SNS COLLEGE OF ENGINEERING

Kurumbapalayam(Po), Coimbatore – 641 919

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Department of Information Technology

COURSE NAME: 23ITB202-PYTHON PROGRAMMING

II YEAR/ III SEM

Unit : MEMORY SYSTEM

Topic : Basic Python

Why we are here now?????

What we going to do???

The Answer is:

- **Explore Python basics**

What is Python?

What is Programming languagelanguage? ???

A program is a set of instructions that help computer to perform tasks.

The languages that are used to write a program or set of instructions are called "Programming languages"

Programming languages are broadly categorized into three types −

1. Machine level language
2. Assembly level language
3. High-level language

Python

Python is a popular programming language. It was created by Guido van Rossum, and released in 1991.

Python is an open-source, high-level, dynamically-typed, portable, expressive, easy to learn, and code programming language.

It is used for:

- web development (server-side),
- software development,
- mathematics,
- system scripting.

hy Python?

- Python works on **different platforms** (Windows, Mac, Linux, Raspberry Pi, etc).
- Python has a **simple syntax** similar to the English language.
- Python has syntax that allows developers to write programs with **fewer lines** than some other programming languages.
- Python runs on an **interpreter** system, meaning that code can be executed as soon as it is written.

Where to execute python??

Here are the ways with which we can run a Python script.

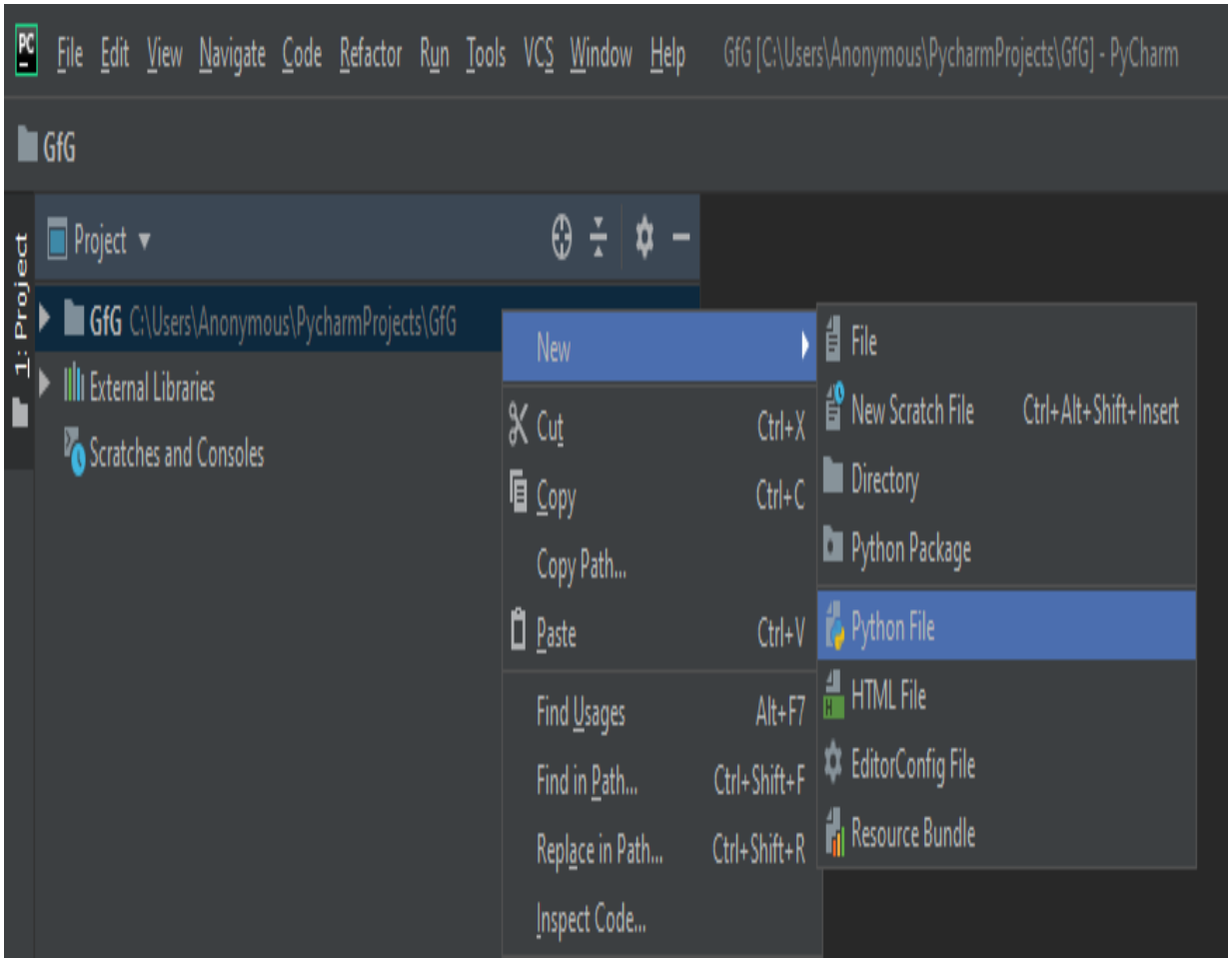
- Interactive Mode
- Command Line
- Text Editor (VS Code)
- IDE (PyCharm)

Explanation

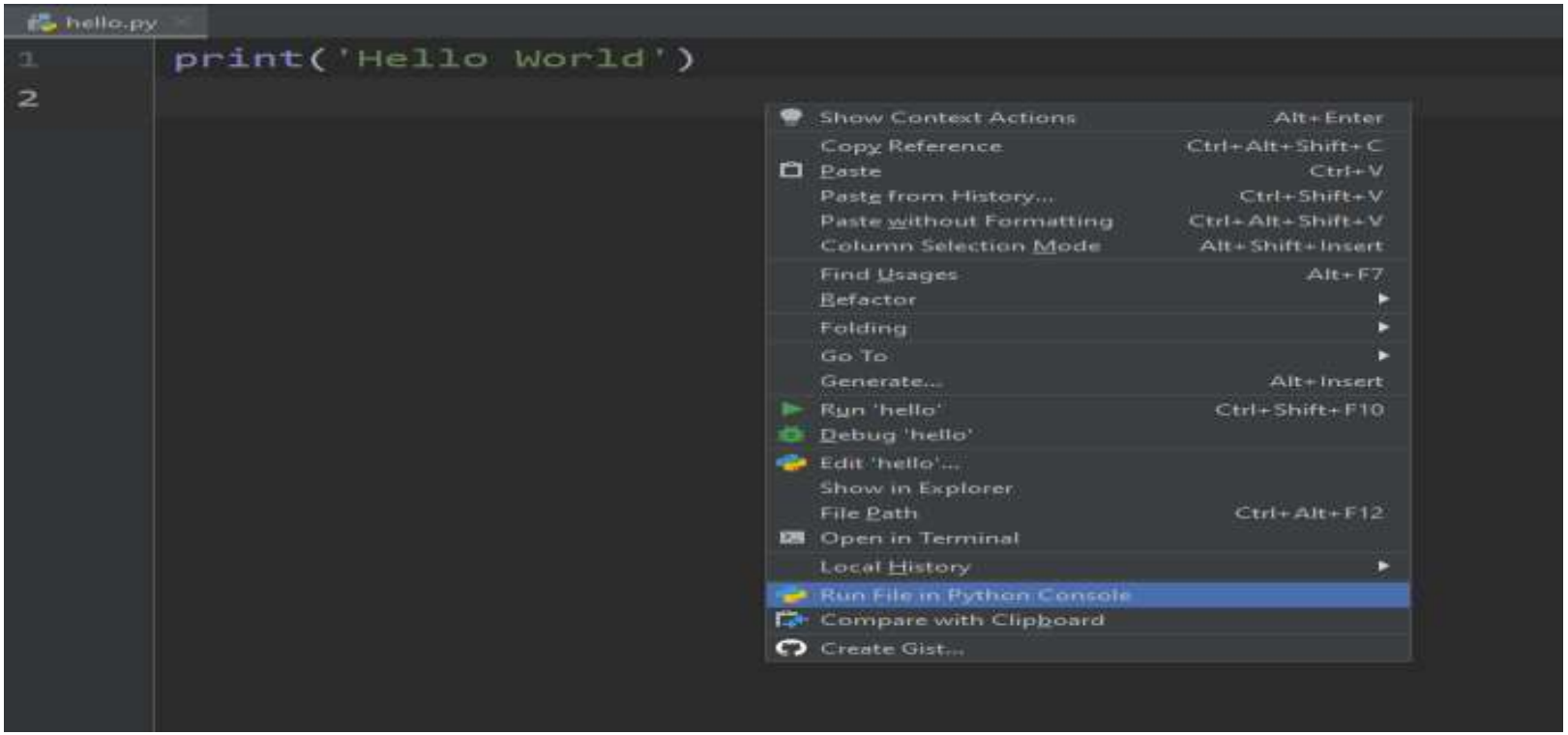
- Interactive Mode:Command Prompt on your windows machine
- Command Line-store in a '.py' file in command line, we have to write 'python' keyword before the file name in the command prompt.
- IDE (PyCharm)

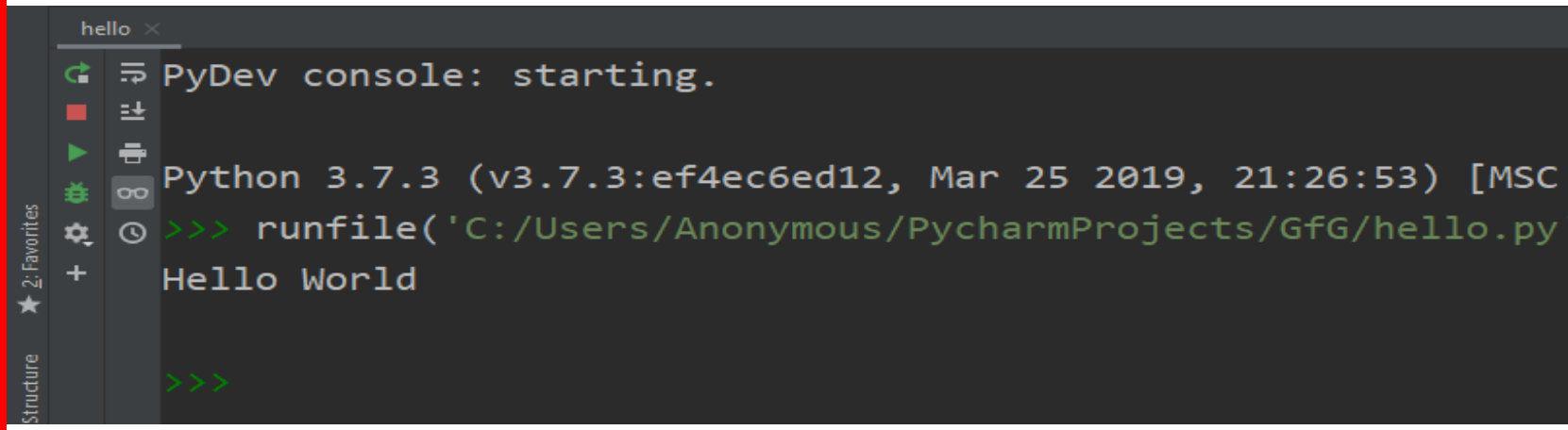
Where we going to execute??

