Introduction to Programming with Python

Day 2

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March 12, 2021

Course Overview

1. Introduction
2. Lists, Tuples, Dicts
3. Conditional and Looping Statements
4. Errors and Error Handlers
5. Functional Programming
6. External Libraries, Numpy, Scipy, Matplotlib
7. Advanced Plotting
8. Working with Files (CSV, Excel, Text)
9. GUI creation with Tkinter
10. Useful Utilities and Way Forward!

Data Structures

String Operations

- We have lot of options with string variables

  - string.lower()
  - string.upper()
  - len(string)
  - string.replace(”a”,”b”)
  - string.split(’,’)
  - string.count(’a’)
  - string.capitalize()

List in Python

- List are containers used to store a group of Data
- List can be of infinite length
- List can store multiple data types
- Lists are mutable and the values can be changed
- List can be of nested type to create multidimensional list

Methods in Lists

- various options available in the list in Python

  - li.reverse()
  - li.sort()
  - li.sort(reverse = True)
  - li.pop()

Methods in Lists

- various options available in the list in Python

  - li.insert(2,“Inserted”)
  - li.remove(“Inserted”)
  - li.index(“Value”)
  - li.append(“Apended”)
  - li.extend(li_tuple)
  - li.copy()

Tuples in Python

- Tuples behaves exactly as the lists, except they are immutables
- Tuples have only two methods

  - tu.index(“Value”)
  - tu.count(“Value”)

Common usage of tuples are to return results of functions, creating keys for dict types, and holding constants values

Dictionary in Python

- Dictionaries is an unique data type in which the data is stored in key value pairs

```
dict_1={
“key_1”:“Value_1”,
“key_2”:“Value_2”
}
employee={
“EMP_ID” :“BA1004”,
“Name” : “Vivek”,
“Team” :“CSD”
}
```

Conditional Statements

If - else in Python

```
if condition:
        code to be executed

#Example
x=10
if x<20:
        print("X is less than 20")
```

if statements can also be nested!

Looping Statements

For Loop in Python

- For loops are used to do operations over the data present in a list or tuple

```
for value in values:
        code to do something with value
```

```
xvals=[1,2,3,4,5]
for x in xvals:
        print(x)
```

For Loops can also be nested!

While Loop in Python

- While loops are useful to execute a code until certain conditions are attained

```
intial_value
while condition:
        code to execute
        increment /decrement operation
```

While Loop Example

```
x=0
while x<=10:
        print(x)
        x+=1
```

Try Out!

- Extend the Ideal Gas equation program to find the density for given Pressure range and Temperature Range
- Extend the Projectile program to solve time dependent solution
- Find the atmospheric pressure variation with Altitude using barometric formula

print(“Thank You!”)