Q1. What the datatypes in python? Explain.
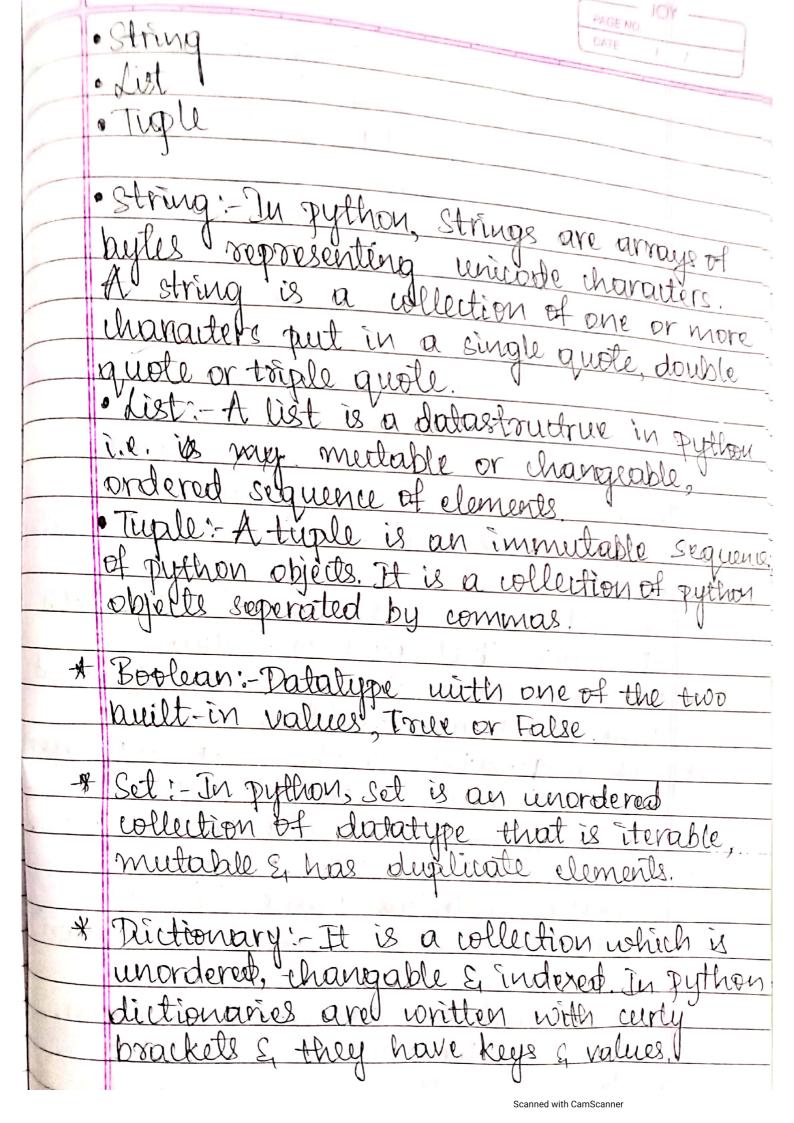Following are the standard or built in datatype of python.
* Numeric
* Sequence type
* Boolean
* Set
* Dictionary

* Numeric:- In python, numeric datatype represent the data which has numeric value. It can be integer, floating number or even complex numbers.
• Integer:- This value represented by int class. It contains +ve or -ve whole number. In python there is no limit to how long an integer value can be.
• Float:- It is a real no. with floating point representation. It is specified by decimal number.
• Complex numbers:- A Complex number is represented by complex class. It is specified as (real part)+(imaginary part)j
eg:- 2+3j

* Sequence type:- In python, sequence is the ordered collection of similar or different data types. Sequence allows to store multiple values in an organized & efficient fashion.
Types of Sequence type are:-

- String
- List
- Tuple

- **String:-** In python, strings are arrays of bytes representing unicode characters. A string is a collection of one or more characters put in a single quote, double quote or triple quote.
- **List:-** A list is a datastructrue in Python i.e. is an mutable or changeable, ordered sequence of elements.
- **Tuple:-** A tuple is an immutable sequence of python objects. It is a collection of python objects seperated by commas.

* **Boolean:-** Datatype with one of the two built-in values, True or False.

* **Set:-** In python, set is an unordered collection of datatype that is iterable, mutable & has duplicate elements.

* **Dictionary:-** It is a collection which is unordered, changable & indexed. In python dictionaries are written with curly brackets & they have keys & values.

**02.** Briefly explain history of python

Python is initially designed by Guido Van Rossum in 1991 and developed by Python software foundation.