IDE (PyCharm)



IDE


hello.py
1
2
print('Hello World')
Show Context Actions Alt+Enter
Copy Reference Ctrl+Alt+Shift+C
Paste Ctrl+V
Paste from History... Ctrl+Shift+V
Paste without Formatting Ctrl+Alt+Shift+V
Column Selection Mode Alt+Shift+Insert
Find Usages Alt+F7
Refactor
Folding
Go To
Generate... Alt+Insert
Run 'hello' Ctrl+Shift+F10
Debug 'hello'
Edit 'hello'...
Show in Explorer
File Path Ctrl+Alt+F12
Open in Terminal
Local History
Run File in Python Console
Compare with Clipboard
Create Gist...


hello
PyDev console: starting.
Python 3.7.3 (v3.7.3:ef4ec6ed12, Mar 25 2019, 21:26:53) [MSC
>>> runfile('C:/Users/Anonymous/PycharmProjects/GfG/hello.py
Hello World
>>>
2: Favorites
Structure

Fundamentals of Python

KEYWORDS

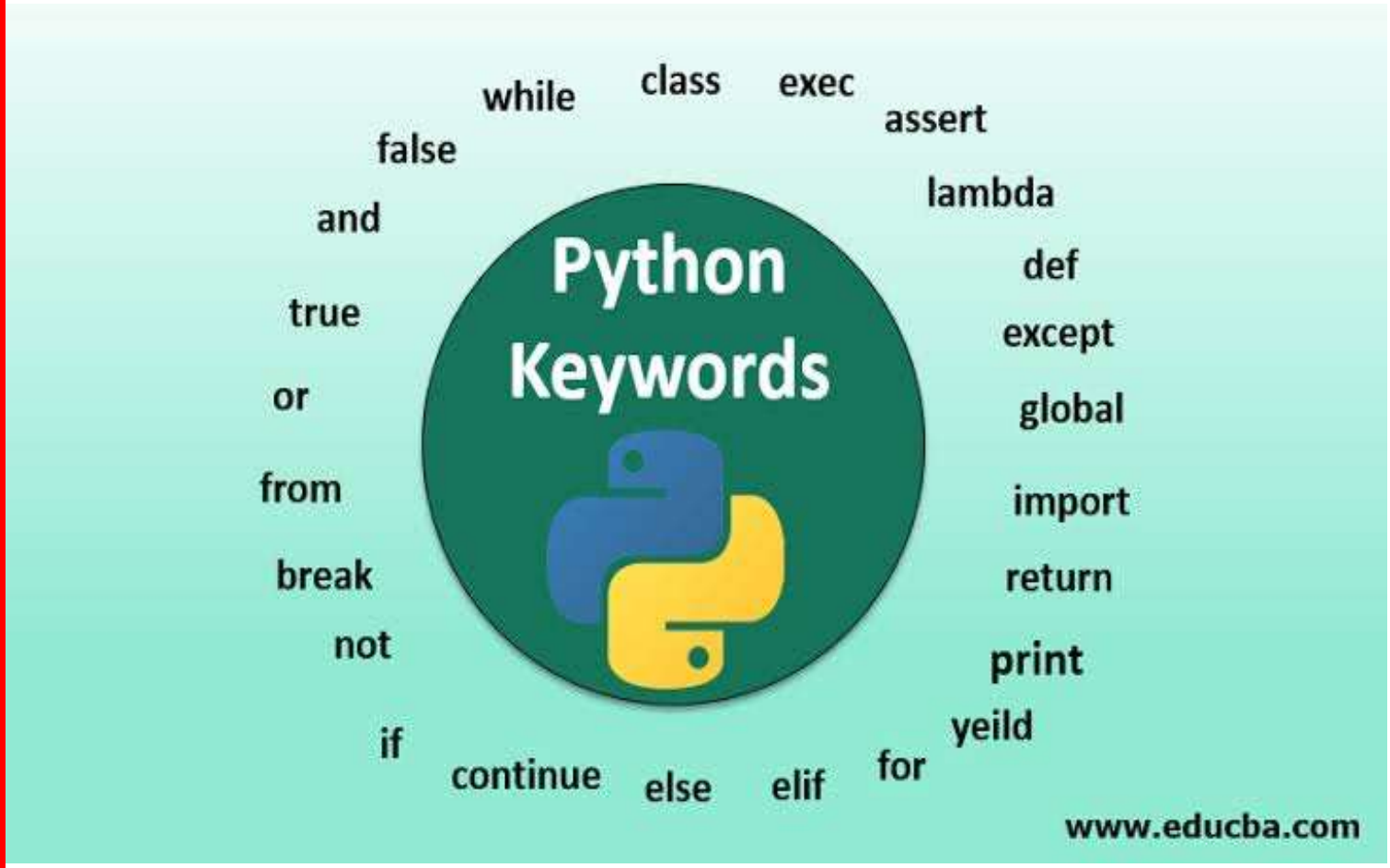
Keywords -Definition

- Python keywords are special reserved words that have specific meanings and purposes and can’t be used for anything but those specific purposes.

Number of Keywords in Python???


What are
Keywords?
WORD

Keywords


Python Keywords
while
class
exec
assert
false
lambda
and
def
true
except
or
global
from
import
break
return
not
print
yeild
if
continue
else
elif
for
www.educba.com

and	A logical operator
as	To create an alias
assert	For debugging
break	To break out of a loop
class	To define a class
continue	To go to the next iteration of a loop
def	To define a function
del	To delete an object
elif	A conditional statements, like else if
else	A conditional statements
except	Used with exceptions, what to do when an exception occurs
False	Boolean value
finally	Used with exceptions, will be executed no matter if there is an exception or not
for	To create a for loop
from	To import specific parts of a module
global	To declare a global variable
if	To make a conditional statement
import	To import a module
in	To check if a value is in a list, tuple
is	To test if two variables are equal
lambda	To create an anonymous function
None	Represents a null value
nonlocal	To declare a non-local variable
not	A logical operator
or	A logical operator
pass	A statement that will do nothing (null)
raise	To raise an exception
return	To exit a function and return a value
True	Boolean value
try	To make a try...except statement
while	To create a while loop
with	Used to simplify exception handling
yield	To end a function, returns a generator

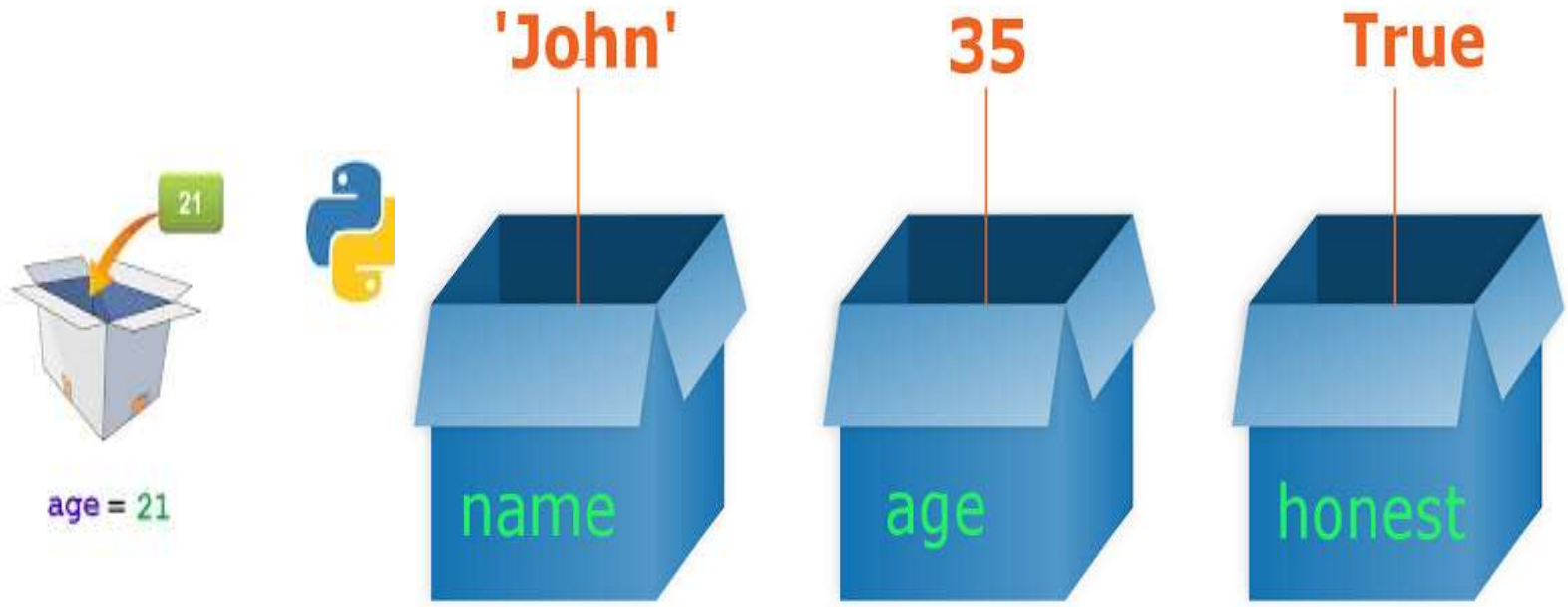

What's
NEXT?

Let's do an Activity!

