Chapter 02 Variables, Data Types, and Operators in Python

Python notes by wahab

Variables

A variable is a container for storing data values.

```
x = 10          # int
y = 3.14        # float
name = "wahab" # str
```

In Python, you do not need to declare the type of a variable. A variable is created the moment you assign a value to it. Variable names are case-sensitive. e.g `a is different from A.`

Conditions for Declaring a Variable Name:

1. **Must start with a letter (a-z, A-Z) or an underscore (_).**
2. **Cannot start with a digit (0-9).**
3. **Can only contain alphanumeric characters and underscores (a-z, A-Z, 0-9, _).**
4. **Variable names are case-sensitive.** (`age`, `Age`, and `AGE` are different).
5. **Should not be a Python reserved word** (keywords used by Python for its syntax)

Reserved Words (Keywords)

Python has a set of reserved words that cannot be used as variable names because they have a special meaning in the language. These are known as keywords.

Data Types

Data types define the type of data a variable can hold. Common data types in Python include:

- **Integer (int):** Stores whole numbers, positive or negative, without decimals.
- **Float (float):** Stores decimal numbers.
- **String (str):** Used for text, represented by a sequence of characters enclosed in quotes.
- **Boolean (bool):** Represents one of two values: `True` or `False`.
- **List (list):** A collection which is ordered and changeable, allowing duplicate members.
- **Tuple (tuple):** Similar to a list, but immutable (cannot be changed after creation).
- **Dictionary (dict):** A collection of key-value pairs, unordered and changeable.

`Example of some valid data type are: wahab, wahab12 , str33`

Operators

Operators are used to perform operations on variables and values. Python supports the following types of operators:

- **Arithmetic Operators:** Used to perform mathematical operations.
  - `+` (Addition), `-` (Subtraction), `*` (Multiplication), `/` (Division), `%` (Modulus), `**` (Exponentiation), `//` (Floor Division).
- **Comparison Operators:** Used to compare two values.
  - `==` (Equal), `!=` (Not equal), `>` (Greater than), `<` (Less than), `>=` (Greater than or equal to), `<=` (Less than or equal to).
- **Assignment Operators:** Used to assign values to variables.
  - `=` (Assign), `+=` (Add and assign), `-=` (Subtract and assign), `*=` (Multiply and assign), `/=` (Divide and assign).
- **Logical Operators:** Used to combine conditional statements.
  - `and` (Returns True if both statements are true), `or` (Returns True if one of the statements is true), `not` (Reverses the result, returns False if the result is true).

Type function and typecasting

The type() function is used to check the data type of a variable.

```
age = 25 <br>
print(type(age)) # Output: <class 'int'>
```

Type casting allows you to convert a variable from one data type to another. For example, you can convert a string to an integer or a float to an integer.

```
number_str = "123"
number_int = int(number_str) # Converts string "123" to integer 123
```

Input function

input() is use to get the the input from user.

`name = input("Enter your name: ")` It will show promt to user so user can enter his name.

Note: the output of input fucntion is always string even a number is enter