NJ Tech Lab

Functions

Dr. Nishant Jain
(M.Tech & Ph.D. from IIT Roorkee)

Function Routine

- Programs are divided into small manageable pieces called program routines (or simply **routines).**
- Routines are a fundamental building block in software development.
- Routines is a form of abstraction in which a more general, less detailed view of a system can be achieved.
- It provides the opportunity for code reuse that is it can be called as many times as needed in a program.
- Some Functions are designed to return a value, whereas others are designed to execute a set of instructions. However, functions that are not designed to return a value, return None.

```
def summ():
   c=2
print(summ())   —> It displays None
```

Function Definition

```
def summ(a,b,c):
s=a+b+c
return s
```

summ(2,3,41) → it returns 46

First line is the **Function Header**. It starts with keyword **def** followed by function name (identifier). Function name is followed by comma separated list of identifiers called as **formal parameters** or simply a parameters. Parameter list if followed by colon(:).

Second and third line represent **Function Body.**

Values in the last line 2, 3, and 41 in the last line are the **actual arguments** passed to the **formal parameters.**

Function returning more than one values

Function designed to return more than one values, returns all the values in a single tuple.

```
def minmax(a):
        return (max(a),min(a))
```

A = minmax([2,3,4,1]) → it assigns (4,1) to A

mx,mn = minmax([2,3,4,1]) → it assigns 4 to mx and 1 to mn

mx,mn = minmax([2,3,4,1]) → it assigns 4 to mx and 1 to mn

Mutable vs Immutable Arguments

Lists are mutable, whereas integers, floats, Booleans, strings and tuples are immutable. Mutable arguments if passed to the function, may get altered within the function.

CODE:

```python
def summ(lst):
    s=0
    for k in range(len(lst)):
        s=s+lst[k]
        lst[k]=1
    return s
a= [1,2,3,4]
print('List before the call of the function', a)
print(summ(a))
print('List after the call of the function', a)
```

OUTPUT:

```
List before the call of the
function [1, 2, 3, 4]
10
List after the call of the
function [1, 1, 1, 1]
```

It is better to design functions that do not produce change in the actual parameter.

Positional vs Keyword Argument

Positional Argument is an argument that is assigned to a particular parameter based on its position in the argument list.

Keyword Argument is an argument that is specified by parameter name.

Example of Positional Argument:

```
def summ(a,b,c):
  return a+b+c
print(summ(2,3,4))
```

Example of Keyword Argument:

```
def summ(a,b,c):
  return a+b+c
print(summ(2,c=3,b=4))
```

Function can be called using both Positional and Keyword arguments, however, all positional arguments must come before all keyword arguments. (as mentioned in example above)

Default Argument

Function can be optionally provided with **Default Argument,** that is value mentioned in the default argument will be used if the argument is omitted in the function call.

All positional arguments must come before any default arguments in the function definition.

Example:

```
def summ(a,b,c=5):
   return a+b+c
print(summ(2,3))
```

Local vs Global Variable

Local variable is a variable that is accessible from within a given function.

Global variable is a variable that is defined outside the function and is accessible within any function.

Use of Global variables is considered a bad programming practice due to the following reasons:

1. Global variables may be altered unintentionally by another functions.
2. If the function depends on global variables, then the same function may not work in another new program due to the absence of the same global variable in the new program. Function should be designed in such a way that all the data are explicitly passed as arguments and not accessed through global variables.

Thank You

Website: www.nishantjainlab.in
GitHub Account: https://github.com/nishantjain86
Linkedin: www.linkedin.com/in/nishantjain86
Email Id: nishantjain86@gmail.com
Facebook Id: nishantjain86
YouTube Channel: nishantjainlab