Python: Language Basics

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- Python Playlist on Youtube

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- Pyton Resources: Books, Websites, Tutorials

- Python Tools

- Python - Quick Guide for Ultimate Python Beginner's

What is Python

- Python is a high-level, general-purpose programming language.
- It is known for its clear syntax, readability, and versatility.
- Python is widely used for `web development`, `data science`, `machine learning`, and `automation`.

Getting Started

- Install Python: Download and install it from https://www.python.org/downloads/.
- Choose a text editor: A program to write code, like Visual Studio Code, Jupyter Notebook, `PyCharm`, or even a simple text editor like `Notepad`.
- Text editor for Android: Pydroid 3 - IDE for Python 3
  - Video: How to: Install Jupyter Notebook on an Android device
- Interactive mode: Experiment with Python directly in your terminal or command prompt using the python command.

> **Important:** Python source code files always use the `.py` extension.

Lesson 1: Python `print` Function

Objectives

- Understand the basic usage of the `print` function.
- Learn how to print different data types.
- Explore advanced `print` function features like formatting and special characters.
- Practice printing in various tasks.

Introduction to `print`

The `print` function is used to output text or variables to the console. or to a file.

Video: Use of print() function in python

Syntax:

```
print(value1, value2, ..., sep=' ', end='\n', file=sys.stdout, flush=False)
```

Parameters:

- `value1, value2, ...`: The values to be printed. Multiple values can be separated by commas.
- `sep`: (Optional) Specifies how to separate multiple values. Default is a space `' '`.
- `end`: (Optional) Specifies what to print at the end. Default is a newline character `'\n'`.
- `file`: (Optional) Specifies the file where to print. Default is `sys.stdout` (console).
- `flush`: (Optional) Specifies whether to forcibly flush the stream. Default is `False`.

Task 1: Basic Printing

Instructions:

1. Print a simple message.
2. Print multiple items separated by commas.

Examples

```python
# Task 1.1: Print a simple message
print("Hello, world!")

# Task 1.2: Print multiple items
print("Hello", "world", 2024)
```

Task 2: Printing Different Data Types

Instructions

1. Print integers, floats, and strings.

Examples

```python
# Task 2.1: Print different data types
print(42)
print(3.14159)
print("This is a string")
```

Task 3: Using sep and end Parameters

Instructions

1. Change the separator between printed items.
2. Change the ending character of a print statement.

Examples

```python
# Task 3.1: Change the separator
print("apple", "banana", "cherry", sep=", ")

# Task 3.2: Change the ending character
print("Hello", end=" ")
print("world!")

# Task 3.3: Print with a custom ending character:
print("Hello", "World", end="!")
```

Task 4: Print Variables

Instructions

- print variables values using print function

```python
# Task 4.1: print a integer variable
x = 5
print(x)

# Task 4.2: print a string variable
message = 'Python is fun'

# print the string message
print(message)

# Task 4.3: print a string variable
message = "How are you?"
print(message)
```

Task 5: String Formatting

Instructions

1. Use f-strings (formatted string literals) for the same purpose.

Examples

```
# Task 5.1: Use f-strings
name = "Ahmad"
age = 30
print(f"My name is {name} and I am {age} years old.")
```

Task 6: Printing Special Characters

Instructions

1. Print a newline character within a string.
2. Print a tab character within a string.

Examples

```
# Task 6.1: Print a newline character
print("Hello\nWorld")

# Task 6.2: Print a tab character
print("Hello\tWorld")
```

```
# Task 6.3: Print a tab character

print("Name\tAge\tCity")
print("Alice\t30\tNew York")
print("Bob\t25\tLos Angeles")
```

Output:

```
Name      Age      City
Alice     30       New York
Bob       25       Los Angeles
```

In this example, \t is used to align the columns of text.

In Python, the \t character is a special escape sequence that represents a horizontal tab. When used in the print function or any other string operation, it inserts a tab space in the output. This can be particularly useful for formatting text to make it more readable.

\t can be combined with other string manipulation techniques, such as f-strings

```
# Task 6.4: Print a tab character with f-strings
```

```python
name = "Alice"
age = 30
city = "New York"

print(f"{name}\t{age}\t{city}")
```

Task 7: Printing to a File

Instructions

1. Print a message to a text file instead of the console.

Examples

```python
# Task 7.1: Print to a file
with open("output.txt", "w") as file:
    print("Hello, file!", file=file)
```

When you use the instruction with open("output.txt", "w") as file in Python, the file is created in the current working directory of your program. On an Android system, this could be different depending on the environment where the code is executed (e.g., a specific app's data directory, a shared storage location, etc.).