Variables

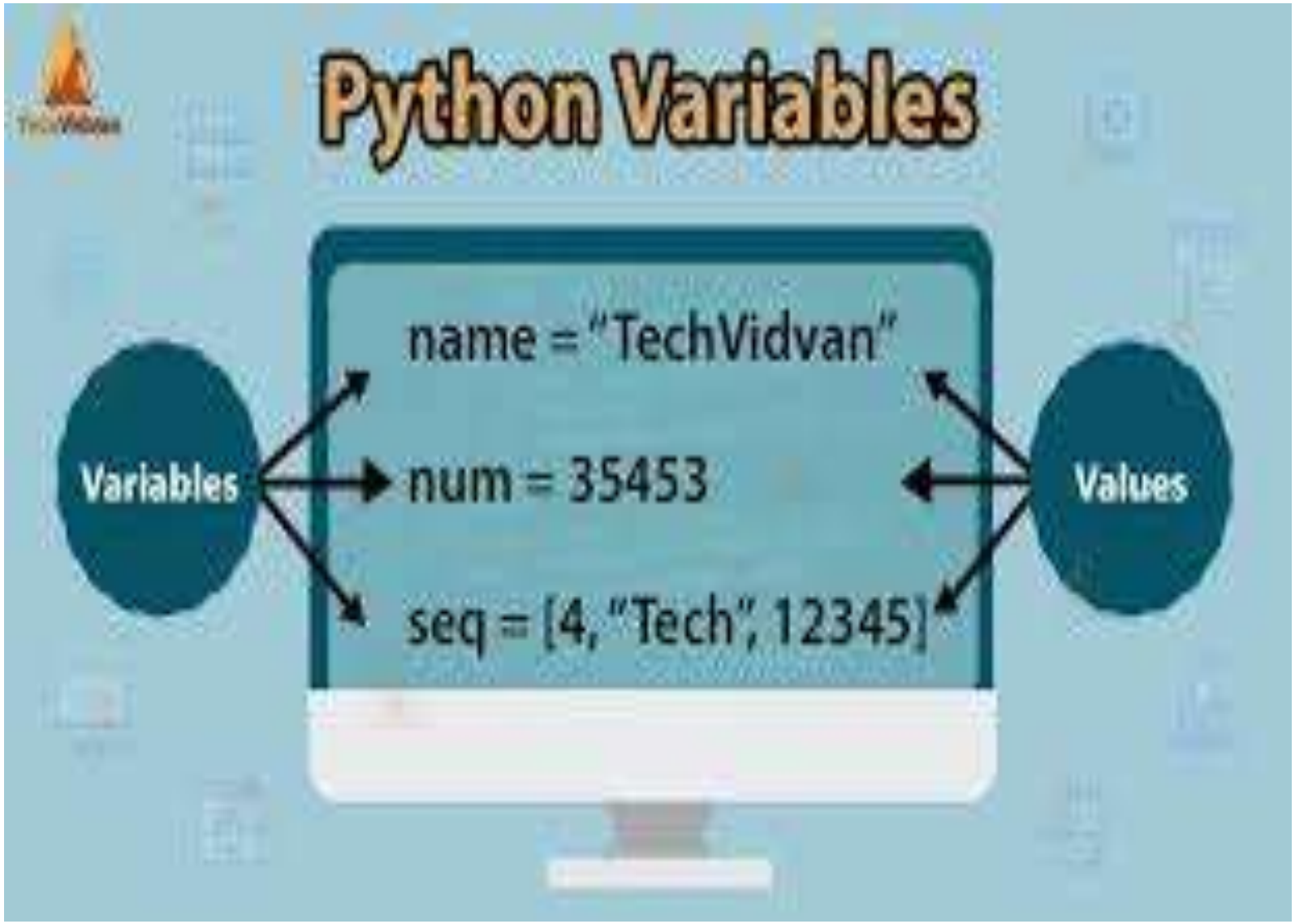
Variables

riables are containers for storing data values.



Naming rules of Variables

- A variable can have a short name (like x and y) or a more descriptive name
- A variable name must start with a letter or the underscore character
- A variable name cannot start with a number
- A variable name can only contain alpha-numeric characters and underscores (A-z, 0-9, and _)
- Variable names are case-sensitive (age, Age and AGE are three different variables)


Python Variables
name = "TechVidvan"
num = 35453
seq = [4, "Tech", 12345]
Variables
Values

Example

Valid/Invalid Variable Names

✓	1.	X	✗	8. int
✓	2.	Name	✗	9. double
✗	3.	first@name	✓	10. NAME
✓	4.	name2	✓	11. first_name
✓	5.	_name	✗	12. first-name
✗	6.	2name	✗	13. first name
✓	7.	Name	✗	14. v.a.l.u.e

Multi Words Variable Names

Camel Case

Each word, except the first, starts with a capital letter:

myVariableName = "John"

Pascal Case

Each word starts with a capital letter:

MyVariableName = "John"

SnakeCase

Each word is separated by an underscore character:

my_variable_name = "John"

Explained

camelCase
snake_case
PascalCase

Many Values to Multiple Variables

- Python allows you to assign values to multiple variables in one line:

Example:

```
x, y, z = "Orange", "Banana", "Cherry"
```

```
Orange
Banana
Cherry
```

One Value to Multiple Variables

- And you can assign the same value to multiple variables in one line:

Example

```
x = y = z = "Orange"
print(x)
print(y)
print(z)
```

QUIZ

1.What is a valid variable name in Python?

a) 2variable_name

b) variable-name

c) variableName

d) variable name

ANSWER: C

2.Which symbol is commonly used to separate words in a variable name?

a) -

b) _

c) .

d) #

ANSWER: B

3.What should a variable name start with in Python?

a) A number

b) A special character

c) A letter or an underscore

d) A space

ANSWER:C

True or False:

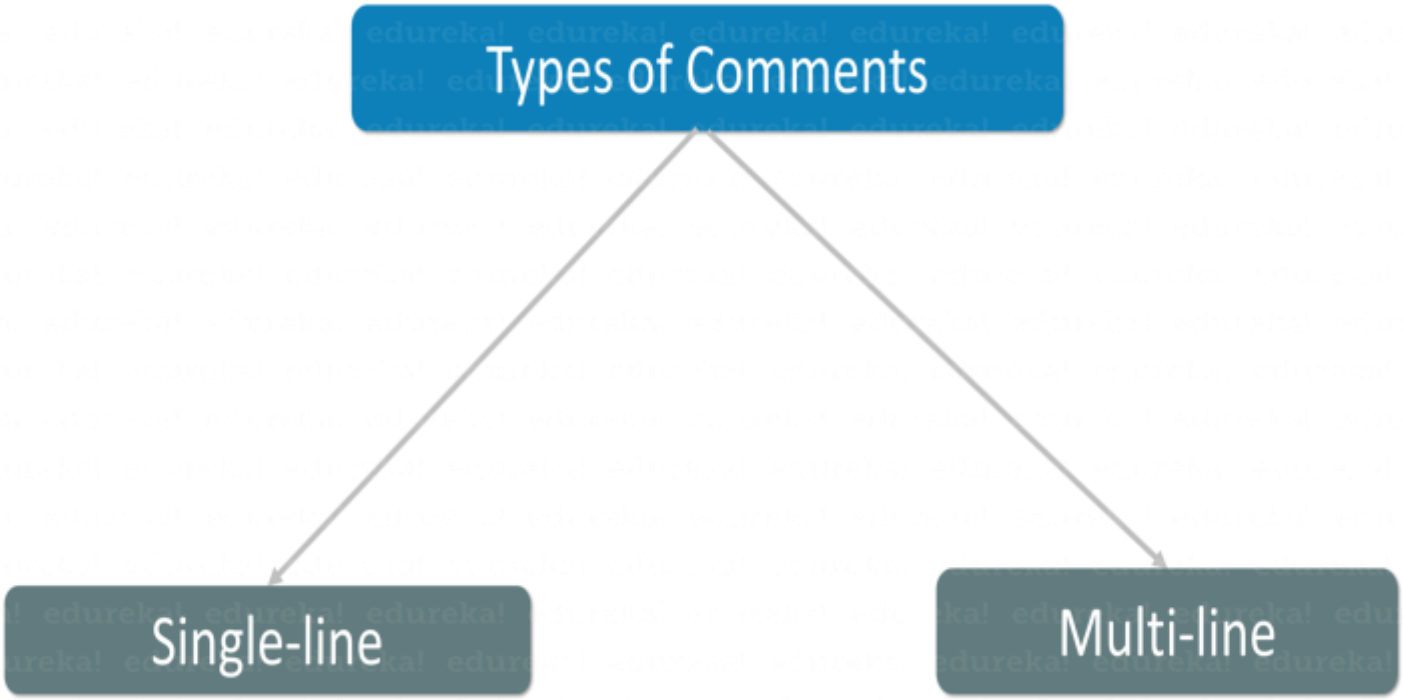
Variable names in Python can include spaces.
ANSWER: FALSE

totalAmount and total_amount are equivalent in Python
ANSWER:FALSE

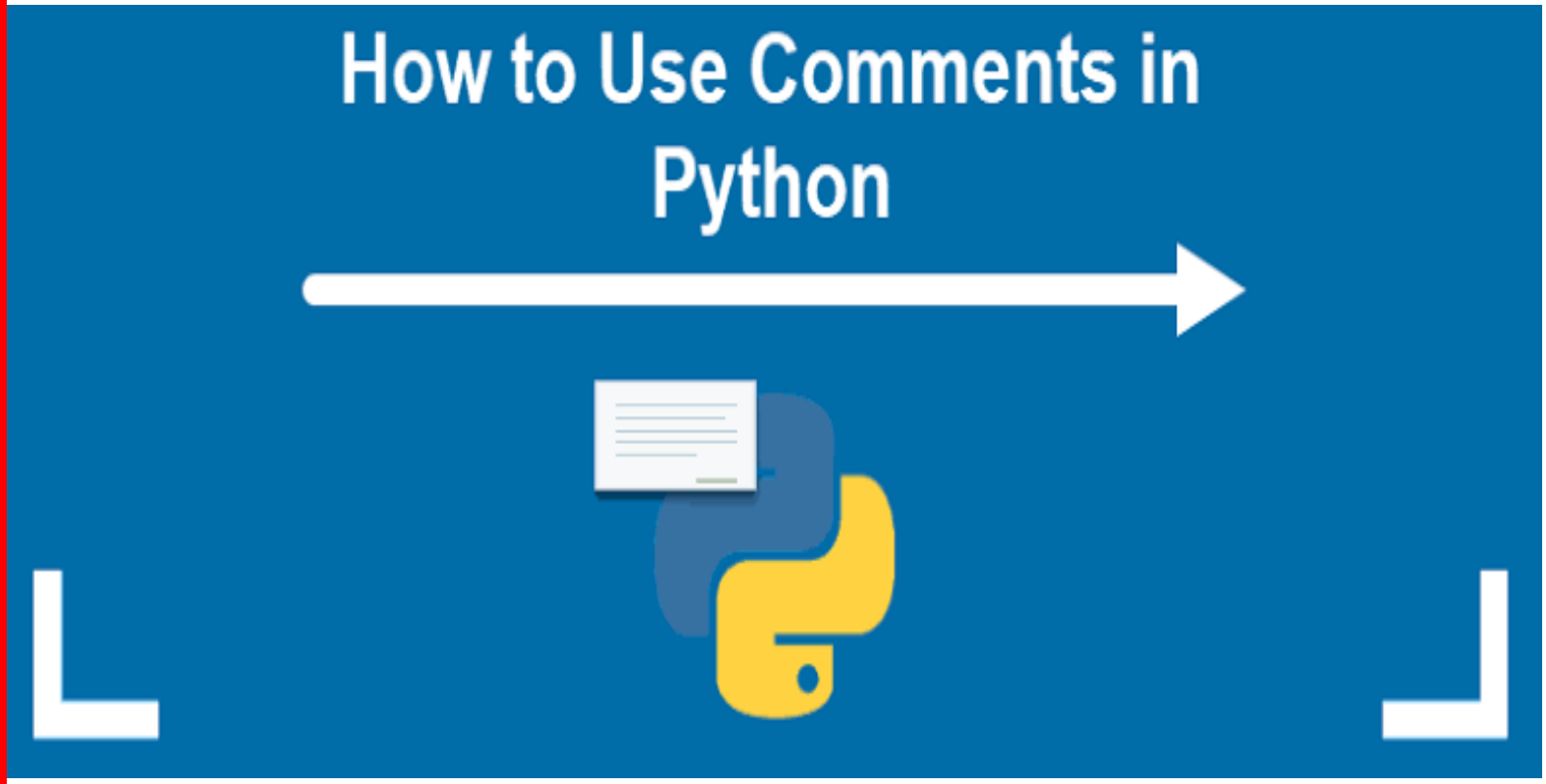
Comments

- Comments can be used to explain Python code.
- Comments can be used to make the code more readable.
- Comments can be used to prevent execution

Types of comments



How to Use Comments in Python



Creating a Comment

- Comments starts with a #, and Python will ignore them:

Example

```
# The value 5 is assigned to variable a
a=5
```

Multi Line Comments

- Python does not really have a syntax for multi line comments.
- To add a multiline comment you could insert a # for each line:
- Example
- #This is a comment
- #written in
- #more than just one line
- print("Hello, World!")

