

Python Fundamentals: A Beginner's Guide To

Programming With Python

Coding with Python is like painting with all the colours in the programmer's palette. Are you one who has just started learning Python so that you can excel in coding? Looking for some guide so that you can learn all the BASICS fundamentals related to Python. Then relax, buddy you have just landed at the right place!

In this guide, we will be learning Python from the beginning and will be creating a base for students to learn more intermediate and advanced Python. These notes will cover the most basic parts of the python language that can help any person or students from the age group of 8 to any year old. These notes are written for beginners only means those who do not have any knowledge of Python or any other language.

So, if you are among those who are searching for notes like this, then our search is over. Unlock this guide just by submitting your email address.

What is Python Language?

Python is an easy, standard-purpose, and trendy coding language. Python is a high-level, interpreted programming language known for its simplicity and readability. It's widely used in various domains, including web development, data science, artificial intelligence, and more. The latest Python 3 has many applications in cutting-edge technology in the Software Industry. Python is being utilised by many top companies – Google, Amazon, Facebook, Instagram, etc. Python language has the biggest advantage of its big libraries that are used in many applications like

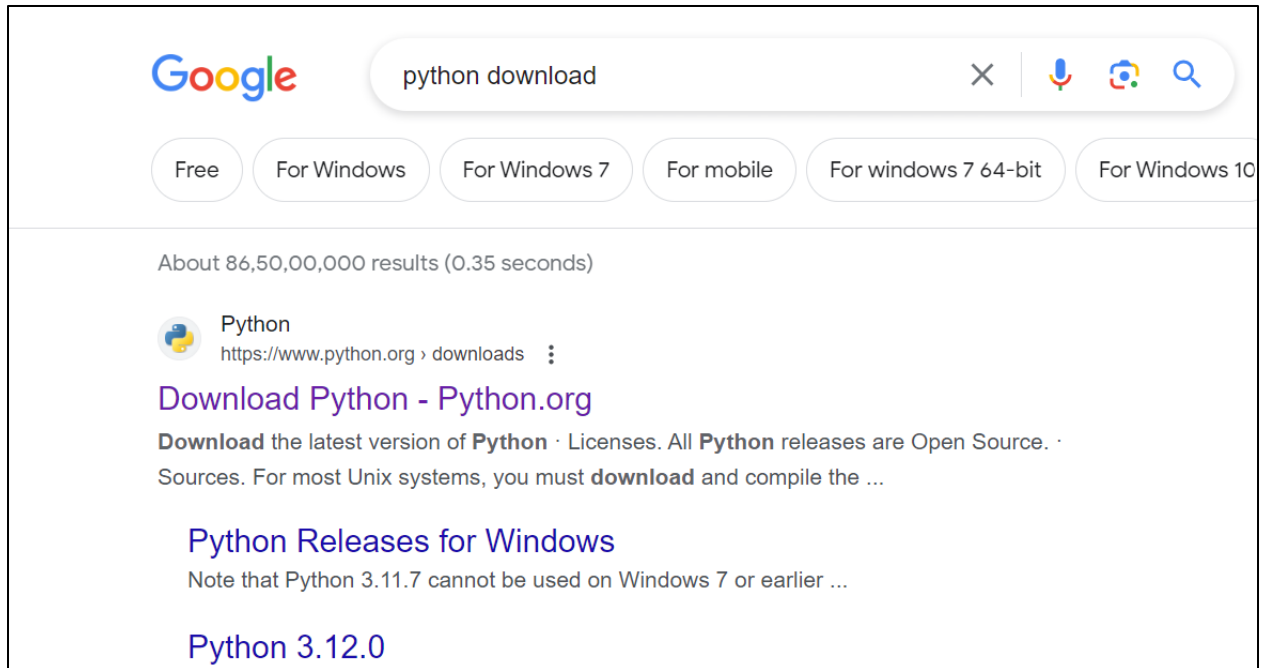
- Artificial Intelligence & Machine Learning.
- Graphical User Interface Applications.
- Web-frameworks
- Image-processing
- Web-scraping
- Test-frameworks
- Multimedia
- Scientific-computing
- Text-processing
- Data Science and many more...

In these notes, we will be using Python basic idle for coding in Python. Let's take a deep dive into coding and how to install Python.

How to install Python?

To learn any language, we first have to install it on a computer. These are the most important and essential steps for installing Python on a computer.

