Tokens and Data Types

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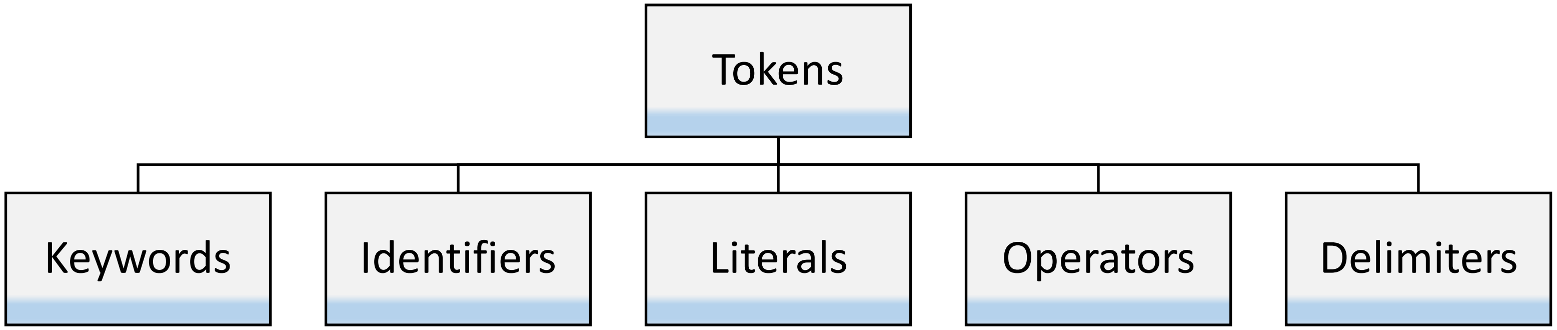
Tokens

- Smallest individual unit in a program is known as token or a lexical unit.
- Python has 5 types of tokens



Keywords

- Keywords are the words that convey a special meaning to language compiler/Interpreter.
- These are fix tokens with specific meaning assign to it and hence cannot be used as Literals.
- There are in all 35 Keywords in Python.
- To get Keywords in python
  - ➢On Python Idle(shell mode)

```
help("keywords")
```

  - ➢On Jupyter notebook in cell

```
import keyword
print(keyword.kwlist)
```

```
>>> help("keywords")
```

Here is a list of the Python keywords.

False	class	from	or	None
continue	global	pass	True	def
if	raise	and	del	import
return	as	elif	in	try
assert	else	is	while	async
except	lambda	with	await	finally
nonlocal	yield	break	for	not

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Identifiers

- Identifiers are the name used to identify a variable, function, class or an object.
- Rules defined for naming an identifiers:
  - No special character except underscore(_) can be used as an identifier.
  - Keyword should not be used as an identifier name.
  - Python is case sensitive, i.e. Var and var are two different identifier.
  - First character of an identifier can be character, underscore but not a digit.
  - For example:- name.

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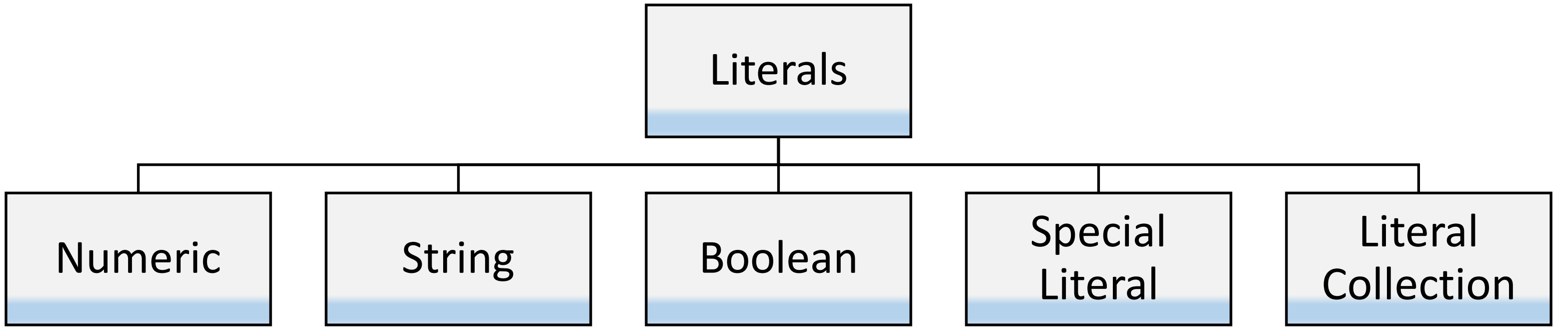
Literals