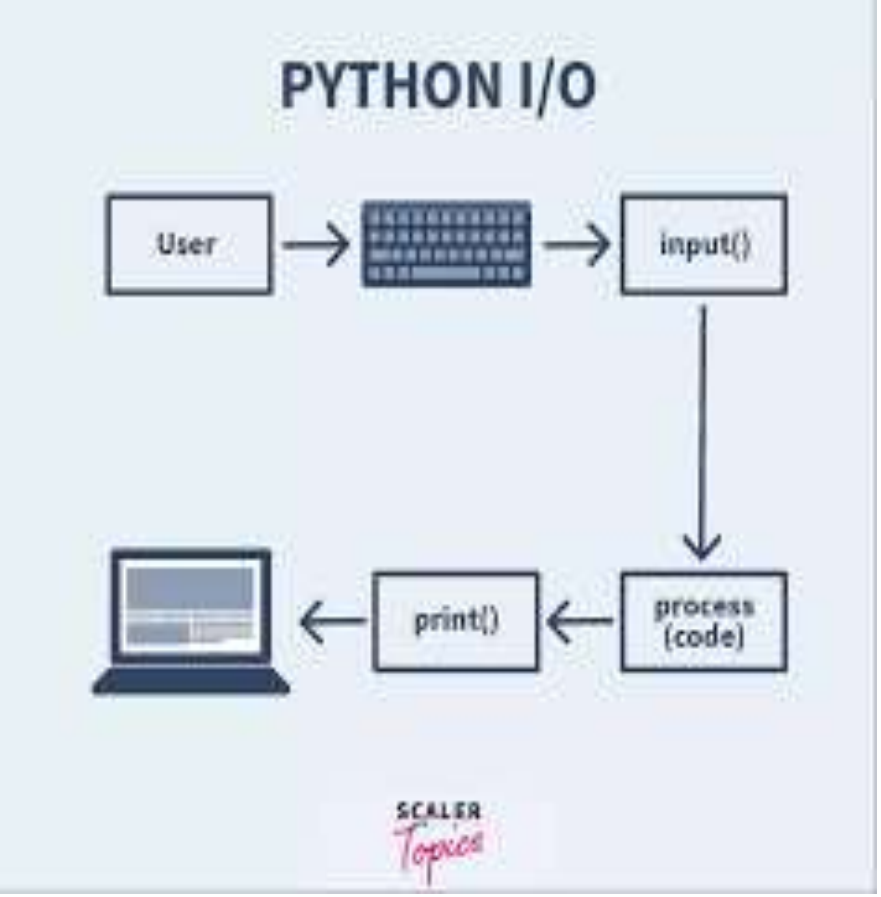
Multiline string

- you can use a multiline string.
- Since Python will ignore string literals that are not assigned to a variable, you can add a multiline string (triple quotes) in your code, and place your comment inside it:

Example

```
"""
This is a comment
written in
more than just one line
"""
print("Hello, World!")
```

Input/Output Statements



INPUT

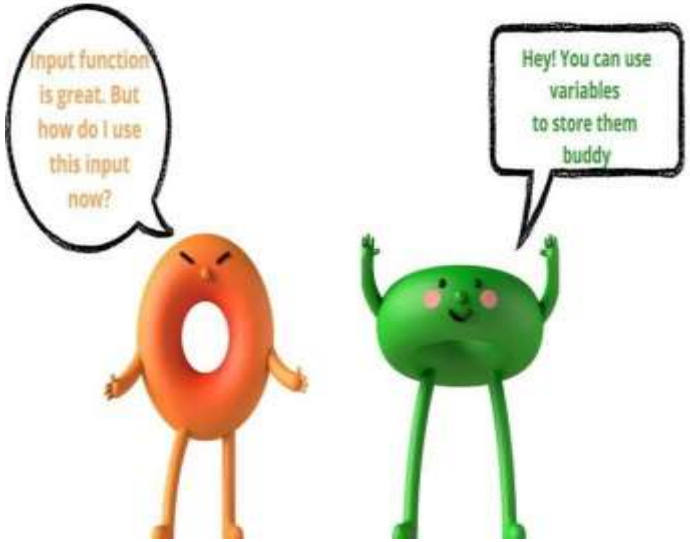
Syntax:

input('prompt')

Example

```
# Taking input from the user
name = input("Enter your name: ")

# Output
print("Hello, " + name)
print(type(name))
```



Integer input in Python

```
# Taking input from the user as integer
num = int(input("Enter a number: "))

add = num + 1

# Output
print(add)
```

Output statement in Python

In Python, we can simply use the print() function to print output. For example,

```
print('Python is powerful')
# Output: Python is powerful
```

Escape Characters

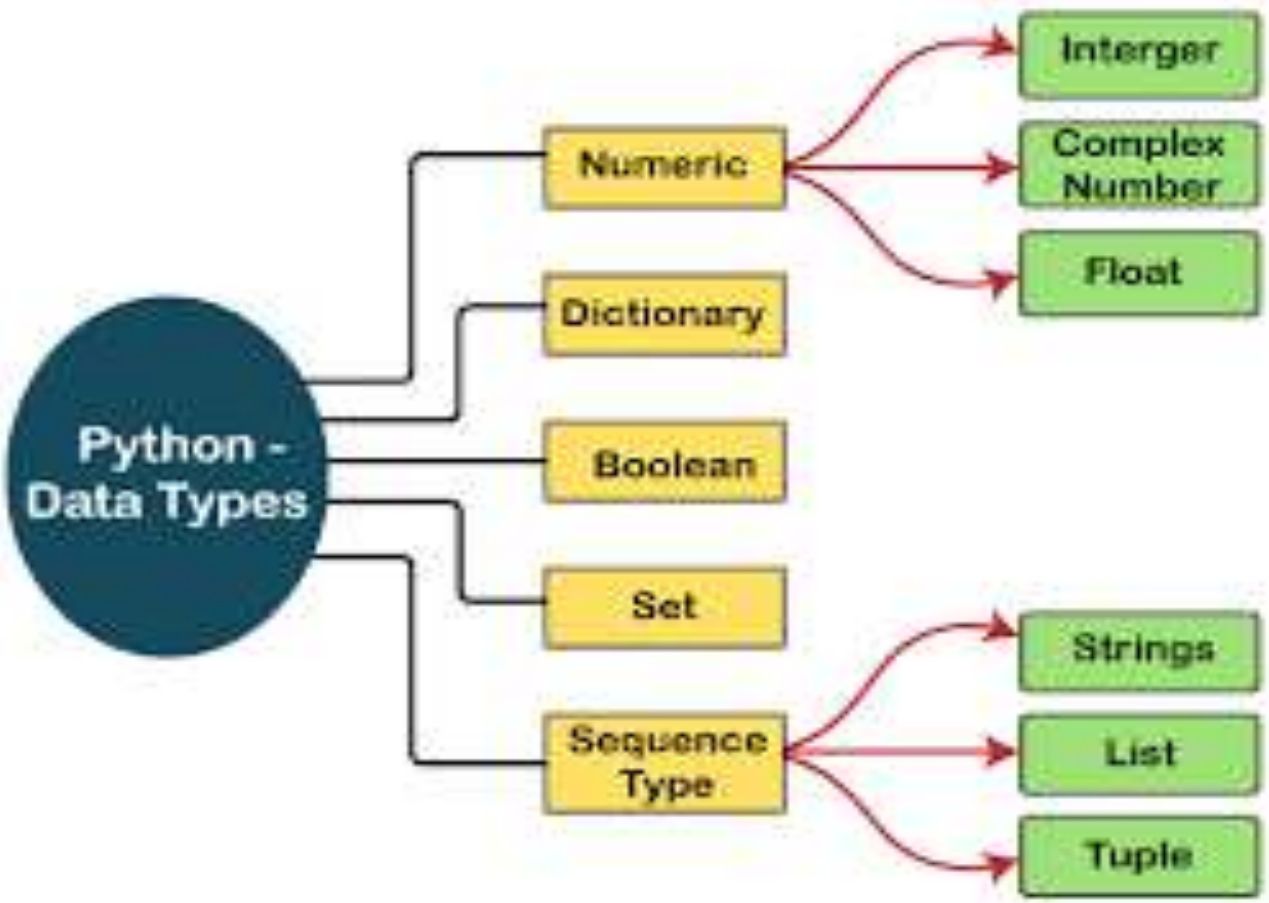
- An escape character is a backslash \ followed by the character you want to insert.
- You will get an error if you use double quotes inside a string that is surrounded by double quotes:
- txt = "We are the so-called \"Vikings\" from the north."

Python Escape Characters

Code	Result/Output	Description
\'	Single Quote	Add single quote with in a String
\\	Backslash	Insert single Back Slash
\n	New Line	\n takes the cursor to first position of a new line
\r	Carriage Return	\r takes the cursor to the first position of the same line
\t	Tab	\t add spaces of 8 characters
\b	Backspace	\b takes the cursor one position backward
\f	Form Feed	Form Feed is page breaking ASCII control character
\ooo	Octal value	Octal value
\xhh	Hex value	Hex value

