Hello Everyone

→ run python on our machine

Python

⇒ terminal ✓

⇒ IDLE ✓

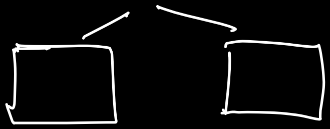
go to language

⇓

Anaconda

install libraries independently

install all libraries beforehand



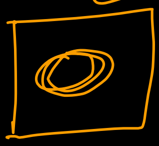
inter depend.

✓

⇓

python ✓
Lib ✓
Tools/softw

dependencies



Vscode

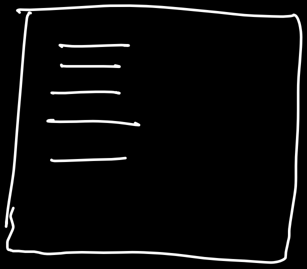
Spyder

Pycharm

2 ways to code

1. Python Script/Code

$\Downarrow$



2. Notebooks

In DS use case, we deal with lots of insights & diagrams/graph,

Notebook

1. Code

2. Markdown
   - For documentation
   - Syntax to follow
   - Readme.md

1. Software Installation & use ✓
2. Resources → ~~Github~~ ~~Resource~~
3. Python Installed ⇒ Print ("hello world")

~~0~~. Jupyter Intro [Lab + Notebook]
1. Python 2 vs 3
2. Pre defined vs User defined f^n
3. Print f^n & input f^n
4. User defined f^n
5. Errors in python
6. Identifiers in python

Python Introduction 2

Saturday 16 March 2024

Mayank Aggarwal

Today’s Agenda

- Version History
- Python 2 v/s Python 3
- Introduction To Predefined Functions And Modules
- How print() function works ?
- How To Remove Newline From print( ) ?
- Types Of Errors In Python
- Rules For Identifiers
- Python Reserved Words

3.11.5 or 3.12

Python Version History

- First released on Feb-20th -1991 (version 0.9.0)
- Python 1.0 launched in Jan-1994
- Python 2.0 launched in $\boxed{\text{Oct-2000}}$
- Python 3.0 launched in $\boxed{\text{Dec-2008}}$
- Python 2.7 launched in July 2010
- Python 3.6.5 launched on March-2018
- Python 3.7 launched on June-2018
- Python 3.8 launched on Oct – 2019
- Python 3.9 launched on Oct – 2020
- Python 3.10 launched on Oct – 2021
- Python 3.11 launched on Oct – 2022 [Latest version]

$\underline{2 \text{ vs } \boxed{3}}$

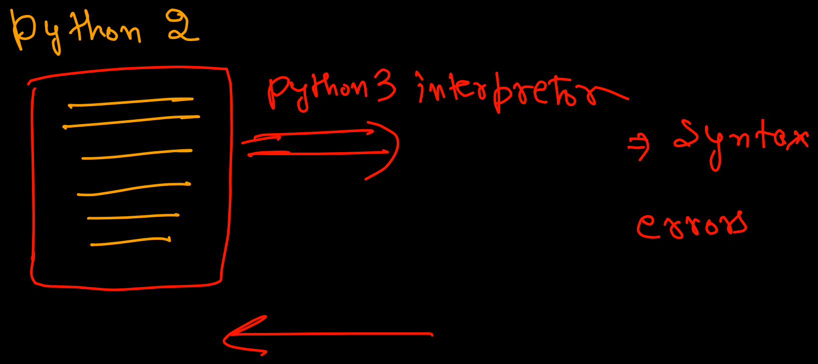
The Two Versions Of Python

- As you can observe from the previous slide , there are 2 major versions of Python , called **Python 2** and **Python 3**
- **Python 3** came in **2008** and **it is not backward compatible with Python 2**
- This means that a project which uses **Python 2** will not run on **Python 3.**
- This means that we have to **rewrite the entire project** to migrate it from **Python 2** to **Python 3**

$\hookrightarrow$ biggest issue

$\uparrow$ Lakhs of line of code

backword compatible



Some Important Differences

- **In Python 2**

  print “Hello iNeuron”

- **In Python 3**

  print(“Hello iNeuron”)

- **In Python 2**

  5/2 ??
  ?????????