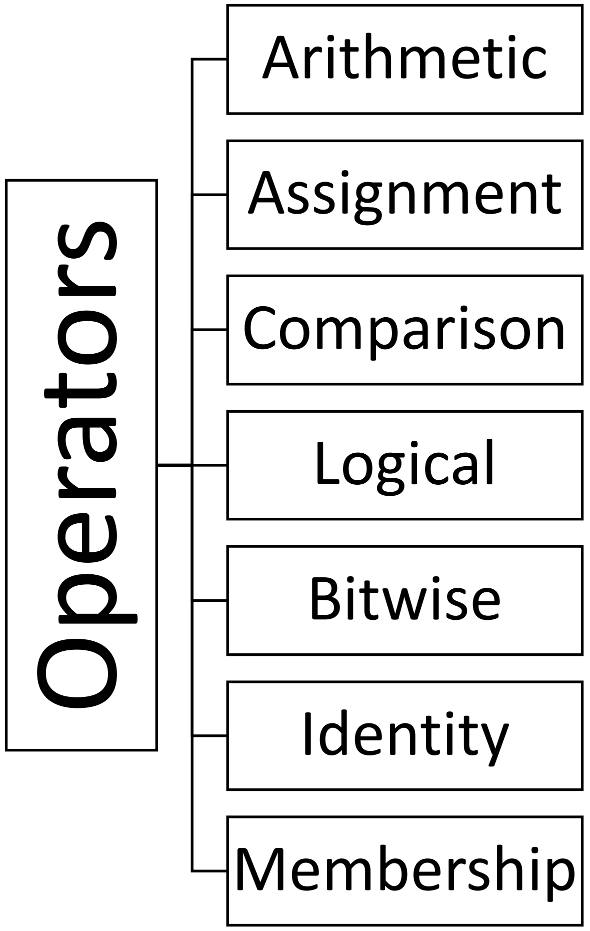
- Literals is a raw data given in variable or constant.
- There are 5 types of Literals supported in python.



Numeric	• It can be float value like 10.6. • It can be integer value like 10.
String	• String Literals are represented in single or double quotes python even supported triple quotes also.
Boolean	• Boolean may include values like True or False.
Special	• Special Literal include a value known as “None”.
Literal collectio n	• This includes Lists, Tuples, Sets, Dictionaries.

Operators

- They are the representation of the operations to be done.



Arithmetic Operators

1. Addition (+)
2. Subtraction (-)
3. Multiplication (*)
4. Division (/)
5. Exponential (**)
6. Modulus (%)
7. Floor /Integer Division (//)

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Assignment Operator

- Assignment operator can be used in number of ways.

For eg

```
c=a+b
c+=b      # c=c+b
c-=b      #c=c-b
c/=b      # c=c/b
c%=b      # c=c%b
c//=b     # c=c//b
c**=b     # c=c**b
```

Comparison Operator

- Comparison operator are used to compare two or more values.

For eg: -

a>b , a>=b

a<b, a<=b

a==b

a!=b

Logical Operator

- There are three Logical operator : -

1. and # returns x if x is false, y otherwise.
2. or # returns y if x is false, x otherwise.
3. not # returns true if x is true, false otherwise.

Bitwise Operator

- There are five bitwise operator.

1. OR (|)   # a|b
2. AND (&)   # a&b
3. XOR (^)   # a^b
4. Right Shift (>>)   # a>>b
5. Left Shift (<<)   # a<<b

- Bitwise operators are used on the binary data.

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Identity Operators

- There are two identity operator.

1. is : - True if the operands are identical.
2. is not: - True if the operands are not identical.

- It gives output as True or False depending on the condition.