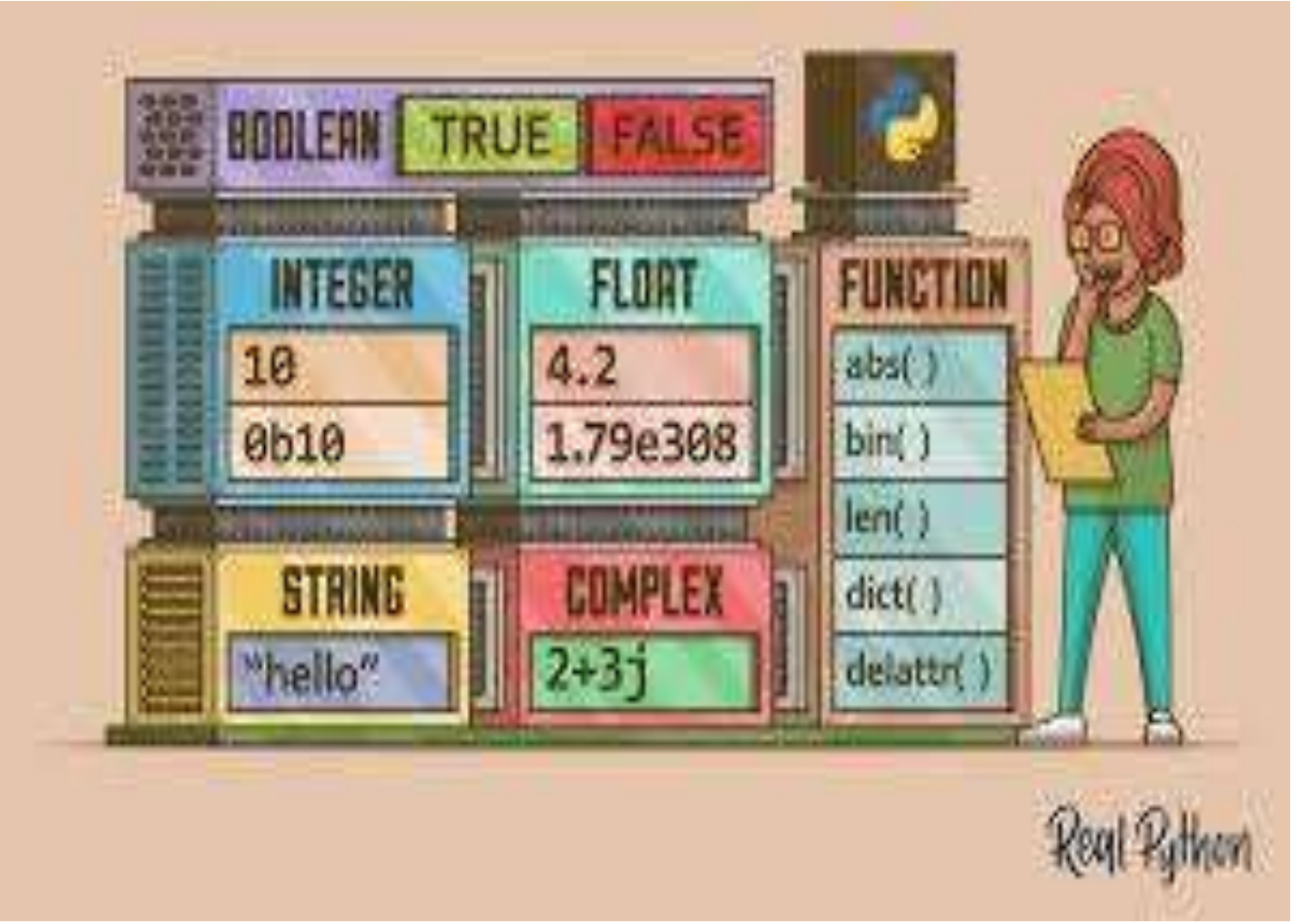

python
data types

Datatypes in python



DATATYPES

Example


BOOLEAN
TRUE
FALSE
INTEGER
10
0b10
FLOAT
4.2
1.79e308
FUNCTION
abs( )
bin( )
len( )
dict( )
delattr( )
STRING
"hello"
COMPLEX
2+3j
Real Python

Getting the Data Type

- x = 5
  print(type(x))

MATCH

- int → Stores textual data.
- float → A collection of unique items.
- str → Represents decimal numbers.
- bool → Represents whole numbers.
- list → Represents a true or false value.
- tuple → Immutable ordered collection of items.
- dict →An ordered collection of items.
- set → A collection of key-value pairs.

ANSWER

- int → Represents whole numbers.
- float → Represents decimal numbers.
- str → Stores textual data.
- bool → Represents a true or false value.
- list → An ordered collection of items.
- tuple → Immutable ordered collection of items.
- dict → A collection of key-value pairs.
- set → A collection of unique items.

Setting the Data Type

Example	Data Type	Try it
`x = "Hello World"`	str	Try it »
`x = 20`	int	Try it »
`x = 20.5`	float	Try it »
`x = 1j`	complex	Try it »
`x = ["apple", "banana", "cherry"]`	list	Try it »
`x = ("apple", "banana", "cherry")`	tuple	Try it »
`x = range(6)`	range	Try it »
`x = {"name" : "John", "age" : 36}`	dict	Try it »
`x = {"apple", "banana", "cherry"}`	set	Try it »
`x = frozenset({"apple", "banana", "cherry"})`	frozenset	Try it »
`x = True`	bool	

Boolean Values

```
print(10 > 9)
print(10 == 9)
print(10 < 9)
```

OUTPUT

```
True
False
False
```

TYPE Casting

INTEGERS

```
x = int(1)   # x will be 1
y = int(2.8) # y will be 2
z = int("3") # z will be 3
```

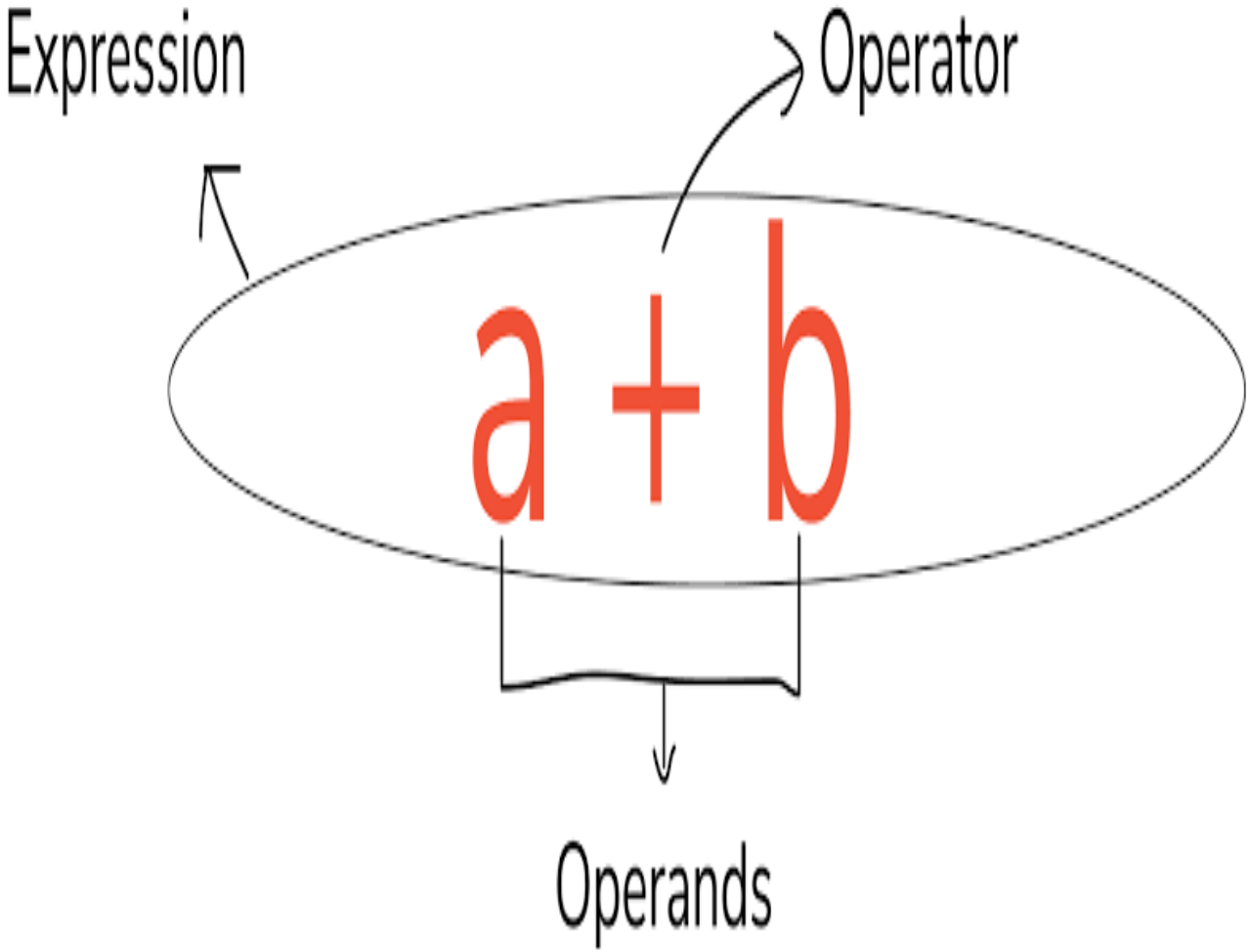
FLOAT

```
x = float(1)     # x will be 1.0
y = float(2.8)   # y will be 2.8
z = float("3")   # z will be 3.0
w = float("4.2") # w will be 4.2
```

STRINGS

```
x = str("s1") # x will be 's1'
y = str(2)    # y will be '2'
z = str(3.0)  # z will be '3.0'
```

Python operators


Expression
Operator
a + b
Operands

OPERATORS

- An operator is a symbol that represents an operations that may be performed on one or more operands.
- An operand is a value that a given operator is applied to.
- **Example: 4+(3*k)**

