Function (Part-2)

Advanced

Function Advanced

Part 1

ALREADY Covered

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Quick Recap

Quick Recap

Function: A reusable block of code that runs when called.

Inputs (Parameters): Functions can accept inputs to work with.

Output (Return): Functions can send a result back after execution.

Types:

- **Built-in Functions** (e.g., print(), len(), type())
- **User-defined Functions** (custom functions you create)

Why Use Functions:

- Code Reusability
- Modularity
- Code Organization
- Easier Debugging

Quick Recap

Defining a Function:

- Use **def** keyword with **function name** and **parameters**.
- (Optional) Add a **docstring** to describe the function.
- (Optional) Use **return** to send back a **result**.

Quick Recap

<table>
<tr><th>Python</th><th>Output</th></tr>
<tr><td><pre>
def greet(name):
    """
    This function greets the person passed as
    an argument.
    """
    return f"Hello, {name}!"

# Calling the function
print(greet(“Amar"))
</pre></td><td><pre>
Hello, Amar!
</pre></td></tr>
</table>

Quick Recap

Python

```python
def greet(name, age):
    """
    This function greets the person passed as an argument.
    """
    return f"Hello, {name}! You are {age} years old."

# Calling the function
print(greet(“Amar“, 25))
```

Output

```
Hello, Amar!
You are 25
years old.
```

02

Intermediate Stuff

Intermediate Stuff

- **Arguments** are the values you **pass inside** the **parentheses ()** when calling a function.

- **Parameters** are the variables you define **inside the function definition** to accept those values.

- **Simple Meaning:**
  • **Parameters** are like **empty containers**,
  • **Arguments** are the **actual items** you put inside when calling.

Python

```python
def greet(name): # 'name' is a parameter
    print(f"Hello, {name}!")

greet("Amar") # "Amar" is an argument
```

Types of Function Arguments

Type	Description
Positional Arguments	Passed by **order**. Must be in the correct position.
Keyword Arguments	Passed by **name**, so order doesn't matter.
Default Arguments	Parameters that already have a **default value** if no argument is provided.
Variable-length Arguments	Accepts **multiple values** using ***args** or **multiple keyworded values** using ****kwargs.**

Positional Arguments

- Arguments are **matched** to parameters by their **position**.
- Order **matters**!

Python

```python
def sub(a, b):
    return a - b

print(sub(5, 10))
```

Output

```
-5
```

(Here, a=3 and b=5 based on their positions.)

Keyword Arguments

- You can pass arguments by **specifying parameter names**.
- **Order doesn't matter** when using keyword arguments.

Python

```
def introduce(name, age):
    print(f"Hello, {name} and I am {age} years old.")

introduce(age = 25, name = ”Amar”)
```

Output

```
My name is Amar
and I am 25 years
old.
```

(Since you used name= and age=, order doesn't matter.)

Default Arguments

- You can assign a **default value** to a **parameter**.
- If **no value** is provided during the function call, the **default value** is used.

Python

```python
def greet(name = ”Guest”):
    print(f"Hello, {name}. ")

greet()
greet(name = ”Amar”)
```

Output

```
Hello, Guest.
Hello, Amar.
```

Default Arguments

Important Rule:

- Parameters with default values **must come after** parameters without default values.

Python

```python
# Correct
def greet(name, age = 18):
    pass
```

```python
# Incorrect:
# SyntaxError: parameter without a default follows parameter with a default
def greet(age = 18, name):
    pass
```

Variable-length Arguments

- Sometimes you **don't** know **how many arguments** you'll **pass**.
- Python gives **two special ways**:
    - ***args** (Non-keyworded variable arguments)
    - ****kwargs** (Keyworded variable arguments)

Variable-length Arguments

***args (Non-keyworded variable arguments):**

- Accepts **multiple positional arguments** as a **tuple**.
- Used when you want to **accept many inputs**.

Python

```python
def add_numbers(*args):
    total = sum(args)
    return total

print(add_numbers(2, 4, 6, 8))
```

Output

```
20
```

Variable-length Arguments

**kwargs (Keyworded variable arguments)

- Accepts **multiple keyword arguments** as a **dictionary**.
- Good when you want **named values**.

Python

```python
def info(**kwargs):
    for key, value in kwargs.items():
        print(f"{key}: {value}")

info(name="Amar", age=25, city="Delhi")
```

Output

```
name: Amar
age: 25
city: Delhi
```

Mixing Arguments

- You can **combine** all these types together while **defining a function**.

- **Order to remember:**
  Normal parameters → *args → default parameters → **kwargs

Python

```python
def demo(a, b, *args, city="Unknown", **kwargs):
    print(a, b)
    print(args)
    print(city)
    print(kwargs)

demo(1, 2, 3, 4, 5, city = "Delhi", country = "India",
pincode = 110001)
```

Output

```
1 2
(3, 4, 5)
Delhi
{'country': 'India',
'pincode': 110001}
```

Summary

- **Positional arguments** must come **before** keyword arguments.
- **Default parameters** must be defined **after** normal parameters.
- ***args** collects extra **positional arguments** as a **tuple**.
- ****kwargs** collects extra **keyword arguments** as a **dictionary**.

Summary

Type	Definition	Calling
Positional Arguments	def f(a, b)	f(1, 2)
Keyword Arguments	def f(a, b)	f(b=2, a=1)
Default Arguments	def f(a, b=2)	f(1) or f(1, 3)
***args**	def f(*args)	f(1,2,3)
****kwargs**	def f(**kwargs)	f(name="Amar", age=25)

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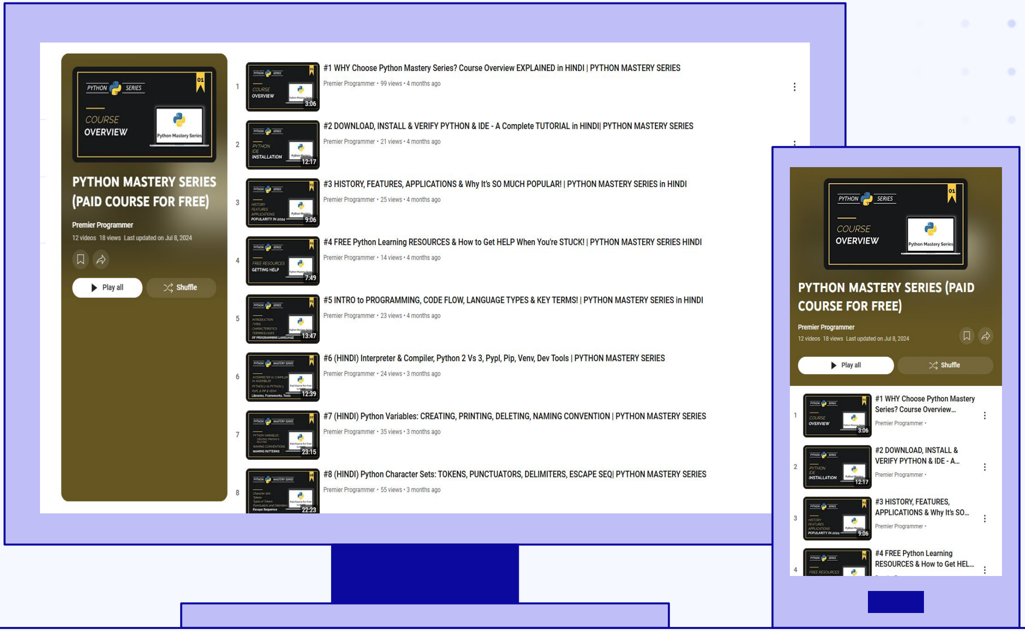

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