  5/2 →2

  5/2.0→2.5

- **In Python 3**

  ????????

- The way of accepting input has also changed and like this there are many changes

The Two Versions Of Python

- So to prevent this overhead of programmers , **PSF** decided to support **Python 2** also.

Project

$2008 \xrightarrow{12 yrs} 2020$

- But this support will only be till **Jan-1-2020**

24 ✓

- You can visit **https://pythonclock.org/** to see exactly how much time is left before Python 2 retires

Which Version Should I Use ?

- For beginners , it is a point of confusion as to **which Python version they should learn ?**
- The obvious answer is **Python 3**

Why Python 3 ?

- We should go with **Python 3** as it brings lot of new features and new tricks compared to **Python 2**

EoL

- **Moreover as per PSF,** *Python 2.x is legacy, Python 3.x is the present and future of the language*
- **All major future upgrades will be to Python 3 and , Python 2.7 will never move ahead to even Python 2.8**

sqrt( ) ⇒ 0.01 sec

In python 3, will be changed

Types Of Predefined Function Provided By Python

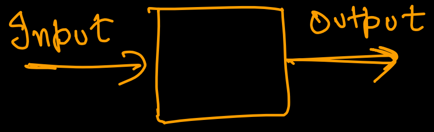
- **Python** has a very rich set of predefined functions and they are broadly categorized to be of 2 types

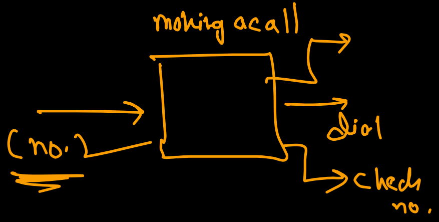
  - **Built In Functions**

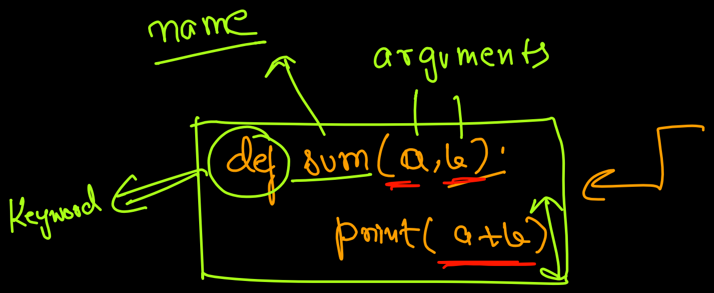
  - **Functions Defined In Modules**

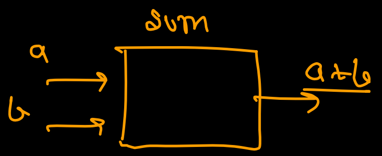
User defined vs Pre defined function

function







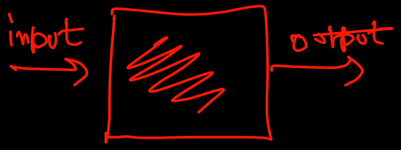


a , b =

a+b   a+b   a+b ∞ a*b a-b

sum (a , b) ⇒ fix

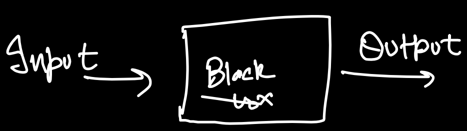
work in user intended way

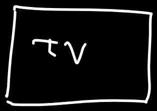


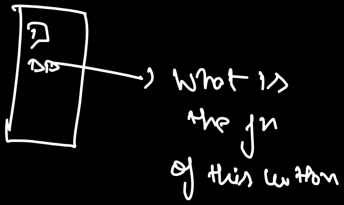
print (" ")
string

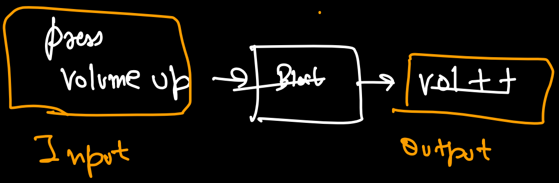
(+) less code
less prone to error
reusable