  +, * are operator and 4,3,k are operands

Operators and Operands

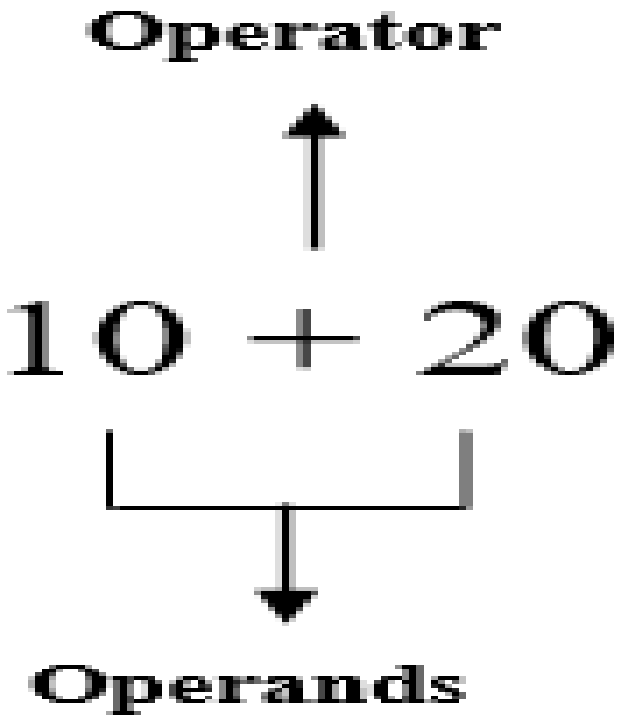


Fig: Operator and operands

Types of Operators

Arithmetic Operators

Arithmetic operators

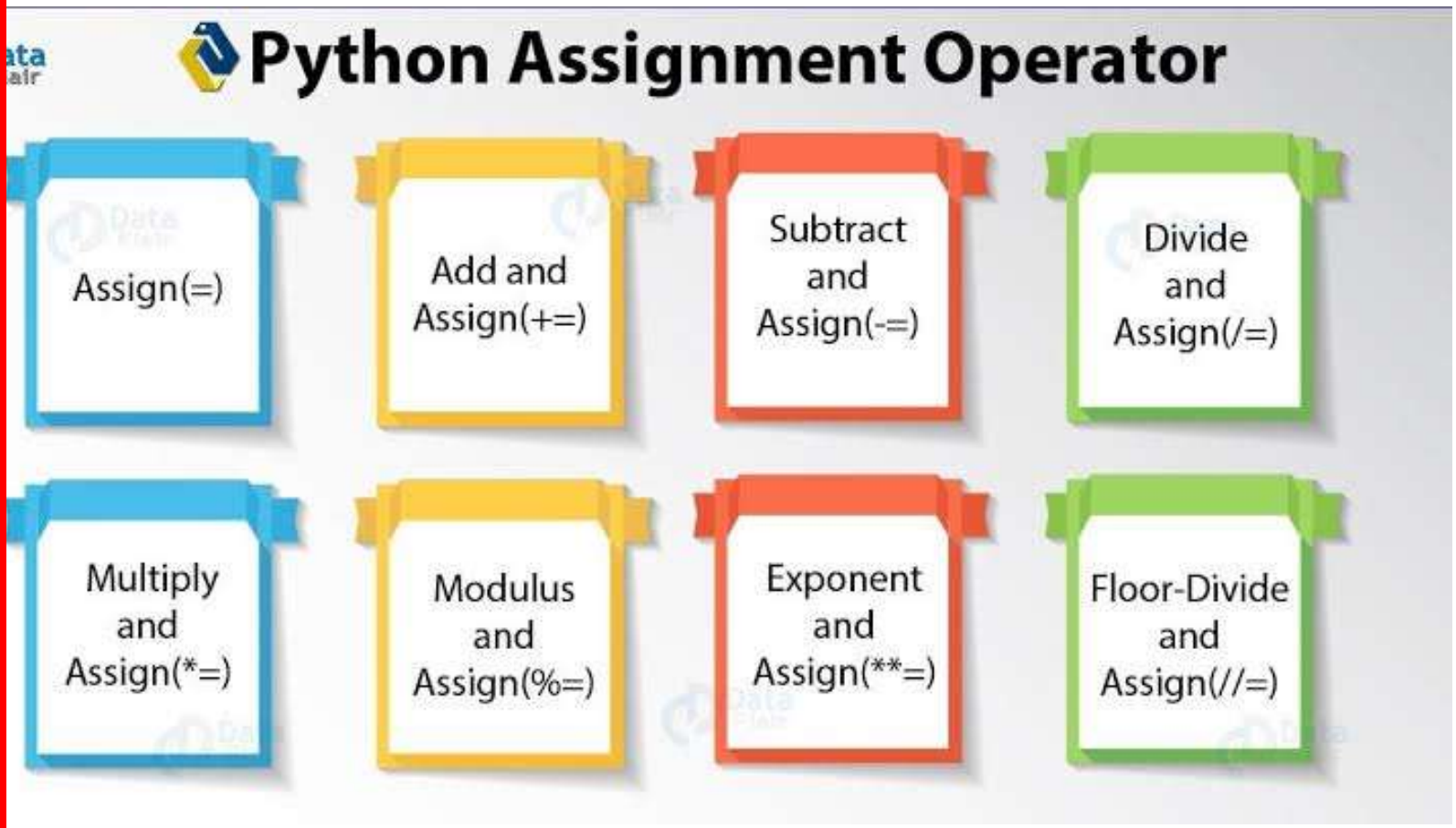
Operator	Name	Description	Syntax	Example
+	Addition	Performs addition	c = a + b	a = 5, b = 5 then c = 10
-	Subtraction	Performs subtraction	c = a – b	a = 5, b = 3 then c = 2
*	Multiplication	Performs multiplication	c = a * b	a = 5, b = 5 then c = 25
/	Division	Performs division	c = a / b	a = 10, b = 5 then c = 2
%	Modulus	Performs division but returns the remainder	c = a % b	a = 15, b = 2 then c = 1
//	Floor Division	Performs division but returns the quotient in which the digits after the decimal points are removed	c = a // b	a = 15, b = 2 then c = 7
**	Exponent	Performs multiplication to power raised	c = a ** b	a = 2, b = 4 then c = 16

Relational Operators

Example

Operator	Name	Description	Syntax	Example
>	Greater than	Compares the operands and then returns **True** if the left operand is greater than the right or else **False**.	a > b	a = 15, b = 5 then True
<	Lesser than	Compares the operands and then returns **True** if the left operand is lesser than the right or else **False**	a < b	a = 5, b = 15 then True
==	Equal to	Compares the operands and then returns **True** if both the operands are equal or else **False**	a == b	a = 5, b = 5 then True
!=	Not equal to	Compares the operands and then returns **True** if both the operands are **not equal** or else **False**	a != b	a = 10, b = 5 then True
>=	Greater than or equal to	Compares the operands and then returns **True** if the left operand is greater than or equal to the right or else **False**	a >= b	a = 15, b = 2 then True
<=	Lesser than or equal to	Compares the operands and then returns **True** if the left operand is lesser than or equal to the right or else **False**	a <= b	a = 2, b = 15 then True

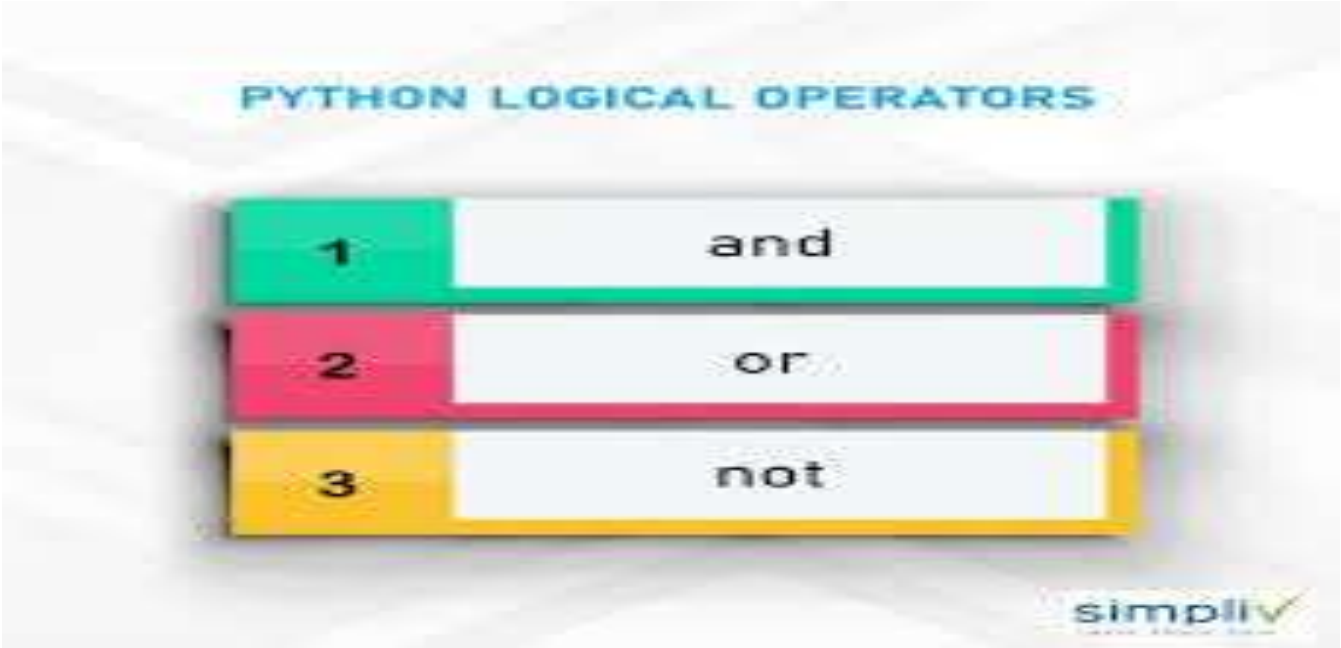
Assignment Operators

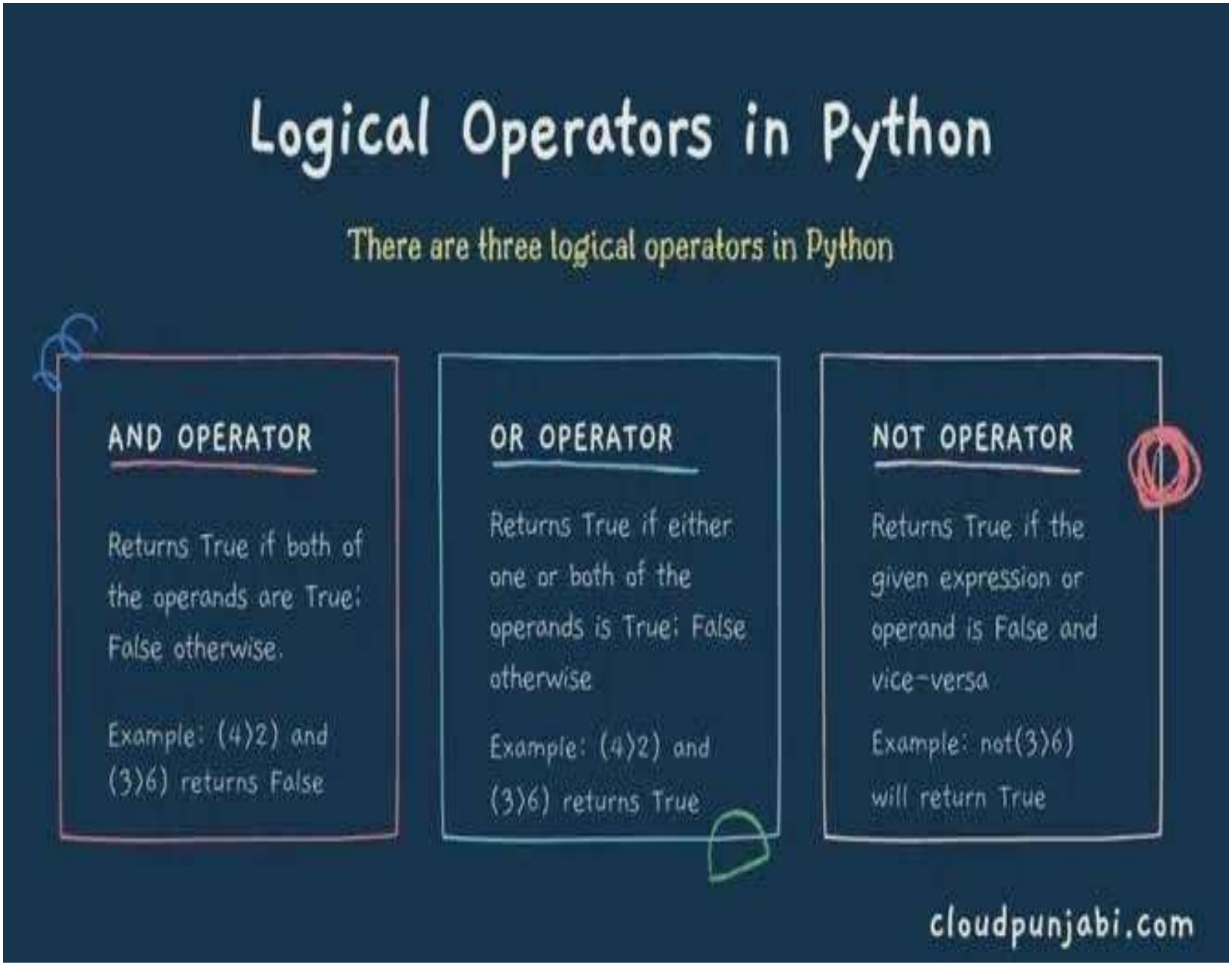


Example

Operator	Example	Equivalent To
Assignment =	i = 1	i = 1
Addition Assignment +=	j +=1	j = j + 1
Subtraction Assignment -=	k -= 2	k = k -2
Multiplication Assignment *=	m *= 2	m = m * 2
Float Division Assignment /=	n /= 2	n = n / 2
Integer Division Assignment //=	p //= 2	p = p // 2
Modulus or Remainder Assignment %=	q %= 2	q = q % 2
Exponent Assignment **=	r **= 2	r= r ** 2

