TOPIC: Introduction to Python II

Lesson Objectives

At the end of this lesson, students should be able to:

- **Define and explain Python functions**
- **Create and call functions with or without parameters**
- **Use functions to perform basic arithmetic operations: addition, subtraction, multiplication, division**
- **Write real Python code to perform calculations**

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1. What is a Function?

Definition:

A **function** is a **block of organized and reusable code** that performs **one specific task** when called.

Why Use Functions?

- **Avoid repetition** – Write once, use many times.
- **Organize code better** – Break large programs into smaller pieces.
- **Easier to understand and maintain**

Real-Life Analogy of a Function

Real Life Action	**Programming Equivalent**
Pressing the power button on a TV	turn_on_tv() function
Using a calculator to add two numbers	add(a, b) function
Opening a door with a key	open_door(key) function

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2. How to Define Functions in Python

Syntax of a Function:

python

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```
def function_name(parameters):
    # Code block
```

Keyword	Meaning
def	Short for **define** – tells Python you're making a function
function_name	The **name of the function** (e.g., greet, add)
parameters	**Inputs** to the function (optional)
Indentation	Always indent the code **inside** a function (4 spaces or 1 tab)

Example: Function without Parameters

python

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```
def greet():
    print("Hello! Welcome to Python.")
```

Calling the function:

python

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```
greet()
```

Output:
Hello! Welcome to Python.

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3. Functions with Parameters

Parameters are **inputs you give to a function** so it can work with different data.

Example:

python

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```
def greet(name):
    print("Hello, " + name + "!")
```

Calling the function:

python

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```
greet("John")
greet("Ada")
```

Output:

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```
Hello, John!
Hello, Ada!
```

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4. The return Statement

Sometimes, instead of just printing the result, a function needs to **return** the result for further use.

Example:

python

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```
def add(a, b):
    return a + b
```

Using the function:

python

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```
sum_result = add(5, 3)

print("The sum is:", sum_result)
```

Output:
The sum is: 8

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5. Simple Arithmetic Operations Using Functions

Addition Function

python

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```
def add(a, b):
    return a + b
```

Subtraction Function

python

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```
def subtract(a, b):
    return a - b
```

Multiplication Function

python

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```
def multiply(a, b):
    return a * b
```

Division Function (With Zero Check)

python

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```
def divide(a, b):
    if b != 0:
        return a / b
    else:
        return "Error: Cannot divide by zero."
```

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6. Full Calculator Example

python

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```
def add(a, b):
    return a + b

def subtract(a, b):
    return a - b

def multiply(a, b):
    return a * b

def divide(a, b):
    if b != 0:
        return a / b
    else:
        return "Error: Division by zero"
```

```
# Collect input from the user
x = float(input("Enter first number: "))
y = float(input("Enter second number: "))

print("Addition:", add(x, y))
print("Subtraction:", subtract(x, y))
print("Multiplication:", multiply(x, y))
print("Division:", divide(x, y))
```

Sample Output:

```
yaml
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Enter first number: 10
Enter second number: 5
Addition: 15.0
Subtraction: 5.0
Multiplication: 50.0
Division: 2.0
```

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7. Real-life Uses of Functions

Daily Task	Python Function Example
Calculate your exam average	calculate_average(marks)
Check if a number is even	is_even(number)
Display a welcome message	welcome_message()

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8. Summary of Key Points

Concept	Explanation
Function	A reusable piece of code for a specific task
def keyword	Used to define a function
Parameters	Inputs to a function
return	Sends back the result to where the function is called
Calling a function	Use the function name followed by parentheses

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9. Assessment Questions

1. What is a **function** in Python?
2. What does the **def** keyword mean?
3. Write a function square(x) that returns the **square of a number**.
4. Write a function to **multiply two numbers** and print the result.
5. Why do we use **return** instead of print() sometimes?

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10. Assignment

Write a **menu-driven calculator** using Python functions. The calculator should:

- Ask the user to choose an operation:
    1. Addition
    2. Subtraction
    3. Multiplication
    4. Division
- Collect two numbers from the user
- Call the correct function based on the choice

- Display the result

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11. Practice Exercises

A) Find the Square of a Number

python

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```
def square(x):
    return x * x


num = int(input("Enter a number: "))
print("Square is:", square(num))
```

B) Find the Area of a Rectangle

python

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```
def area_of_rectangle(length, width):
    return length * width


l = float(input("Enter length: "))
w = float(input("Enter width: "))
print("Area of rectangle:", area_of_rectangle(l, w))
```

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12. Tools to Practice Python

Tool	Usage
IDLE (Python shell)	Local programming

Tool	Usage
Replit.com	Online programming
Google Colab	For notebooks
Mobile apps	PyDroid (Android)

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13. Real-life Analogy Summary

Real Life	Python Equivalent
Use a blender	blend_fruits()
Use a calculator	calculate()
Boil water in a kettle	boil_water()