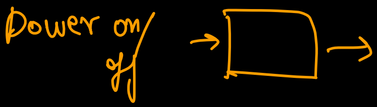
(−) complex

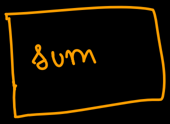

Input
Black ~~box~~
Output

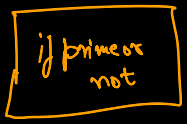

TV

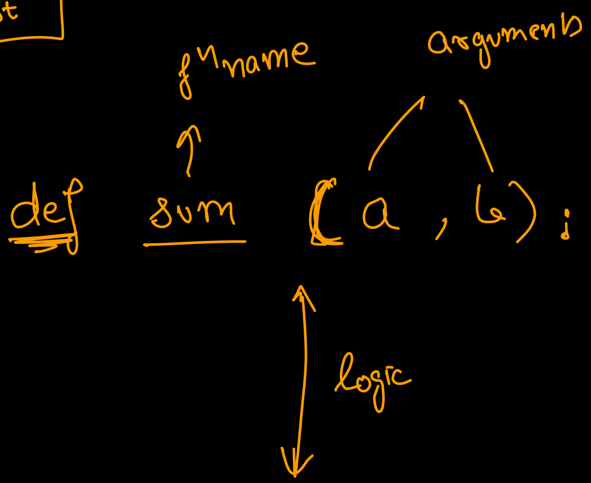

what is the fn of this button


press volume up
Black
vol++
Input
Output


power on/off


sum


if prime or not


fn name
arguments
def sum (a, b):
logic

print

Built In Functions

- **Built in functions** are those functions which are always available for use.
- For example , **print()** is a **built-in function** which prints the given object to the standard output device (screen)
- As of version **3.6** , Python has **68 built-in function** and their list can be obtained on the following URL :

  https://docs.python.org/3/library/functions.html

What Is print( ) And How It Is Made Available To Our Program ?

```
x = ("apple", "banana", "cherry")
print(x)
```

Std

a+b

How To Remove newline From print() ?

```
print("Hello User")

print("Python Rocks")
```

If we closely observe , we will see that the 2 messages are getting displayed on separate lines , even though we have not used any newline character. \n

This is because the function **print()** automatically appends a **newline character** after the message it is printing.

\n = new line

print ("string", end
⇓
$\boxed{\text{\n}}$
⇓
default value

fn.

print (str1, str2 ..., sep=" ", end="\n")

first   second

my sum $\boxed{(a , b)}$

my sum with default (a , $\boxed{b = 10)}$

default argument

call my fn

a=5
b=10 ⇒ 15

my sum with default (5)

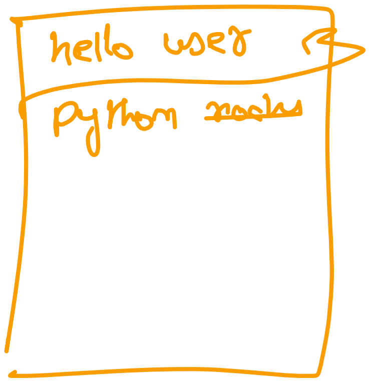
(5, 20)

overwrites my 10 value ⟵ a = 5
$\boxed{b = 20}$ ⇒ 25

How To Remove newline From print() ?

If we do not want this then we can use the **print()** function as shown below:

```
print("Hello User", end="")
print("Python Rocks")
```



iNeuron

How To Remove newline From print() ?

The word **end** is called **keyword argument** in **Python** and it's default value is **"\n"**.

But we have changed it to **empty string**("") to tell **Python** not to produce any newline.

tab backspace con

Similarly we can set it to **"\t"** to generate tab or **"\b"** to erase the previous character

Some Examples

1.

```
print("Hello User",end="\t")
print("Python Rocks")
```

Hello User _ _ _ _ Python

2.

```
print("Hello User",end="\b")
print("Python Rocks")
```

Hello Use Py

print ($\underline{\text{str1 str2} \qquad\qquad}$, end , $\underline{\text{sep}}$)

str1 + sep + str2 + sep + str3 $\underline{\text{+end}}$

Predefined fn   User defined fn

input fn ⇒ inbuilt fn

helps to take input from user

By default, input is of str type

Types Of Errors In Python

- Just like any other programming language , **Python** also has 2 kinds of errors:
    - **Syntax Error**
    - **Runtime Error**

