Introduction to Python Syntax

Python is known for its readability and simplicity. Python uses indentation and colons to define blocks of code.

Key Features of Python Syntax:

- **Easy to Read:** Resembles natural language.
- **Whitespace Matters:** Uses indentation (spaces/tabs) to define code blocks.
- **Dynamic Typing:** No need to declare variable types explicitly.

Basic Syntax Rules

1. **Comments :** Used for documentation (ignored by Python interpreter).

```
# Single-line comment

"""
Multi-line
comment (docstring)
"""
```

2. **Variables & Data Types :** Python infers the type automatically.

```
name = "Alice"       # String
age = 25            # Integer
height = 5.9        # Float
is_student = True   # Boolean
```

3. **Indentation & Code Blocks :** Python uses indentation (4 spaces) instead of braces.

```
if age >= 18:
    print("You are an adult.")  # Inside the if-block
else:
    print("You are a minor.")   # Inside the else-block
```

4. **Functions:** Defined using def followed by a colon : and indented body.

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

greet("Bob")  # Function call
```

5. **Loops :** for iterating over a given data

for Loop:

```python
for i in range(5):  # Prints 0 to 4
    print(i)
```

while Loop:

```python
count = 0
while count < 3:
    print("Looping!")
    count += 1
```

Common Syntax Errors & Best Practices

Incorrect Indentation

```python
if x > 0:
print("Positive")  # Error: Expected indented block
```

Missing Colons (:):

```python
def say_hello()  # Error: Missing colon
    print("Hello")
```

Incorrect Variable Names:

- Cannot start with numbers (1name = "Alice" ❌).
- Case-sensitive (Age ≠ age).

Best Practices

- Use 4 spaces (not tabs) for indentation.
- Follow PEP 8 (Python style guide).
- Use descriptive variable names (user_age instead of a).