking if an element exist
  - Slicing etc

Dictionaries

- List of key : value pairs
  - dict = {“Name” : “John”, “Age” : 42, “Place” : “UK”}
- Access with key:
  - dict[“Name”]
- Can have mixed datatypes
- Updating dictionaries
- Duplicate keys are not allowed
- Keys can be strings, numbers of tuples but not lists

Comments in code

- Comments: Lines in code that will not be executed
- Single line:
  - #this code will not be executed
- Multiline:
  - ‘’’

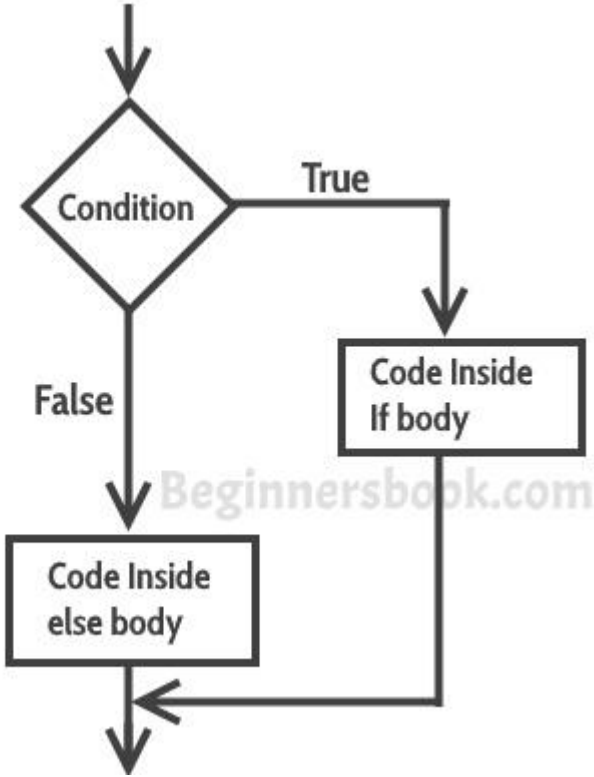
    This code will not be execute

    This one too

    ‘’’

If-else-elif statements

- Called conditional statements
- If condition is satisfied, execute a block of code
- If not, do something else
- 0 : FALSE
- 1 : TRUE
- Syntax & alignment
- Nested if-else statement

