

Practice for Mastering Functions in Python

Instructions:

- Complete the following tasks to demonstrate your understanding of Python functions.
 - Provide proper comments in your code for clarity.
 - Test your functions with various inputs and include the test cases in your submission.
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Task 1: Basic Function

Write a function named `greet_user` that takes a name as input and prints a personalized greeting message.

Example Input:

```
greet_user("Alice")
```

Expected Output:

```
Hello, Alice! Welcome to Python Programming.
```

Task 2: Default Parameters

Create a function `calculate_area` that calculates the area of a rectangle. Use default values for the width and height (e.g., width=10, height=5).

Example Input:

```
calculate_area()  
calculate_area(7, 3)
```

Expected Output:

- Default values: `Area: 50`
 - Custom values: `Area: 21`
-

Task 3: Positional vs. Keyword Arguments

Define a function `order_summary` that takes three arguments: `item`, `quantity`, and `price`. Use both positional and keyword arguments to call the function.

Example Input:

```
order_summary("Apples", 5, 2.5)
order_summary(price=1.5, quantity=10, item="Bananas")
```

Expected Output:

- Positional: You ordered 5 Apples for a total of \$12.5
 - Keyword: You ordered 10 Bananas for a total of \$15.0
-

Task 4: Using `return`

Write a function named `find_maximum` that accepts a list of numbers and returns the largest number in the list.

Example Input:

```
find_maximum([3, 7, 2, 9, 5])
```

Expected Output:

9

Task 5: Scope of Variables

Create a program that demonstrates the difference between local and global variables using a function.

Example:

Define a global variable `x = 50`, and a function that locally modifies `x`.

Task 6: Lambda Functions

Write a lambda function to calculate the square of a number and another lambda function to find the product of two numbers. Test both functions with multiple inputs.

Task 7: Recursive Function

Create a recursive function named `factorial` to calculate the factorial of a number.

Example Input:

```
factorial(5)
```

Expected Output:

```
120
```

Task 8: Practical Problem

Write a function named `convert_temperature` that converts a given Celsius temperature to Fahrenheit and vice versa based on a second argument ("`CtoF`" or "`FtoC`").

Example Input:

```
convert_temperature(25, "CtoF")
```

```
convert_temperature(77, "FtoC")
```

Expected Output:

- Celsius to Fahrenheit: `77°F`
 - Fahrenheit to Celsius: `25°C`
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Bonus Task: Advanced Usage

Implement a function named `student_grades` that accepts an arbitrary number of keyword arguments representing student names and their grades. The function should print each student's name and grade.

Example Input:

```
student_grades(Alice=90, Bob=85, Charlie=78)
```

Expected Output:

```
Alice: 90
```

```
Bob: 85
```

```
Charlie: 78
```