Python

A powerful and widely used programming language known for its simple and readable syntax.

High-level programming language: This means that Python is closer to human languages (like English) and abstracted from the low-level operations of the computer. It allows developers to write code without worrying too much about how the hardware executes it.

Establish interaction between humans and computers:

Computers don't understand human language directly; they understand binary (0s and 1s).

> Python acts as a "translator" — letting humans write instructions in a readable way, which Python then converts into something the computer can understand and execute.

Perform specific tasks: Python can be used for a wide range of tasks such as:

1. Automating repetitive jobs
2. Analyzing data
3. Building websites
4. Developing software and applications
5. Creating AI and machine learning models And much more

Python can be described as a :

1. Free and Open Source
2. Multi-purpose
3. High Level Programming language

That can be used in the fields of:

1. Data Analytics
2. Artificial Intelligence
3. Data Visualization
4. Programming Applications
5. Web Development etc.

Capabilities/Benefits of Python:

1. Simple and beginner-friendly to learn
2. Procedure and based on objects

3. Platform Independent
4. Portable
5. Dynamically Typed
6. Both Procedure Oriented and Object Oriented
7. Interpreted
8. Vast Library Support

Syntactical Difference between other languages:

syntax for c

```
include <stdio.h>

int main()
{
    printf("Hello, World!\n");
    return 0;
}
```

syntax for c++

```
#include <iostream>

int main()
{
    std::cout << "Hello, World!" << std::endl;
    World!" to the console
    return 0;
}
```

syntax for java

```
public class HelloWorld {
    public static void main(String[] args) {
        System.out.println("Hello, World!");
    }
}
```

syntax for python

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

Challenges of Python:

Performance and Speed: Python can be described as an interpreted language, which means that it is slower than compiled languages like C or Java. This can be a problem for certain categories of

applications that require high performance, such as real-time systems or heavy computation.

Do Not have Support for Concurrency and Parallelism: Python does not have built-in support for concurrency and parallelism. This can make it difficult to write programs that take advantage of multiple cores or processors.

Static Typing: Python can be described as a dynamically typed language, which means that the type of a variable is not checked at compile time. This can lead to errors at runtime.

Web Support: Python does not have built-in support for web development. This means that programmers need to use third-party frameworks and libraries to develop web applications in Python

Python can take almost all programming capabilities from different languages:--

1. Functional Programming Capabilities from C
2. Object Oriented Programming Capabilities from C++
3. Scripting Language Capabilities from Perl and Shell Script
4. Modular Programming Capabilities from Modula-3(Programming Language)

Flavors of Python or categories of python interpreter's:

1. CPython:

It is the standard flavor of Python. It can be used to work with C lanugage Applications

2. Jython or JPython:

It is for Java Applications. It can run on JVM.

3. IronPython:

It is for C#.Net platform

4. PyPy:

The main advantage of PyPy is performance will be improved because JIT (just in time)compiler is available inside PVM.

5. RubyPython:

For Ruby Platforms

6. AnacondaPython:

It is specially designed for handling large amount of data processing.