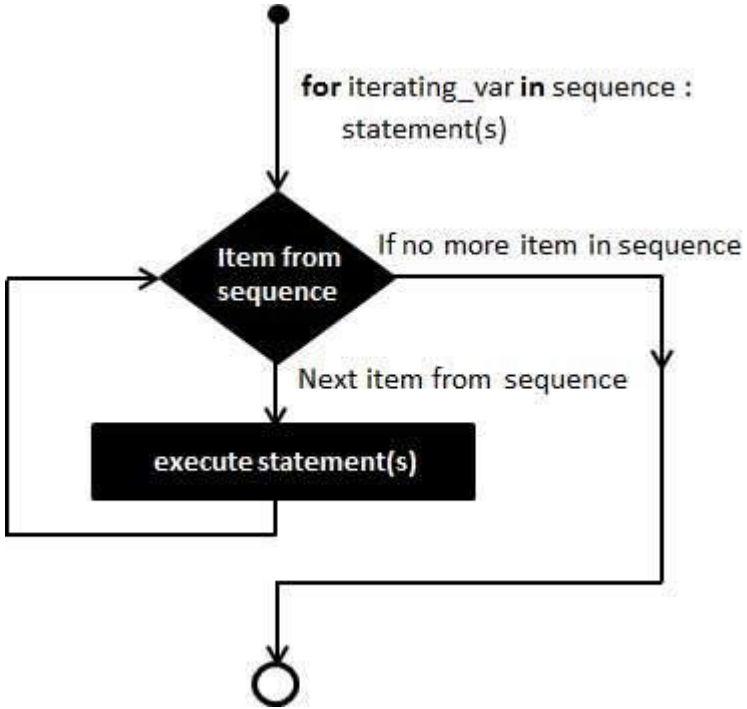


Creating a calculator demo

- Variables
- Operations
- Displaying result

Loops / Iteration

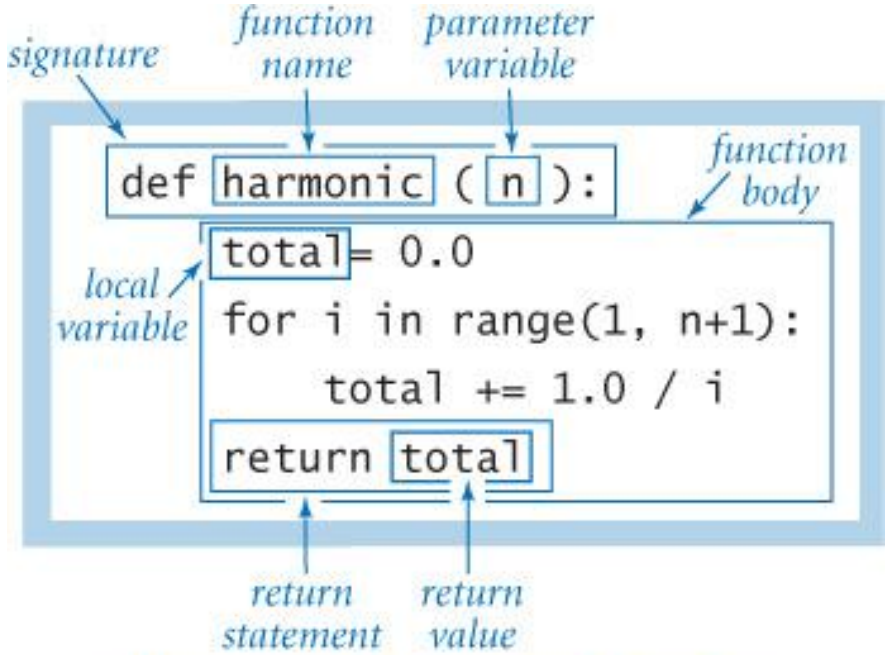
- Iterate over numbers / lists
- range()
- Types of loops & how they are executed:
  - For loop
  - While loop
  - Do while loop
- Demo



Functions

- A piece of code / group of lines of code that can be called for execution as we want
- Modularizing code
- Function definition
- Calling functions
- Function parameters
- Default parameters
- Returning values from function
- Calculator demo with functions

Parts of a function



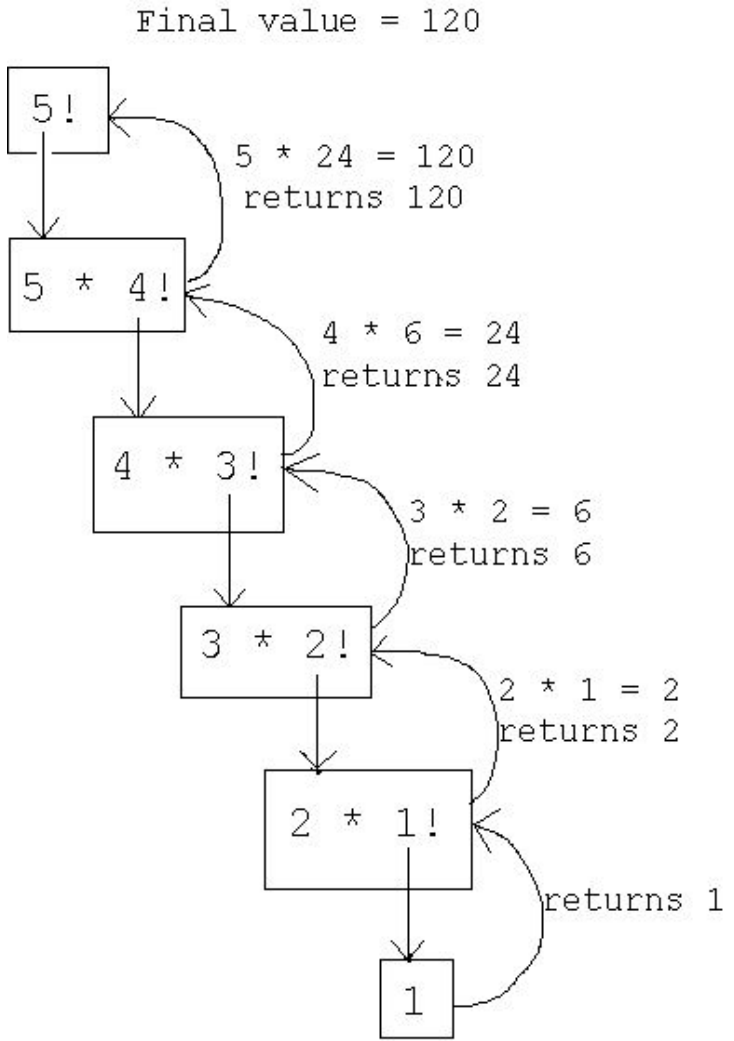
Anatomy of a function definition

Variable scope

- Scope : where all a variable’s value can be accessed
- Global variable: exists throughout the entire duration in which the code runs
- Local variable: exists only when the block it belongs to is executed
- Demo

Recursion

- When a function calls itself
- For example: computing the factorial of a number
- The three laws of recursion
  - Algorithm must have a base case (like an ending point)
  - Algorithm must move towards base case
  - Algorithm must call itself
- How is recursion executed by the computer?



Questions?

Warming up for next week!

Algorithms - Introduction

- Algorithm : a way of doing something
- Example: calculating the factorial of a number:
  - Algorithm #1: using recursion
  - Algorithm #2: using loops
- Writing a pseudo code
- More examples:
  - Algorithm to add two numbers
  - Algorithm to find the greatest of two given numbers
  - Algorithm to find the greatest of three given numbers
- Checking to see if your example works: run a case through it and calculate using pen and paper