Syntax Error

- Syntaxes are **RULES OF A LANGUAGE** and when we break these rules , the error which occurs is called **Syntax Error.**

- Examples of **Syntax Errors** are:

  - **Misspalled keywords.**
  - **Incorrect use of an operator.**
  - **Omitting parentheses in a function call.**

Runtime Errors (Exceptions)

- **As the name says, Runtime Errors are errors which occur while the program is running.**

- **As soon as Python interpreter encounters them it halts the execution of the program and displays a message about the probable cause of the problem.**

Runtime Errors (Exceptions)

- They usually occurs when interpreter counters a operation that is impossible to carry out and one such operation is **dividing a number by 0.**

- Since dividing a number by 0 is undefined , so ,when the interpreter encounters this operation it raises **ZeroDivisionError** as follows:

Functions Defined In Modules

A **Module** in **Python** is collection of functions and statements which provide some extra functionality as compared to built in functions.

We can assume it just like a header file of **C/C++** language.

Python has 100s of built in **Modules** like **math** , **sys** , **platform** etc which prove to be very useful for a programmer

Functions Defined In Modules

For example , the module **math** contains a function called **factorial( )** which can calculate and return the factorial of any number.

But to use a module we must first import it in our code using the syntax :

- **import <name of the module>**

For example: **import math**

Then we can call any function of this module by prefixing it with the module name

For example: **math.factorial(5)**

Rules For Identifiers

- **What is an identifier ?**
  - Identifier is the name given to entities like **class**, **functions**, **variables** , **modules** and **any other object** in Python.

- **Rules for identifiers:**
  - Identifiers can be a combination of letters in **lowercase** (a to z) or **uppercase** (A to Z) or **digits** (0 to 9) or an **underscore** (_)
  - No special character except **underscore** is allowed in the name of a variable

Rules For Reserved Words

- **What is a Reserved Word?**
  - A word in a programming language which has a fixed meaning and cannot be redefined by the programmer or used as identifiers
- **How many reserved words are there in Python ?**
  - Python contains **33 reserved words** or **keywords**
  - The list is mentioned on the next slide
  - We can get this list by using **help()** in **Python Shell**

Rules For Reserved Words

These 33 keywords are:

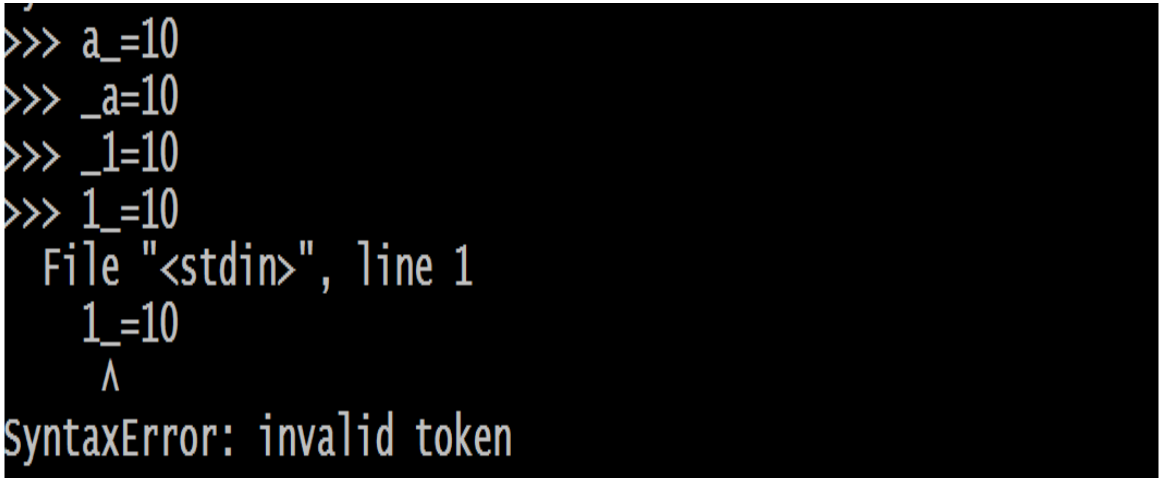
False , True , None ,def,
del ,import ,return , and , or ,
not ,if, else , elif , for , while ,
break , continue, is , as , in ,
global , nonlocal ,yield ,
try ,except , finally, raise,
lambda ,with ,assert ,class ,
from , pass

