Introduction to Python

Detailed Features of Python with Examples

1. Simple and Easy to Learn

Python's syntax is clean and easy to read, making it ideal for beginners.

Example:

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

2. Interpreted Language

Python is interpreted, meaning each line is executed one by one, making debugging easier.

Example:

```
a = 10
b = 5
print(a + b)
```

3. High-Level Language (HLL)

Python abstracts low-level details like memory management, allowing developers to focus on logic.

Example:

```
name = "Alice"
print(name.upper())
```

4. Object-Oriented Programming (OOP)

Python supports classes, objects, inheritance, encapsulation, and polymorphism.

Example:

```
class Dog:
    def __init__(self, name):
```

```
        self.name = name


    def bark(self):
        print(f"{self.name} says Woof!")


dog1 = Dog("Buddy")
dog1.bark()
```

5. Dynamically Typed

You don't need to declare variable types; Python decides the type at runtime.

Example:

```
x = 10      # integer
x = "Hello"  # now it's a string
```

6. Portable / Cross-platform

Python code runs on different platforms like Windows, macOS, and Linux without changes.

Example:

```
print("Runs anywhere!")
```

7. Extensive Standard Library

Python includes modules for math, file I/O, networking, web services, etc.

Example:

```
import math
print(math.sqrt(25))
```

8. Open Source

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Python is freely available and modifiable. You can contribute to its development.

9. Large Community and Ecosystem

A huge community provides support, libraries, and frameworks like Django, Pandas, TensorFlow.

10. Embeddable and Extensible

You can use Python code inside C/C++ programs and vice versa for performance-critical tasks.

11. GUI Programming Support

Python offers GUI libraries like Tkinter, PyQt, and Kivy for desktop apps.

Example:

```
import tkinter as tk

window = tk.Tk()
label = tk.Label(window, text="Hello GUI")
label.pack()
window.mainloop()
```

12. Integration with Other Technologies

Python works with databases, web servers, cloud platforms, and APIs, making it highly versatile.