* It was mainly developed for emphasis on code readability and its syntax allows programers to express concepts in fewer lines of code.

* The programming language which python is said to have succeded in ABC programming language, which had the interfacing with the amoeba operating system and had the feature of exception handling.

* He had taken seen some issues with ABC but liked most of features

* He had taken the syntax of ABC, and some of its good features.

* The inspiration for the name came from BBC's TV show - "Monty Python's Flying circus, as he was a big fan of TV show

* Also he wanted a short, unique & slightly mysterious name for his invention & hence named it "Python".


**03.** Explain all the operators in python.

Python Operators are as follows:

i) Arithmetic Operators:- It is used to perform a mathematical operations like addition, subtraction, multiplication & division.

| operator | description | syntax |
|---|---|---|
| + | adds 2 operands | $x+y$ |
| - | subtracts 2 operands | $x-y$ |
| * | Multiplies 2 operands | $x*y$ |
| / | divides the 1st operand by the second | $x/y$ |
| // | divides the 1st operand by second: Division(floor) | $x//y$ |
| % | returns the remainder | $x\%y$ |
| ** | returns first raised to power second | $x**y$ |

ii) **Relational Operators:-** Relational operators compares the values. It either return True or False according to condition.

| > | Greaterthan: True if left operand is greater than the right | $x>y$ |
|---|---|---|
| < | Less-than: True if left operand is less than right | $x<y$ |
| == | Equal to: True if both operands are equal | $x==y$ |
| != | Notequalto:- True if operands are not equal | $x!=y$ |
| >= | Greater than or equal to the right | $x>=y$ |
| <= | lessthan or equal to: True if left operand is less than or equal to right | $x<=y$ |

iii) **Logical Operators:-** Logical Operators perform Logical AND, Logical OR and Logical NOT operations.

and      Logical AND: True if        x and y
         both the operands are
         true
or        Logical OR: True if        x or y
         either of operands is True
not     Logical NOT: True if        not x
         operand is false

**iv) Bitwise Operator:-** Bitwise Operators acts on bits and performs bit by bit operation

| | | |
|---|---|---|
| & | Bitwise AND | $x \& y$ |
| \| | Bitwise OR | $x \| y$ |
| ~ | Bitwise NOT | $\sim x$ |
| ^ | Bitwise XOR | $x \wedge y$ |
| >> | Bitwise right shift | $x >>$ |
| << | Bitwise left shift | $x <<$ |

**v) Assignment Operators:-** Assignment Operators are used to assign values to variable
eg:- $=$ , $+=$, $-=$, $*=$, $/=$, $\%=$, $//=$, $**=$,
$\&=$ , $|=$, $\wedge=$, $>>=$, $<<=$

**vi) Special Operators:-** There are some special type of operators like

• Identify operators - is and is not are the identify operators both are used to check if two values are located on same part of memory

is        True if operands are identical
is not    True if operands are not identical

- Membership operators:- in and not in are the membership operators, used to test whether a value or variable is in a sequence.

in      True if value is found in sequence

not in    True if value f is not found in sequence.

**Q4. Explain the features of python.**

i) Easy to learn and use:- python is easy to learn and use. It is ~~develope~~ open-friendly and high level programming language.

ii) Expressive language:- It means i.e. more ~~ware~~ understanbale & readable.

iii) Interpreted language:- Interpreter executes the code line by line at a time. This makes debugging easy & thus suitable for beginners.

iv) Cross-platform language:- It can run equally for on dff platforms such as windows, linux, unix etc. So we can say python is a portable language.

v) Free and open source:- It is freely available at official web address source code is also available. ∴ it is open source.

vi) Object-oriented language:- It supports object oriented lang & concepts of classes & objects came into existence.

vii) Extensible:- It implies that other lang such as c/c++ can be used to compile code

and thus it can be used further in our Python code.

viii) Large Standard Library:-
Python has large & library & provides rich set of module & functions for rapid application development.

ix) GUI programming support
graphical user interfaces can be developed using python.

x) Integrated:- It can be easily integrated with languages like C, C++, java etc.

5). Justify why python is interactive interpreted language.

Python is an interacted interpreted language because unlike c/c++ etc, python is an interpreted oop language. By interpreted it is meant that each time a program is run the interpreter checks through the code for errors & then interprets the instruction into machine readable byte code we can easily integrated python with other language like c, C++ etc. There is no need to compile python code this makes it easier to debug our code. The source code of python is converted into on immediate form called byte code.