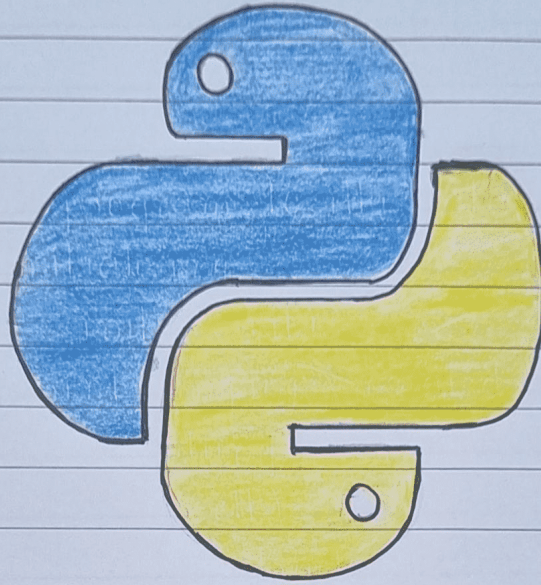# Clean & Neat
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PYTHON

NOTES

Python

Complete Handwritten Notes

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Introduction to Python

- **What is Python ?**

- Python is a general-purpose, dynamic, high-level, and inter-preted programming language. It supports Object Oriented Programming approach to develop applications. It is simple and easy to learn and provides lots of high-level data structures.

- Python is an easy-to-learn yet powerful and versatile scripting language, which makes it attractive for Application Development.

- With its interpreted nature, Python's syntax and dynamic typing make it and ideal language for scripting and rapid application development.

- Python supports multiple programming patterns, including object-oriented, imperative, and functional or procedural programming styles.

- Python makes development and debugging fast because no compilation step is included in Python development, and the edit-test debug cycle is very fast.

- Python is an open-source, cost free programming language. It is utilized in several sectors and disciplines as a result.
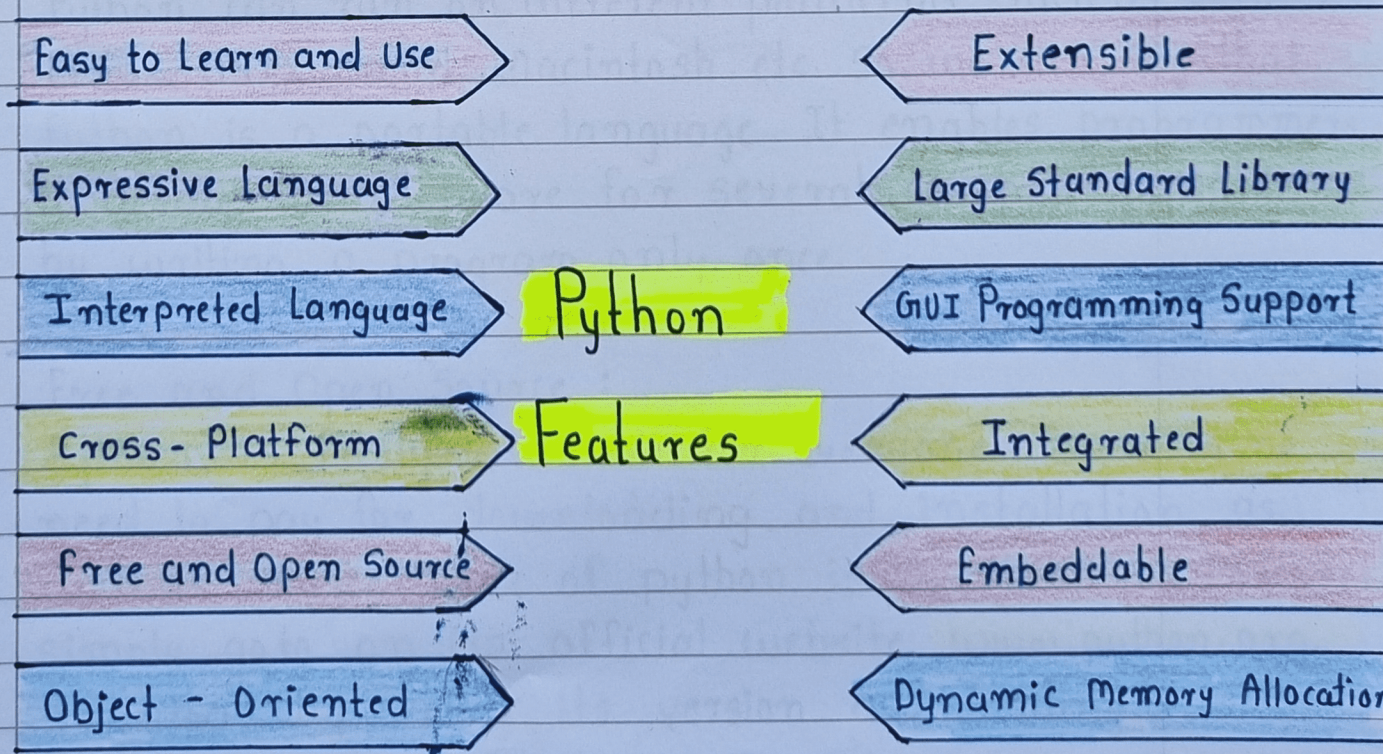
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➢ Python Basic Syntax :

