12. PYTHON – FUNCTIONS - PART - 1

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12. PYTHON - FUNCTIONS - PART - 1

1. Function

- ✓ A function can contain group of statements which performs the task.

Advantages

- ✓ Maintaining the code is an easy way.
- ✓ Code reusability.

Make a note

- ✓ print() is predefined function in python which prints output on the console.

2. Types of function

- ✓ There are two types of functions,
  - Pre-defined or built-in functions
  - User-defined functions

2.1. Pre-defined or built-in functions

- ✓ The functions which are already existing in python are called as predefined function

Examples

- print(p)
- type(p)
- input(p)

2.2. User Defined Functions:

- ✓ Based on requirement a programmer can create his own function, these functions are called as user defined functions.
- ✓ So, practically we will see how to define and use, user defined functions.

3. Function related terminology

- ✓ If we want to understand function concept in better way then we need to focus on function related terminology,
    - def keyword
    - name of the function
    - parenthesis **()**
    - parameters (if required)
    - colon symbol**:**
    - function body
    - return type (optional)

4. Function definition

- ✓ A function can contains group of statements.
- ✓ The purpose of function is to perform an operation.
- ✓ A function can contain mainly two parts,
    1. Creating a function
    2. Calling a function

4.1. Creating a function

- ✓ Very first step is we need to create a function.
- ✓ We need to use **def** keyword to create a function.
- ✓ After **def** keyword we should write name of the function.
    - After function name, we should write parenthesis **()**
        - This parenthesis may contain parameters.
            - Parameters are just like variables which receive the values
            - If function having parameters, then we need to provide the values while calling.
            - We will learn more in parameterized function
    - After parenthesis we should write colon **: symbol**
    - After : symbol in next line we should provide indentation
- ✓ Function body.
    - Actual logic contains by function body
    - This function body helps to perform the operation.
- ✓ Before closing the function, function may contain return type.

Syntax

```
def functionname():
        """ doc string"""
        Body of the function to perform operation
```

A naming convention to define a function

- ✓ As discussed in Naming convention chapter, function name should be in lower case.
- ✓ If name having multiple words, then separating words with underscore (_) symbol is a good practice.

Program Name: Creating a function
demo1.py

```
# function creation
def display():
        print("Welcome to function")
```

output

Make a note

- ✓ When we execute above program, then function body not executed.
- ✓ To execute function body, we need to call the function.

4.2. Calling a function

- ✓ After function is created then we need to call that function to execute the function body.
- ✓ While calling the function, function name should be match otherwise we will get error.

Program Name: Create and call user defined function
demo2.py

```
# function creation
def display():
        print("Welcome to function concept")

# function calling
display()
```

output

```
Welcome to function concept
```

Program Name: Create and call user defined function
demo3.py

```
# function creation
def display():
        print("Welcome to function concept")

# function calling
display()
display()
```

output

```
Welcome to function concept
Welcome to function concept
```

Program Name: Create and call user defined function
demo4.py

```
# function creation
def display():
        print("Welcome to function concept")

# function calling
details()
```

output

```
NameError: name 'details' is not defined
```

Question

- Can i create more than one function in a single python program?

Answer

- Yes, we can
- Based on requirement we can create any number of functions.

Program Name: Creating two functions and calling those functions

demo5.py

```
def first():
    print("This is first function")

def second():
    print("This is second function")

first()
second()
```

output

```
This is first function
This is second function
```

Program Name: Creating two functions and calling those functions
demo6.py

```
def first():
        print("This is first function")

def second():
        print("This is second function")

second()
first()
```

output

```
This is second function
This is first function
```

6. A Function can call other function

- ✓ Based on requirement a function can call another function as well.
- ✓ We can call a function inside another function.

Syntax

```
def first_function():
        body of the first function
        we can call the secondfunction


def second_function():
        body of the second function

first function calling
```

Program Name: Creating two functions
demo7.py

```
def m1():
        print("first function")

def m2():
        print("second function")

m1()
m2()
```

output

```
first function
second function
```

Program Name: One function can call another function

demo8.py

```
def m1():
        print("first function")
        m2()

def m2():
        print("second function")

m1()
```

output

```
first function
second function
```

5. Based on Parameters: Functions are two types

- ✓ Based on parameters, functions can be divided into two types,
  - Function without parameters **(or)** No parameterised function
  - Function with parameters **(or)** Parameterised function

5.1. Function without parameters

- ✓ If a function having no parameters then that function is called as, No parameterized function

Syntax

```
def nameofthefunction():
        body of the function to perform operations

function calling
```

Program Name: Function which having no parameters
demo9.py

```
# defining a function
def display():
        print("Welcome to function which having no parameters")

# calling function
display()
```

output

```
Welcome to function which having no parameters
```

5.2. Function with parameters

- ✓ If a function having parameters then that function called as parameterised function

Why function having parameters?

- ✓ Function parameters help to process the function operation.
- ✓ When we pass parameters then,
  - Function capture parameters values
  - These values perform the operations.
  - Finally it brings the result.

