What is a Variable?

A **variable** is a named location used to store data in memory. In Python:

- No need to declare the type explicitly
- Variables are created when you assign a value

```
Start coding or generate with AI.
```

```
# Variable assignment
x = 10 # Number assignment
name = "Python" # String Assignment
pi = 3.14 # Decimal Number assignment

print(x) # 10
print(name) # Python
print(pi) # 3.14
```

```
10
Python
3.14
```

🔹 Rules for Naming Variables

- Must start with a letter or underscore (_)
- Cannot start with a number
- Can contain letters, numbers, and underscores
- Case-sensitive: `name` and `Name` are different

✅ Valid: `name`, `_temp`, `value1`
❌ Invalid: `1value`, `user-name`, `class` (reserved word)

Built-in Data Types (Basic)

Type	Example	Description
int	`10`	Integer numbers
float	`3.14`	Floating point numbers
str	`"hello"`	Text (string of characters)
bool	`True`, `False`	Boolean values

```
# Examples of basic data types
a = 10          # int
b = 3.5         # float
c = "Python"    # str
d = True        # bool

# Print type of each
print(type(a))
print(type(b))
print(type(c))
print(type(d))
```

```
<class 'int'>
<class 'float'>
<class 'str'>
<class 'bool'>
```

🔸 String Example

```
language = "Python Programming"
print("First letter:", language[0])
print("Length:", len(language))
```

```
First letter: P
Length: 18
```

🔸 Boolean Example

```
x = 5
y = 10
result = x < y
print("Is x less than y?", result)
print("Type of result:", type(result))
```

```
Is x less than y? True
Type of result: <class 'bool'>
```

✅ What is Type Conversion?

Type conversion is the process of converting the **data type** of a value into another.

🔹 Two types:

- **Implicit Conversion**: Done automatically by Python
- **Explicit Conversion**: Done manually by programmer using functions

```
# Implicit: Python promotes int to float automatically
a = 5        # int
b = 2.5      # float
result = a + b

print("Result:", result)
print("Type of result:", type(result))  # float
```

```
Result: 7.5
Type of result: <class 'float'>
```

```
# Convert str to int
num_str = "100"
num_int = int(num_str)

print("String:", num_str, "| Type:", type(num_str))
print("Converted:", num_int, "| Type:", type(num_int))
```

```
String: 100 | Type: <class 'str'>
Converted: 100 | Type: <class 'int'>
```

```
# Convert float to int (truncates decimal part)
f = 5.99
i = int(f)

print("Float:", f)
print("Converted to int:", i)
```

```
Float: 5.99
Converted to int: 5
```

```
# Convert int to string
age = 25
text = "Age is " + str(age)
print(text)
```

```
Age is 25
```

🔸 Invalid Conversion (Example)

```
# Will raise an error if the string is not numeric
invalid_str = "abc"
# int(invalid_str)   # Uncommenting this will raise ValueError
print(invalid_str)
```

abc

Summary

Concept	Description	Function Used
int()	Convert to integer	`int("10")`
float()	Convert to float	`float("3.14")`
str()	Convert to string	`str(25)`
bool()	Convert to boolean	`bool(0)` → False
type()	Returns type of variable	`type(x)`