Chapter - 8
Functions and Recursions

A function is a group of statements performing a specific task.

When a program gets bigger in size and its complexity grows, it gets difficult for a programmer to keep track on which pice of code is doing what!

A function can be reused by the programmer in a given program any number of.

Example and Syntax of function
The syntax of a function looks as follow:

```
def func():
    print("Hello")
```

This function can be called any number of times, anywhere in the program

Function Call
Whenever we want to call a function, we put the name of the function followed by parentheses as follows:

```
func()
```
→ This is called function call

function definition
The part containing the exact set of instruction which are executed during the function call.

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Quick Quiz: Write a program to greet a user with "Good day" using functions.

Types of functions in Python

There are two types of functions in python:

1. Built in functions → Already present in python
2. User defined functions → Defined by the user

Example of built in function includes len(), print() range() etc.

The func() function we defined is an example of user defined function.

Functions with arguments

A function can accept some values it can work with. We can put these values in the parenthesis a function can also return values as show below:

```
def greet(name):
    gr = "Hello" + name
    return gr

a = greet("Abhi")
```

→ "Abhi" is passed to greet in name

→ a will now contain "Hello Abhi"

print(a) → print "Hello Abhi"

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Default Parameter Value

We can have a value as default argument in a function:
If we specify name = "stranger" in the line containing def, this value is used when no argument is passed.

Example

```
def greet(name = "stranger"):
    # function body

greet()
```

→ Name will be "stranger" in function body (default)

```
greet("Abhi")
```

↳ name will be "Abhi" in function body (passed)

Recursion

Recursion is a function which calls itself.
It is used to directly use a mathematical formula as a function.
Example:

factorial(n) = n x factorial(n-1)

This function can be defined as follows:

```
def factorial(n)
    if i == 0 or i = 1:
        return 1
    else:
        return n * factorial(n-1)
```

→ Base condition which doesn't call the function any further.

↳ function calling itself

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This works as follows:

factorial(4) → [function called]

↓

4 x factorial(3)

↓

4 x [3 x factorial(2)]

4 x 3 x [2 x factorial(1)]

4 x 3 x 2 x 1 [function returned]

The programmer need to be extremely careful while working with recursion to ensure that the function doesn't infinitely keep calling itself.

Recursion is sometimes the most direct way to code an algorithm.

Chapter - 8
Practice Set

Que 1. Write a program using function to find greatest of three numbers.

Que 2. Write a python program using function to convert celcius to fahrenheit.

Que 3. How do you prevent a python print() function to print a new line a the end.

Que 4. Write a recursive function to calculate the sum of first n natural numbers.

Que.5. Write a python program using function to print first n lines of the following pattern:

```
* * *        for n = 3
* *
*
```

Ques.6. Write a python function which converts inches to cms.

Ques.7. Write a python function to remove a given word from a list and stop if at the some time.

Que.8. Write a python function to print multiplication table of a given number.