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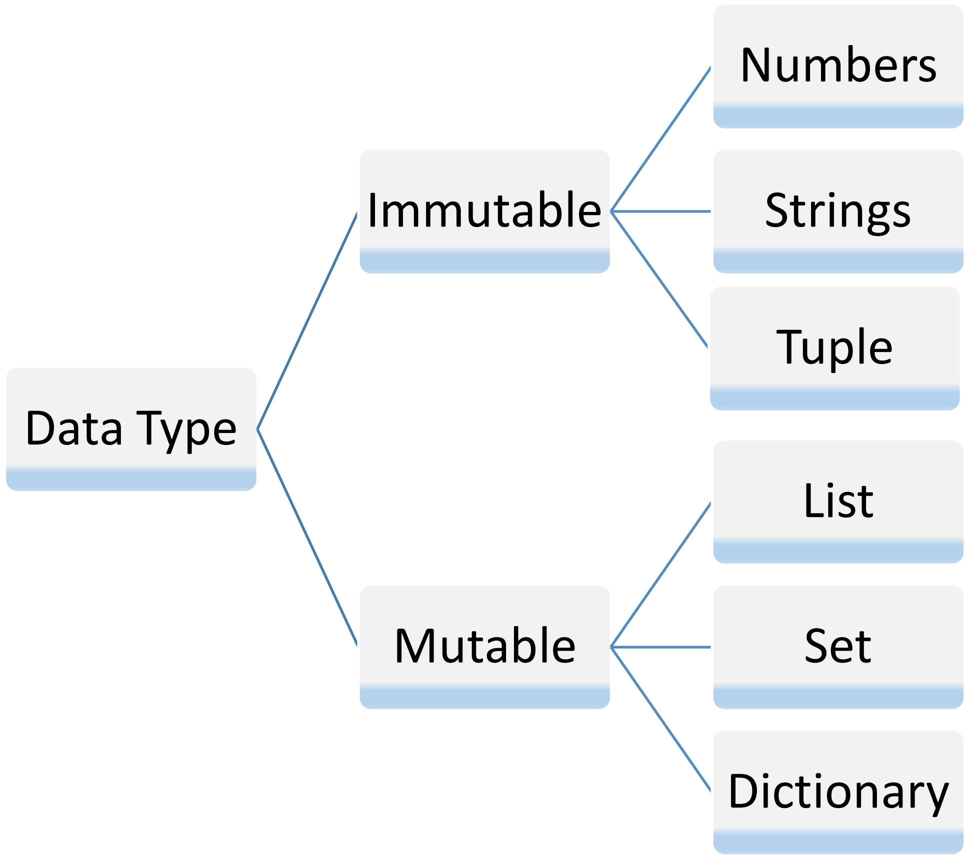
Membership Operators

- It deals with lists data type.
- There are two membership operators.

1. in : - True if it finds elements in the specified sequence.
2. Not in : -True if it does not find elements in the specified sequence.

Data Type

- Basic Data Types are int, float, string, double, long etc.
- In python there is no need to define a particular type of data type when using it.



Immutable and Mutable Data Type

- Immutable objects does not allow modification after creation.
- Mutable objects can be modified after creation.

Immutable Data Type

Numeric

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Numeric

- It is Immutable data type
- It has three types

1. Integer
2. Float
3. Complex (instead of i python uses j)

- By default integer is long int and float is double

Strings

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Strings

- Strings are sequences of one-character strings.

Example:

string1 =“Hi there”.

or

string2 =‘Hi there’.

- Multi-line strings can be denoted using triple quotes,’’’ or ”””

string3=“”” Hi there how are u “””.

- Memory assessment is handle by python itself.

Sequence operations on strings

- **Concatenation**

“HI “ + “There” # output = “HI There”

- **Repetition**

“HI” * 2 # output = “HIHI”

- **Slicing**

string1=“Python”

string1[2:6] # output = “thon”

- **Indexing**

string1 =“Python”

string1[-1]+string1[1] # output = “ny”

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Type specific operations on strings

- **find()**

str =“Python”
str.find(“thon”)   # output: - 2

- **replace()**

str =“Python”
str.replace(“th”,”t”)   # output: - Pyton

- **split()**

str =“P, y,t,h,o,n”
s.split(‘,’)   # output=[‘P’,’y’,’t’,’h’,’o’,’n’]

- **count()**

str =“Python”
str.count(‘y’, beg=0,end=5)   # output = 1

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Type specific operations on strings

- **upper()**

str = “Python”

str.upper()   # output: - “PYHTON”

- **max()**

str = “Python”

max(str)   # output: - “y”

- **min()**

str = “Python”

min(str)   # output: - “h”

- **isalpha()**

str = “Python”

str.isalpha()   # output: - “True”

References

- These notes are based on information from several sources:
- "Learning Python," 2nd edition, Mark Lutz and David Ascher (O'Reilly, Sebastopol, CA, 2004) (Thorough. Hard to get into as a quick read)
- "Dive Into Python," Mark Pilgrim (http://diveintopython.org, 2004)
- "How to Think Like a Computer Scientist: Learning with Python," 2nd edition, Jeffrey Elkner, Allen B. Downey, and Chris Meyers (http://openbookproject.net//thinkCSpy/)
- "Programming in Python 3: A Complete Introduction to the Python Language," Mark Summerfeld (Addison-Wesley, Boston, 2009)
- http://www.python.org

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