To determine the exact path, you can use the os module to get the current working directory:

```python
import os

print(os.getcwd())
```

Regarding file closure, when you use the `with` statement to open a file, Python automatically takes care of closing the file for you once the block of code under the `with` statement is executed. There is no need to explicitly close the file; it is done automatically when the block is exited. This is one of the benefits of using the with statement for file operations.

Practice Exercises

Exercise 1: Print Your Favorite Quote

Print your favorite quote, ensuring proper formatting.

Exercise 2: Create a Simple Receipt

Print a simple receipt with items and prices, properly aligned using tab characters.

Exercise 3: Use Variables in Print Statements

Create variables for your name, age, and favorite hobby, then print a sentence using these variables.

Exercise 4: Output to a File

Write a program that prints a summary of your week (e.g., tasks completed, hours worked) to a text file.

Exercise 5: 100 times "hello world" without loop

related video: 100 times "hello world" without loop

Exercise 6: 100 times "hello world" without loop

Related Video: How to print multiple lines

Comments

- Comments are important for making code more readable and understandable, especially for other programmers who may need to read or modify the code.
- Comments in Python are non-executable lines of code and ignored by the Python interpreter when the code is executed.

There are two main types of comments in Python:

- **Single-line comments:** These comments start with the hash symbol (#) and extend to the end of the line.

```python
# This is a single-line comment
print("Hello, World!")
```

- **Multi-line comments:** These comments are enclosed in triple quotes (""" or ''').

```python
"""
This is a multi-line comment.
It can span multiple lines of code.
"""
print("Hello, World!")
```

See also:

- Video: A Comprehensive Guide to Single Line & Multi-Line Comments

Indentation

Indentation is a very important concept in Python. It refers to adding white space before a statement to a particular block of code. In another word, all the statements with the same space to the right, belong to the same code block.

For example, consider the following code snippet:

```
if True:
    print("True")
else:
    print("False")
```

See also:

- [Indentation in Python - geeksforgeeks.org](#)
- [Indentation in Python (With Examples) - askpython.com](#)

True/False (Mark T for True and F for False)

Multiple Choice (Select the best answer)

Which of the following is the correct syntax for the print statement in Python?

1. ☐ print ("text")
2. ☐ println ("text")
3. ☐ echo ("text")

What will be the output of the following code?

```
print("Hello, world!")
```

1. ☐ Hello
2. ☐ world
3. ☐ Hello, world!
4. ☐ There will be no output.

How can you print multiple values on a single line in Python?

1. ☐ Use commas to separate the values within the print statement.
2. ☐ Use semicolons to separate the values within the print statement.
3. ☐ Use the + operator to concatenate the values before printing.
4. ☐ Create a list of the values and print the list.

Which of the following statements will print the value of the variable x?

1. ☐ print(x)
2. ☐ print "x"
3. ☐ println(x)
4. ☐ echo x

What is the purpose of the sep argument in the print function?

1. ☐ To specify the separator between multiple values printed on the same line.
2. ☐ To specify the end character for the printed line.
3. ☐ To specify the file to which the output should be printed.

4. ☐ To specify the format of the output.

> What is the purpose of the end argument in the print function?

1. ☐ To specify the separator between multiple values printed on the same line.
2. ☐ To specify the end character for the printed line.
3. ☐ To specify the file to which the output should be printed.
4. ☐ To specify the format of the output.

> How can you print a string without a newline character?

1. ☐ print(string, end="")
2. ☐ print(string, sep="")
3. ☐ print(string + "")
4. ☐ print(string; "")

Comments:

> What is the primary purpose of comments in Python code?

1. ☐ To execute instructions for the computer
2. ☐ To temporarily disable lines of code
3. ☐ To make the code more readable and understandable for humans
4. ☐ To create errors for debugging

> Which of the following is the correct syntax for a single-line comment in Python?

1. ☐ // This is a comment
2. ☐ /* This is a comment */
3. ☐ # This is a comment
4. ☐ { This is a comment }

> How can you create a multi-line comment in Python?

1. ☐ Using triple single quotes (''')
2. ☐ Using triple double quotes (""")
3. ☐ Using backslash () at the end of each line
4. ☐ Using the comment keyword

> What happens when you run code that includes comments?

1. ☐ The comments are executed along with the code.
2. ☐ The comments are ignored by the Python interpreter.
3. ☐ The comments are displayed as output.
4. ☐ The comments are converted into machine code.

Exercises

Review Questions

References and Bibliography

- Indentation in Python - geeksforgeeks.org
- Indentation in Python (With Examples) - askpython.com

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