Some Important Observations:

1. Except **False** , **True** and **None** all the other keywords are in lowercase
2. We don't have **else if** in **Python** , rather it is **elif**
3. There are no **switch** and **do-while** statements in **Python**

Rules For Identifiers

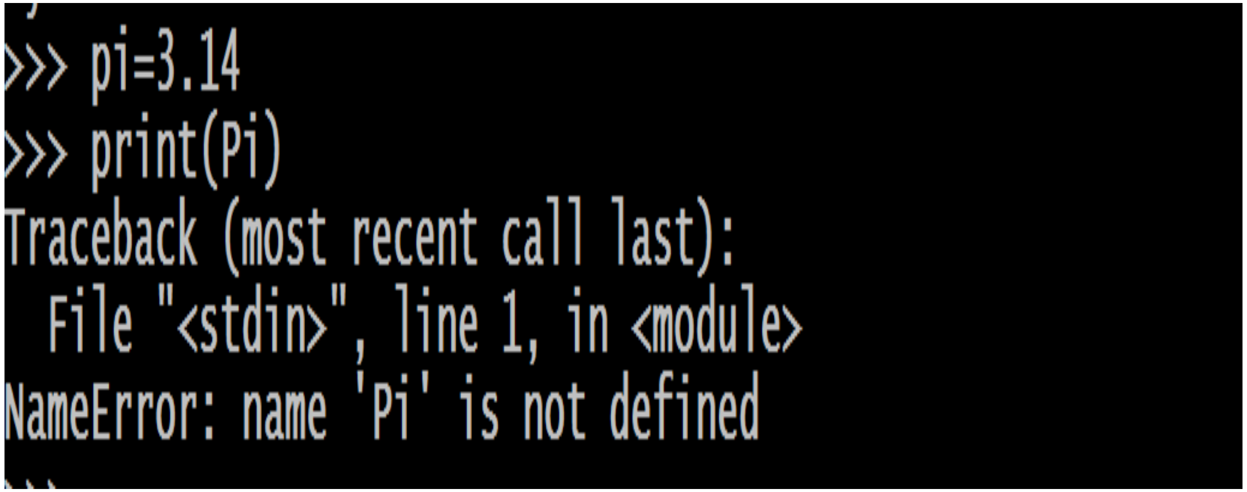
It must compulsorily begin with a underscore (_) or a letter and not with a digit . Although after the first letter we can have as many digits as we want. So **1a** is **invalid** , while **a1** or **_a** or **_1** is a **valid name** for an identifier.



```
>>> a_=10
>>> _a=10
>>> _1=10
>>> 1_=10
  File "<stdin>", line 1
    1_=10
     ^
SyntaxError: invalid token
```

Rules For Identifiers

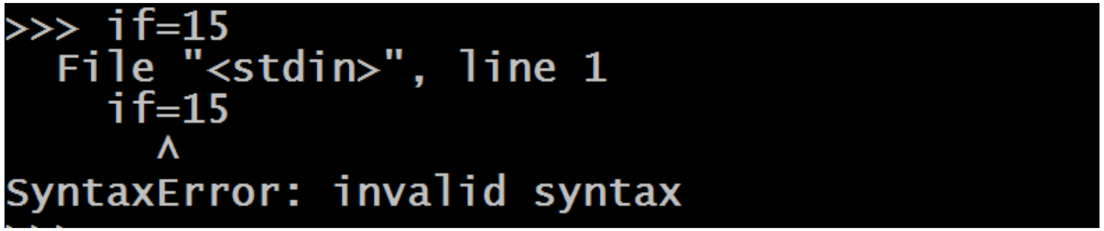
Identifiers are case sensitive , so **pi** and **Pi** are two different identifiers.



```
>>> pi=3.14
>>> print(Pi)
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
NameError: name 'Pi' is not defined
```

Rules For Identifiers

- Keywords cannot be used as identifiers



```
>>> if=15
  File "<stdin>", line 1
    if=15
      ^
SyntaxError: invalid syntax
```

- Identifier can be of any length.

T h a n k   y o u