# Variables and Data Types

## 1. Variables and Data Types

Variables are containers for storing data values. Python has several built-in data types including integers, floats, strings, and booleans.

## 1.1 Basic Data Types

```
# Integer
x = 10
print(f"Integer: x = {x}, type = {type(x)}")

# Float
y = 3.14
print(f"Float: y = {y}, type = {type(y)}")

# String
name = "Alice"
print(f"String: name = '{name}', type = {type(name)}")

# Boolean
is_student = True
print(f"Boolean: is_student = {is_student}, type = {type(is_student)}")
```

```
Integer: x = 10, type = <class 'int'>
Float: y = 3.14, type = <class 'float'>
String: name = 'Alice', type = <class 'str'>
Boolean: is_student = True, type = <class 'bool'>
```

## 1.2 Type Conversion

Python allows you to convert between different data types using built-in functions.

```
# Convert string to integer
num_str = "42"
num_int = int(num_str)
print(f"Type conversion: '{num_str}' -> {num_int}")

# Convert to float
x = 5
x_float = float(x)
print(f"Integer to float: {x} -> {x_float}")

# Convert to string
age = 25
age_str = str(age)
print(f"Integer to string: {age} -> '{age_str}'")
```

```
Type conversion: '42' -> 42
Integer to float: 5 -> 5.0
```

```
Integer to string: 25 -> '25'
```

## 1.3 Multiple Assignment

Python allows you to assign values to multiple variables in one line.

```
# Multiple assignment
a, b, c = 1, 2, 3
print(f"Multiple assignment: a={a}, b={b}, c={c}")

# Swap values
x, y = 10, 20
x, y = y, x
print(f"After swap: x={x}, y={y}")
```

```
Multiple assignment: a=1, b=2, c=3
After swap: x=20, y=10
```

## Key Takeaways

• Python has dynamic typing - you don't need to declare variable types
• Main data types: int, float, str, bool
• Use type() to check a variable's type
• Type conversion functions: int(), float(), str(), bool()