Syntax

```
def functionname(parameter1, parameter2, …):
        body of the function
function calling
```

Program Name: One parameterized function
demo10.py

```
def testing(a):
        print("one parameterised function:", a)

testing(10)
```

output

```
one parameterised function: 10
```

Program Name: One parameterized function
demo11.py

```
def testing(a):
        print("one parameterised function:", a)

testing(10.56)
```

output

```
one parameterised function: 10.56
```

Program Name: One parameterized function
demo12.py

```
def testing(a):
        print("one parameterised function:", a)

testing("Daniel")
```

output

```
one parameterised function: Daniel
```

Program Name: One parameterized function
demo13.py

```
def testing(a):
        print("one parameterised function:", a)


x = input("Enter a value:")
testing(x)
```

output

```
Enter a value: 10
one parameterised function: 10
```

Program Name: Two parameterized function
demo14.py

```
def testing(a, b):
        print("two parameterised function:", a, b)

testing(10, 20)
```

output

```
two parameterised function: 10 20
```

Program Name: Function performing addition operation
demo15.py

```
def addition(a, b):
        print("Addition of two values=", (a+b))

addition(10, 20)
```

output

```
Addition of two values =30
```

7. return keyword in python

- ✓ Based on return statement, functions can be divided into two types,
  - Function without return statement
  - Function with return statement

- ✓ return is a keyword in python.
- ✓ We should use return statement with function or method, otherwise we will get error.

Program Name	return outside of function which is invalid demo16.py
	print('Hello') return 100
output	
	SyntaxError: 'return' outside function

7.1. Function without return

- ✓ If a function cannot contains return statement then that function is called as a function without return statement.
- ✓ It's not mandatory to write return statement to a function.
- ✓ A function without return statement is valid.

Program Name: Function displaying information
demo17.py

```
def balance():
        print("My bank balance is: ")

balance()
```

output

```
My bank balance is:
```

7.2. Function with return

- ✓ Based on requirement we can write return statement to a function.
- ✓ A function with return statement is valid.

Syntax

```
def nameofthefunction():
    body of the function
    return result
```

Program Name: Function with return statement displaying information
demo18.py

```
def balance():
    print("My bank balance is: ")
    return 100

balance()
```

output

```
My bank balance is:
```

Note

- ✓ If a function contains return statement then that function calling we need to assign to a variable.
- ✓ Daniel why we need to assign to a variable?
- ✓ Yes, i will explain please wait in another five minutes, then you can understand.

Program Name: Function with return statement
demo19.py

```
def balance():
        print("My bank balance is: ")
        return 100

b = balance()
print(b)
```

output

```
My bank balance is:
100
```

Why we need to assign a function calling to a variable?

- ✓ If we assign function calling to a variable then that variable holding the variable value.
- ✓ That variable we can use further in our program.

Program Name: Function with return statement
demo20.py

```
def balance():
    return 100

b = balance()

if b==0:
    print("Balance is: ", b)

elif b<=0:
    print("Balance is: ", b, " negative please deposit")

else:
    print("Balance is: ", b)
```

output

```
Balance is: 100
```

Program Name: Function with return statement
demo21.py

```
def balance():
        return 0

b = balance()

if b == 0:
        print("Balance is: ", b)

elif b<=0:
        print("Balance is: ", b, " negative please deposit")

else:
        print("Balance is: ", b)
```

output

```
Balance is: 0
```

Program Name: Function with return statement
demo22.py

```
def balance():
        return -50

b = balance()

if b == 0:
        print("Balance is: ", b)

elif b <= 0:
        print("Balance is: ", b, "it is negative please deposit")

else:
        print("Balance is: ", b)
```

output

```
Balance is: -50 it is negative please deposit
```

Note

- ✓ Below program also valid but not recommended.

Program Name: Function with return statement
demo23.py

```
def balance():
    print("My bank balance is: ")
    return 100

print(balance())
```

output

```
My bank balance is:
100
```

Note

- ✓ A method can return a value as well.
- ✓ We will learn this concept again in OOPS chapter.

7.3. return vs None

- ✓ If any function is not return anything, then by default that function returns None data type.
- ✓ We can also say as, if we are not writing return statement, then default return value is None

Program Name: function returning the None value
demo24.py

```
def m1():
        print("This function is returning nothing")

x = m1()
print(x)
```

output

```
This function is returning nothing
None
```

7.4. A function can return multiple values

- ✓ In python, a function can return multiple values.
- ✓ Based on requirement a function can return multiple values.
  - If function is returning two values then while function calling we need to assign to two variables
  - If function is returning three values then while function calling we need to assign to three variables.
  - If function is returning more than one values, while calling function if we assign with one variable then all values will be stored in tuple.

Syntax

```
def name_of_the_function():
    body of the function
    return value1, value2, value3,...,valueN
```

Program Name: Define a function which can return multiple values
demo25.py

```
def m1():
        a = 10
        b = 11
        return a, b

x, y = m1()

print("first value is:", x)
print("second value is:", y)
```

output

```
first value is: 10
second value is: 11
```

Program Name: Define a function which can return multiple values
demo26.py

```
def m1():
        a = 10
        b = 11
        c = 12

        return a, b, c

x, y, z = m1()

print("first value is:", x)
print("second value is:", y)
print("third value is:", z)
```

output

```
first value is: 10
second value is: 11
third value is: 12
```

Program Name: Define a function which can return multiple values
demo27.py

```
def m1():
        a = 10
        b = 11
        c = 12
        return a, b, c

x = m1()
print("all values:", x)
```

output

```
all values: (10, 20, 30)
```

Program Name: A function with parameters and return type.
demo28.py

```
def add(x, y, z):
        result = x+y+z
        return result

r = add(10, 20, 30)

print("Addition of values:", r)
```

output

```
Addition of values: 60
```