# Python Functions

## Function Basics

### Defining Functions

Basic function structure:

```python
def greet():
    print("Hello, World!")

# Calling the function
greet()
```

### Functions with Parameters

Accepting input values:

```python
def greet(name):
    print(f"Hello, {name}!")

greet("Alice")  # Prints: Hello, Alice!
```

### Return Values

Functions that give back results:

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

result = add(5, 3)  # result = 8
```

## Function Arguments

### Required Arguments

Must be provided in correct order:

```python
def divide(x, y):
    return x / y

result = divide(10, 2)  # 5
```

### Default Arguments

Optional parameters with default values:

```python
def power(base, exponent=2):
    return base ** exponent
```

```
square = power(4)        # 16 (uses default exponent=2)
cube = power(4, 3)       # 64 (overrides default)
```

## Keyword Arguments

Named parameters in any order:

```python
def print_info(name, age):
    print(f"{name} is {age} years old")


print_info(age=25, name="Alice")
```

## Variable-Length Arguments

### *args (Tuple of positional arguments)

```python
def sum_all(*numbers):
    return sum(numbers)


total = sum_all(1, 2, 3, 4)   # 10
```

### **kwargs (Dictionary of keyword arguments)