**Variables in Python**

**What is a Variable?**

A variable is like a labeled box where you can store information (like a number, text, or something else) to use later in your program. You give the box a name, and you can put data in it, change the data, or check what's inside whenever you want.

Think of it like labeling a jar as "Cookies" and putting cookies inside. The jar's name is the variable name, and the cookies are the data.

**How to Create a Variable in Python**

In Python, you create a variable by:

1. Choosing a name for the variable.
2. Using the = sign to assign a value to it.

Here’s an example:

age = 25

* age is the variable name.
* 25 is the value stored in the variable.
* The = sign is like saying, "put this value in the box."

You can now use age in your program, and Python will know it means 25.

**Rules for Variable Names**

When choosing a name for your variable, follow these rules:

1. **Start with a letter or underscore (\_)**: Variable names can begin with a letter (a-z, A-Z) or an underscore, but not a number.
   * Good: name, \_count, totalScore
   * Bad: 2score, $money
2. **Use letters, numbers, or underscores after the first character**: For example, score2 or my\_variable are fine.
3. **No spaces or special characters**: Use underscores instead of spaces, like my\_name instead of my name.
4. **Case-sensitive**: Age and age are different variables.
5. **Avoid Python keywords**: Words like if, for, or while are reserved for Python commands, so don’t use them as variable names.

**Examples of Creating Variables**

*# Storing a number*

score = 100

*# Storing text (called a string)*

name = "Alice"

*# Storing a decimal number*

price = 19.99

*# Storing a true/false value*

is\_student = True

Each of these variables holds a different kind of data. You can think of them as different types of items in labeled boxes.

**Using Variables**

Once you create a variable, you can:

* **Print it**: Show the value on the screen.
* **Update it**: Change the value in the box.
* **Use it in calculations**: Combine it with other variables or values.

Here’s an example:

*# Create a variable*

age = 20

*# Print the variable*

print(age) *# Output: 20*

*# Update the variable*

age = 21

print(age) *# Output: 21*

*# Use in a calculation*

age\_next\_year = age + 1

print(age\_next\_year) *# Output: 22*

**Why Use Variables?**

Variables make your code:

* **Reusable**: You can use the same variable multiple times.
* **Readable**: Good variable names (like score or name) make your code easier to understand.
* **Flexible**: You can change the value without rewriting the whole program.

For example:

*# Without variables*

print(100 + 50) *# Output: 150*

*# With variables*

math\_score = 100

science\_score = 50

total = math\_score + science\_score

print(total) *# Output: 150*

Using variables makes it easier to update the scores later or reuse them elsewhere.

**Common Mistakes to Avoid**

1. **Forgetting to assign a value**:

name *# Error: name is not defined*

You must assign a value (like name = "Bob") before using the variable.

1. **Using a variable before creating it**:

print(city) *# Error: city is not defined*

city = "New York"

1. **Invalid variable names**:

2score = 100 *# Error: Invalid variable name*

my-score = 50 *# Error: Hyphens not allowed*

**Practice Example**

Let’s write a small program to store and display some information:

*# Create variables*

name = "Emma"

age = 16

favorite\_color = "Blue"

*# Print a message using the variables*

print("Hi, my name is", name)

print("I am", age, "years old")

print("My favorite color is", favorite\_color)

**Output**:

text

Hi, my name is Emma

I am 16 years old

My favorite color is Blue

**Key Points to Remember**

* Variables are like labeled boxes that store data.
* Use = to assign a value to a variable.
* Choose clear, meaningful names following the naming rules.
* You can update or reuse variables as needed.
* Always create and assign a value to a variable before using it.