Learning Python Variables: Rules and Naming Conventions

1 What is a Variable in Python?

A variable in Python is a named storage location used to hold data, such as numbers, text, or other objects. Think of it as a labeled box where you can store information and retrieve it later by referring to the label.

2 Assigning Variables

In Python, you create a variable by assigning a value to a name using the `=` operator. The name (or identifier) is on the left, and the value is on the right.

```python
# Example of variable assignment
name = "Alice"
age = 25
height = 5.6
```

You can change a variable's value by assigning a new value to it:

```python
age = 26  # Updates the value of age
```

3 Rules for Naming Variables

Python has specific rules for naming variables to ensure code is valid and readable:

- **Valid Characters**: Variable names can include letters (a-z, A-Z), digits (0-9), and underscores (_). They cannot start with a digit.
- **Case Sensitivity**: Python variable names are case-sensitive. `myVar` and `myvar` are different variables.
- **No Reserved Words**: You cannot use Python's reserved keywords (e.g., `if`, `for`, `while`, `class`) as variable names.
- **No Special Characters**: Symbols like `@`, `#`, or `$` are not allowed in variable names.

```python
# Valid variable names
user_name = "Bob"
age2 = 30
_total = 100.50

# Invalid variable names
2age = 25       # Starts with a digit
user@name = "Eve"   # Contains special character
for = 10        # Uses reserved keyword
```

4 Naming Conventions

To write clean and readable Python code, follow these conventions:

- **Use Descriptive Names**: Choose names that describe the variable's purpose, e.g., `student`$_{n}ameinsteadof$ `sn`.Use $Forvariablenames, uselowercaseletterswithunderscorestoseparatewords(e.g.,$ `first`$_{n}ame)$.`Avoid Single Lette`
- **Be Consistent**: Stick to a naming style throughout your code.

```python
# Good naming examples
student_name = "Charlie"
total_score = 95
is_active = True

# Poor naming examples
sn = "Charlie"  # Unclear
x = 95          # Not descriptive
```

5 Variable Scope

Variables have a scope, which determines where they can be accessed:

- **Local Variables**: Defined inside a function and only accessible within it.
- **Global Variables**: Defined outside functions and accessible throughout the program.

```python
# Global variable
global_var = "I'm global"

def my_function():
    # Local variable
    local_var = "I'm local"
    print(local_var)
    print(global_var)

my_function()
# print(local_var)  # Error: local_var is not accessible here
```

6 Tips for Beginners

- Use meaningful names to make your code self-explanatory.
- Avoid reassigning built-in names like `list` or `str`.
- Check variable names for typos to avoid `NameError`.
- Use comments to explain the purpose of complex variables.

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