Lab 4: Functions

Learning Objectives

- Understand the purpose and structure of functions.
- Learn how to define and call functions.
- Practice using parameters, return values, and scope.
- Explore advanced features: arbitrary arguments, keyword arguments, default parameters, and multiple return values.

Lab Tasks

Exercise 1:

- Define a function named print_str that prints "User-defined function".
- Call the function to display the output.

Code Example:

```
def print_str():
    print("User-defined function")

print_str()
```

```
User-defined function
```

Exercise 2: Functions with return values

- Define a function compute_square(num_to_square) that returns the square of its argument.
- Call the function with the value 7 and print the result as: 7 squared is 49.

Code Example:

```
def compute_square(num_to_square):
    return num_to_square * num_to_square

num_squared = compute_square(7)
print("7 squared is", num_squared)
```

```
7 squared is 49
```

Exercise 3: Functions with multiple parameters

- Define a function add(x, y) that returns the sum of x and y.
- Call the function with numbers (5, 7) and with strings ('Tora', 'Bora').
- Print the results as shown.

Code Example:

```
def add(x, y):
    return x + y

print("add(5, 7) is", add(5, 7))
print("add('Tora', 'Bora') is", add('Tora', 'Bora'))
```

```
add(5, 7) is 12
add('Tora', 'Bora') is ToraBora
```

Exercise 4

- Define a function height_to_centimeters(feet, inches) that converts height in feet/inches to centimeters using the equations:

$$\text{total\_inches} = \text{feet} \times 12 + \text{inches};$$
$$\text{centimeters} = \text{total\_inches} \times 2.54$$

- Use global constants for conversion.
- Call the function with feet = 5 and inches = 5, and print the result.

Code Example:

```
centimeters_per_inch = 2.54
inches_per_foot = 12

def height_to_centimeters(feet, inches):
    total_inches = (feet * inches_per_foot) + inches
    centimeters = total_inches * centimeters_per_inch
    return centimeters

feet = 5
inches = 5
print("Centimeters:", height_to_centimeters(feet, inches))
```

```
Centimeters: 165.1
```

Exercise 5

- Write a function that tries to modify a global variable without using global (observe the result).
- Then, modify the function to use the global keyword and observe the difference.

Code Example:

```
employee_name = 'N/A'

def get_name():
    name = input('Enter employee name:')
    employee_name = name  # No effect on global variable

get_name()
print("Employee name:", employee_name)
```

```
Enter employee name: Azizah
Employee name: N/A
```

```
# Now with global
employee_name = 'N/A'

def get_name():
    global employee_name
    name = input('Enter employee name:')
    employee_name = name

get_name()
print("Employee name:", employee_name)
```

```
Enter employee name: Azizah
Employee name: Azizah
```

Exercise 6

- Define a function avg(a, b) that calculates the average using a local variable tmp.

Concept: Local: tmp = (a + b) / 2;

Global: tmp = a + b

- Outside the function, define a global variable tmp as the sum.
- Print both values to show the difference in scope.

Code Example:

```
def avg(a, b):
    tmp = (a + b) / 2.0
    return tmp

a = 5
b = 10
tmp = a + b

print("Avg:", avg(a, b))
print("Sum:", tmp)
```

```
Avg: 7.5
Sum: 15
```