Logical Operators




Logical Operators in Python
There are three logical operators in Python
AND OPERATOR
Returns True if both of the operands are True; False otherwise.
Example: (4)2) and (3)6) returns False
OR OPERATOR
Returns True if either one or both of the operands is True; False otherwise
Example: (4)2) and (3)6) returns True
NOT OPERATOR
Returns True if the given expression or operand is False and vice-versa
Example: not(3)6) will return True
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Logical Operators

Python - Logical Operators

- not

x	not x
False	True
True	False

- and

x	y	x and y
False	False	False
False	True	False
True	False	False
True	True	True

- or

x	y	x or y
False	False	False
False	True	True
True	False	True
True	True	True

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Example

Example of Logical Operator

```
print("Logical Operator")
print(10<5 and 10<20)
print(10<5 or 10<20)
print(not(10<20))
```

Output:

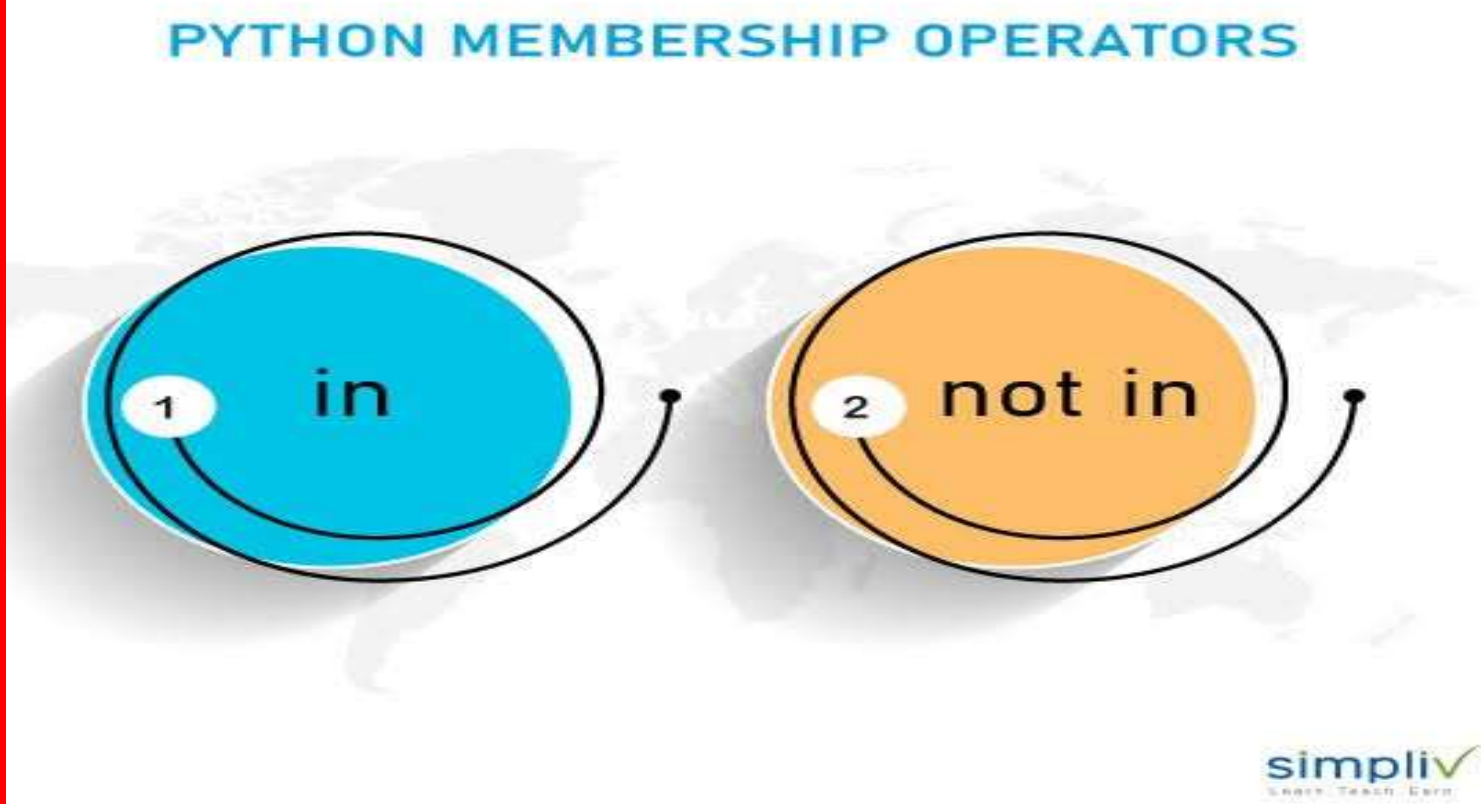
```
Logical Operator

False
True
False
```

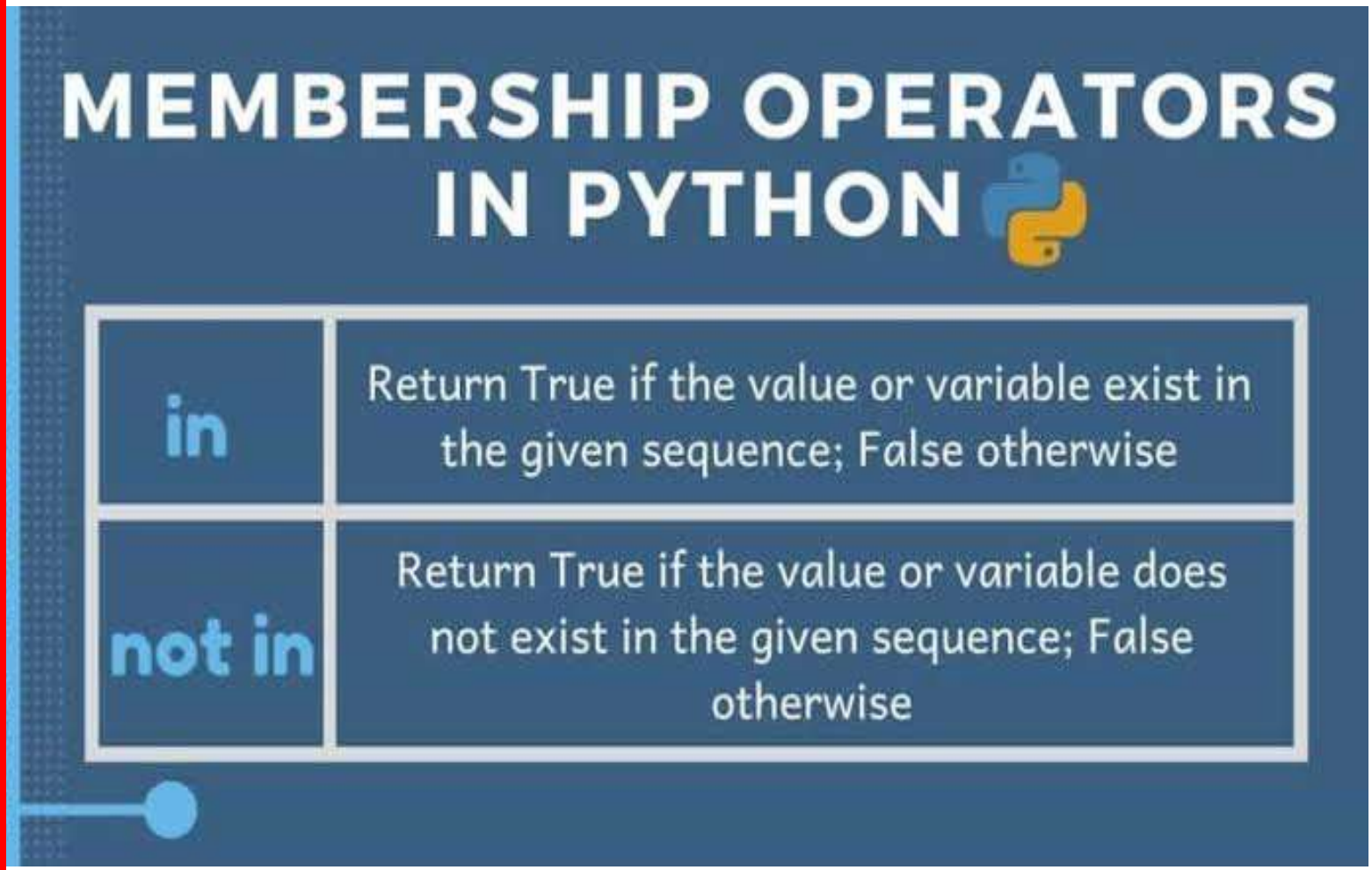
Example

Operator	Meaning	Example	Result
and	Logical and	(5<2) and (5>3)	False
or	Logical or	(5<2) or (5>3)	True
not	Logical not	not (5<2)	True

Membership Operators



Membership operators

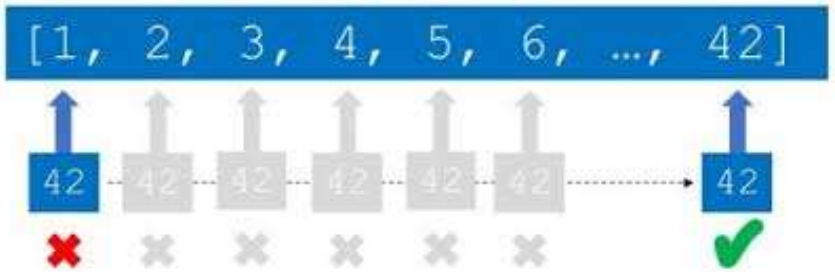


Example

finxter

Python Membership “in” operator

```
>>> item = 42
>>> my_list = [1, 2, 3, 4, 5, 6, …, 42]
>>> item in my_list
True
```