There is no use of curly braces or semicolon in Python programming language. But Python uses the indentation to define a block of code. Indentation is nothing but adding whitespace before the statement when it is needed. for example -

```
def func ():
    Statement 1
    statement 2
    ............
    ...........
    statement N
```

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• Features of Python :

Easy to Learn and Use	Extensible
Expressive Language	Large Standard Library
Interpreted Language	**Python**	GUI Programming Support
Cross - Platform	**Features**	Integrated
Free and Open Source	Embeddable
Object - Oriented	Dynamic Memory Allocation

1) **Easy to Learn and Use :**
Python is easy to learn as compared to other programming languages. There is no use of the semicolon or curly-bracket, the indentation defines the code of block.

2) **Expressive Language :**
Python can perform complex tasks using a few lines of code. A simple example, the hello world program you simply type print("Hello World"). It will take only one line to execute, while Java or C takes multiple lines.

3) **Interpreted Language :**
Python is interpreted language; it means the Python program is executed one line at a time. The advantage of being interpreted language, it makes debugging easy and portable.
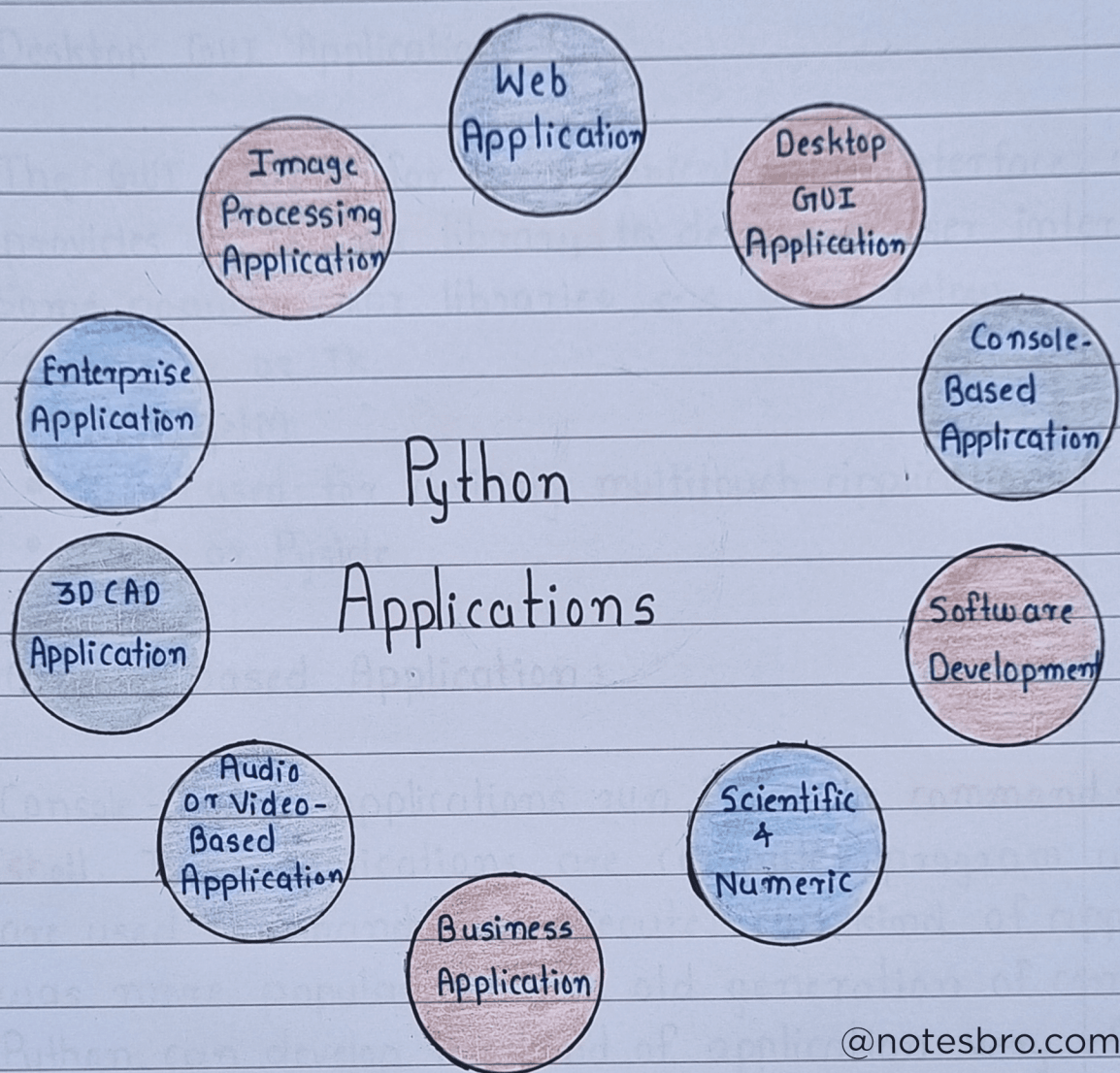
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4) **Cross-platform Language :**
Python can run on different platforms such as Windows, Linux, UNIX, and Macintosh, etc. So, we can say that Python is a portable language. It enables programmers to develop the software for several competing platforms by writing a program only once.

5) **Free and Open Source :**
Python is freely available for everyone. There is no need to pay for downloading and installation, as well as source code of python is available on internet simply go to on its official website www.python.org. download by seeing its version downloading.

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Python Applications

Circle diagram with the following labels surrounding "Python Applications":

- Web Application
- Image Processing Application
- Desktop GUI Application
- Enterprise Application
- Console-Based Application
- 3D CAD Application
- Software Development
- Audio or Video-Based Application
- Scientific & Numeric
- Business Application

1) **Web Applications :**

- Python is commonly used for develop web applications. Python comes up with a wide range of frameworks like Django, Flask, Bottle, and a lot more that provide ease to developers. Python has inbuilt libraries and tools which make the web applications/ development process completely effortless.

- Use of Python for web applications also offers :
  - Amazing Visualization
  - Convenience in development
  - Fast development process.
  - Enhanced Security

2) Desktop GUI Applications :

- The GUI stands for the Graphical User Interface, which provides a ==Tk GUI library== to develop a user interface. Some popular GUI libraries are given below.
  • Tkinter or Tk
  • WxWidgetM
  • Kivy (used for writing multitouch applications)
  • PyQt or Pyside
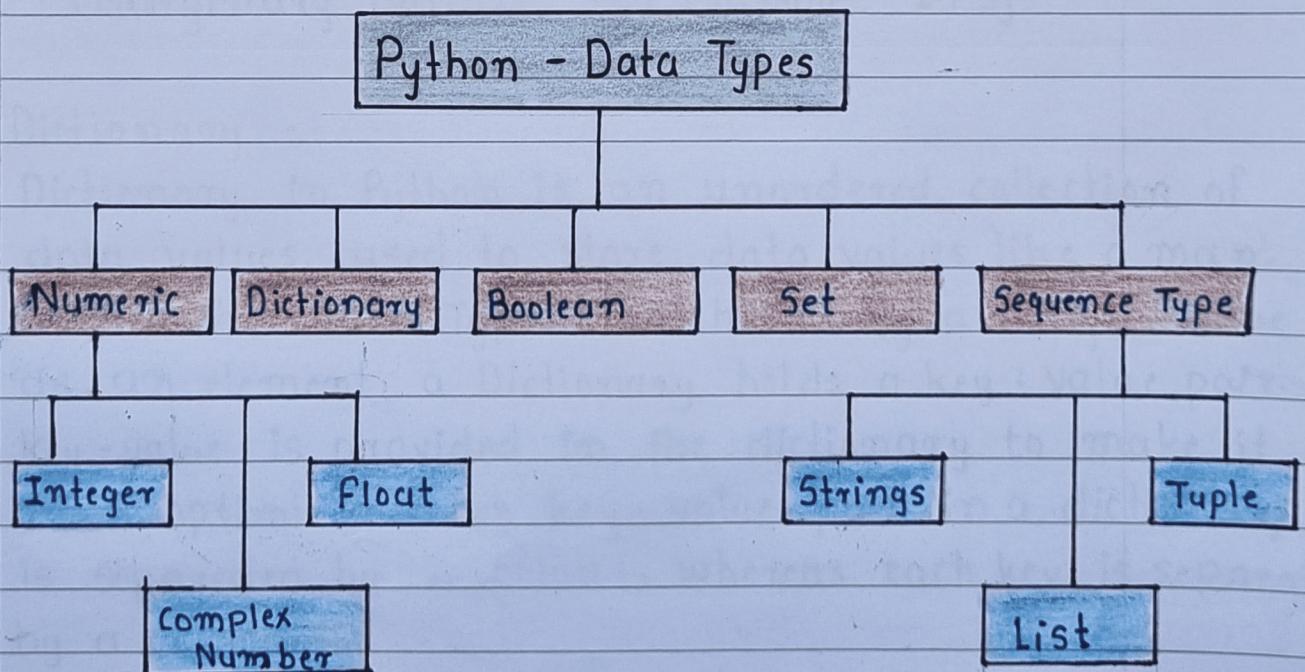
3) Console - based Application :

- Console - based applications run from the ==command - line or shell==. These applications are computer program which are used commands to execute. This kind of application was more popular in the old generation of computers. Python can develop this kind of application very effectively. It is very famous for having REPL, which means the ==Read - Eval - Print Loop== that makes it the most suitable lang--uage for the command - line applications.

- Python provides many free library or module which helps to build the command -line apps. The necessary ==   == libraries are used to read and write. It helps to parse argument and create console help text out -of- the -box. There are also advance libraries that can develop indep--endent console apps.

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- **Data Types :**