Identity operators

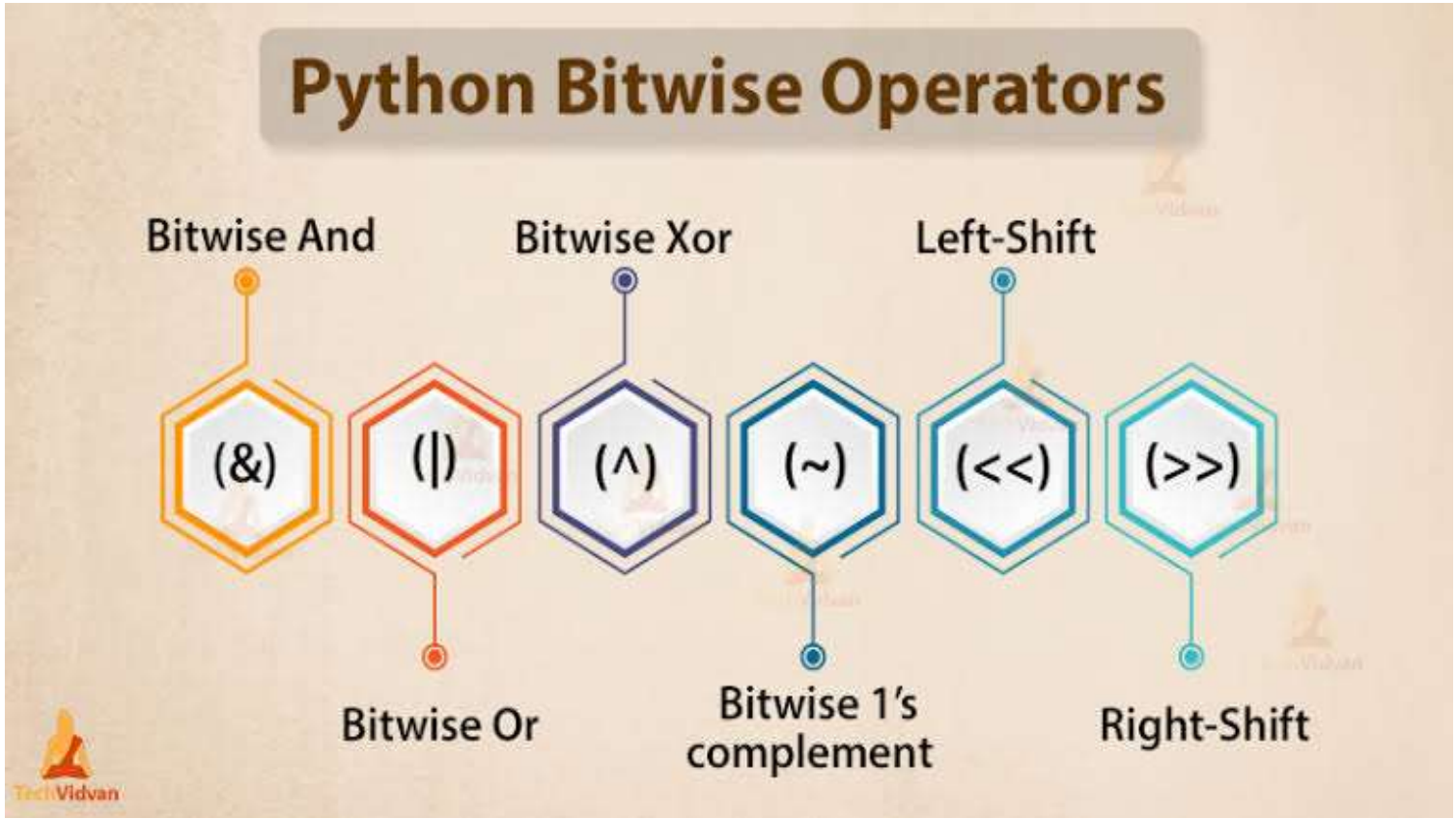
Identity operators

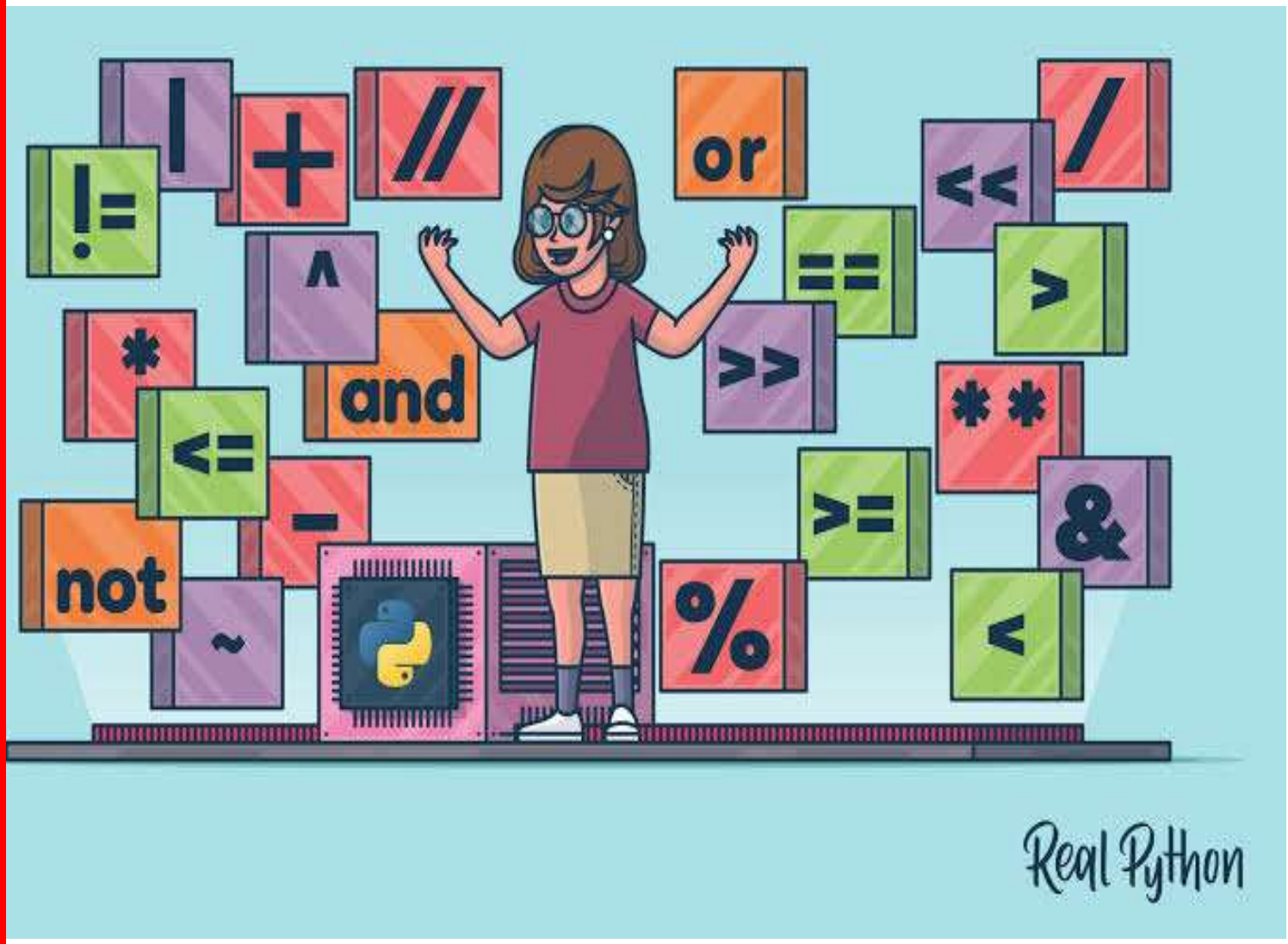
Example

```
A = 20
B = 20
C = 22
D = 15
E = [10, 22]
F = [10, 22]          #E and F are equal but are not same object
print(A is B)
print(C is B)
print(E is not F)
```

```
>>> runfile('C:/Users/Aditya/PycharmProjects/Hello1/Hello.
True
False
True
```

Bitwise operators




|
+
//
or
<<
/
!=
^
==
>
*
and
>>
**
<=
-
>=
&
not
~
%
<
Real Python

Operator precedence

Python Operator Precedence

Precedence	Operator Sign	Operator Name
Highest	**	Exponentiation
	+x, -x, ~x	Unary positive, unary negative, bitwise negation
	*, /, //, %	Multiplication, division, floor, division, modulus
	+, -	Addition, subtraction
	<<, >>	Left-shift, right-shift
	&	Bitwise AND
	^	Bitwise XOR
	|	Bitwise OR
	==, !=, <, <=, >, >=, is, is not	Comparison, identity
	not	Boolean NOT
	and	Boolean AND
Lowest	or	Boolean OR

Bitwise operators

Operator	Meaning
&	Bitwise AND
|	Bitwise OR
^	Bitwise exclusive OR / Bitwise XOR
~	Bitwise inversion (one's complement)
<<	Shifts the bits to left / Bitwise Left Shift
>>	Shifts the bits to right / Bitwise Right Shift

WORD SEARCH

A S S I G N M E N T R O A D I
C A R R Y E O I O R R D A E O
C O M P A R I S O N L O G I M
A R I I A L A A R B I T O R S
R L N A D M S E R I E L S T N
L T E T E R T I O S L G A T O
A E E O S M T M I T O T O S T
O I L I O N I A O L L A L H E
G N N I M N I T A D A R S S R
E P A E S S T R A T T A L A R
O S S O C I T A R S C H R A T
N R A B O S C A E C A D I N T

ASSIGNMENT
CARRY
COMPARISON
LOGICAL
ARITHMETIC
RELATIONAL
BITWISE
UNARY
TERNARY
INCREMENT
DECREMENT

- ASSIGNMENT (row 1, starting at column 1 to 10)
- CARRY (row 2, starting at column 3 to 7)
- COMPARISON (row 3, starting at column 2 to 11)
- LOGICAL (row 3, starting at column 8 to 15)
- ARITHMETIC (row 4, starting at column 1 to 11)
- RELATIONAL (row 5, starting at column 5 to 14)
- BITWISE (row 4, starting at column 8 to 15)
- UNARY (row 7, starting at column 2 to 6)
- TERNARY (row 10, starting at column 3 to 9)
- INCREMENT (row 9, starting at column 5 to 14)
- DECREMENT (row 9, starting at column 8 to 17)

main.py

Save Run

```
3  b = 5
4  x = True
5  y = False
6  c = 3
7  d = 10  # 1010 in binary
8  e = 4   # 0100 in binary
9  f = [1, 2, 3]
10 h = 2
11 print("Arithmetic Operator:")
12 print(f"{a} + {b} = {a + b}")  #
13 print("\nComparison Operator:")
14 print(f"{a} > {b} -> {a > b}")
15 print("\nLogical Operator:")
16 print(f"x or y -> {x or y}")
17 print("\nAssignment Operator:")
18 c += 2
19 print(f"c += 2 -> {c}")
20 print("\nBitwise Operator:")
21 print(f"{d} & {e} -> {d & e}")
22 print("\nIdentity Operator:")
23 print(f"f is [1, 2, 3] -> {f is [1, 2, 3]}")  #
24 print("\nMembership Operator:")
```

Output

Clear

```
Arithmetic Operator:
10 + 5 = 15

Comparison Operator:
10 > 5 -> True

Logical Operator:
x or y -> True

Assignment Operator:
c += 2 -> 5

Bitwise Operator:
10 & 4 -> 0

Identity Operator:
f is [1, 2, 3] -> False

Membership Operator:
2 in [1, 2, 3] -> True

=== Code Execution Successful ===
```

Thank You