- Data types are the classification or categorization of data items. It represents the kind of value that tells what operations can be performed on a particular data. Since, everything is an object in ==Python Programming==, data types are actually classes and variables are the standard or built-in data types in Python:
  - Numeric
  - Sequence Type
  - Boolean
  - Set
  - Dictionary
  - Binary Types

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```
                        ┌──────────────────────┐
                        │  Python - Data Types │
                        └──────────┬───────────┘
    ┌───────────┬───────────┬──────┴─────┬─────────────────┐
 ┌──────┐  ┌──────────┐  ┌─────────┐  ┌─────┐  ┌───────────────┐
 │Numeric│  │Dictionary│  │ Boolean │  │ Set │  │ Sequence Type │
 └───┬───┘  └──────────┘  └─────────┘  └─────┘  └───────┬───────┘
  ┌──┴──────────┐                              ┌────────┴──────┐
┌────────┐  ┌───────┐                      ┌─────────┐     ┌───────┐
│Integer │  │ Float │                      │ Strings │     │ Tuple │
└────────┘  └───┬───┘                      └─────────┘     └───────┘
          ┌─────┴─────┐                          ┌───────┐
          │ Complex   │                          │ List  │
          │ Number    │                          └───────┘
          └───────────┘
```

1) **Numeric :**
- The numeric data type in Python represents the data that has a numeric value. A numeric value can be an integer, a floating number, or even a complex number. These values are defined as Python int, Python float, and Python complex classes in Python.

- **Integers** - This value is represented by int class. It contains positive or negative whole numbers.

- **Float** - Floating-point numbers represent numbers with decimal point or functions. For example, pi = 3.14

- **Complex Numbers** - Complex number is represented by a complex class. It is specified as (real part) + (imaginary parth)j. For example - 2 + 3j

2) **Dictionary** -
- Dictionary in Python is an unordered collection of data values, used to store data values like a map. unlike other Data Types that hold only a single value as an element, a Dictionary holds a key : value pair. key-value is provided in the dictionary to make it more optimized. Each key-value pair in a dictionary is separated by a colon :, whereas each key is separated by a 'comma'.

3) **Boolean :**
- Data type with one of the two built-in values, True or False. Boolean objects that are equal to True are true,