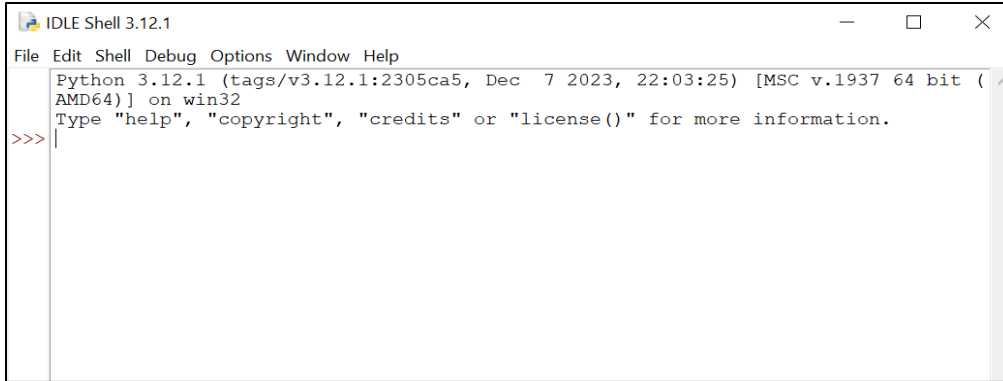
- Step 1 - Go to Google and search python download.
- Step 2 - Click on the website “<https://www.python.org/downloads/>”



- Step 3 - On the Python website click on download python



- Step 4 After downloading, open the exe, install it and then open it. This window should pop up.



```

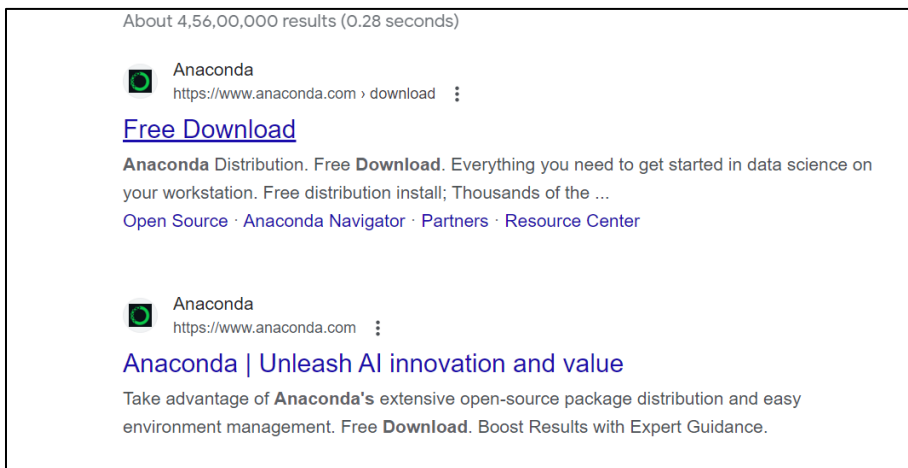
IDLE Shell 3.12.1
File Edit Shell Debug Options Window Help
Python 3.12.1 (tags/v3.12.1:2305ca5, Dec 7 2023, 22:03:25) [MSC v.1937 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>> |
  
```

This is how anyone can install Python on their computer. Installing python is not needed if you are doing only basics. But if you are going to choose Python as your carrier language, you have to download any Python IDE (Integration Development Environment) like Anaconda Jupyter, PyCharm and many more. This is because they are heavy applications that contain all the libraries and are used in creating many applications of python. These IDE are used by many large companies for their project, websites and IT works. In these notes, we will be doing coding in Jupyter which is the part of anaconda. So, let’s see how to install Anaconda step by step below.

How to install Jupyter on computers?

In this part, we will be discussing how to install Jupyter means full installation of Anaconda. Let’s discuss step by step how to install Jupyter in Python -

- Step 1 - Go to Google and search Anaconda.
- Step 2 - After Searching, click on the first website, “Free Download | Anaconda”.




- Step 3 - Click on the download button on the website to download the Anaconda

Anaconda Distribution

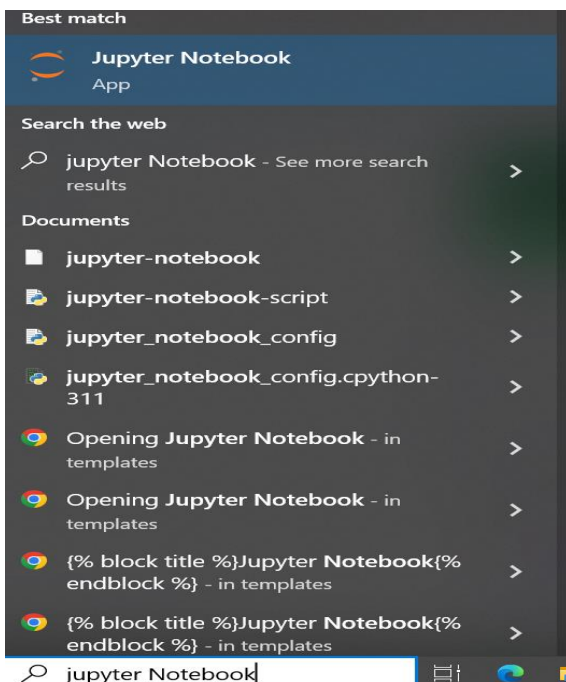
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- ✓ Manage packages and environments from desktop application
- ✓ Deploy across hardware and software platforms



- Step 4 - After Downloading, install the application.
- Step 5 - Then go to the search bar and search Jupyter Notebook.



- Step 6 - Then, in Jupyter Notebook, click on New then choose Python for writing code.

Why is Anaconda, not another IDE?

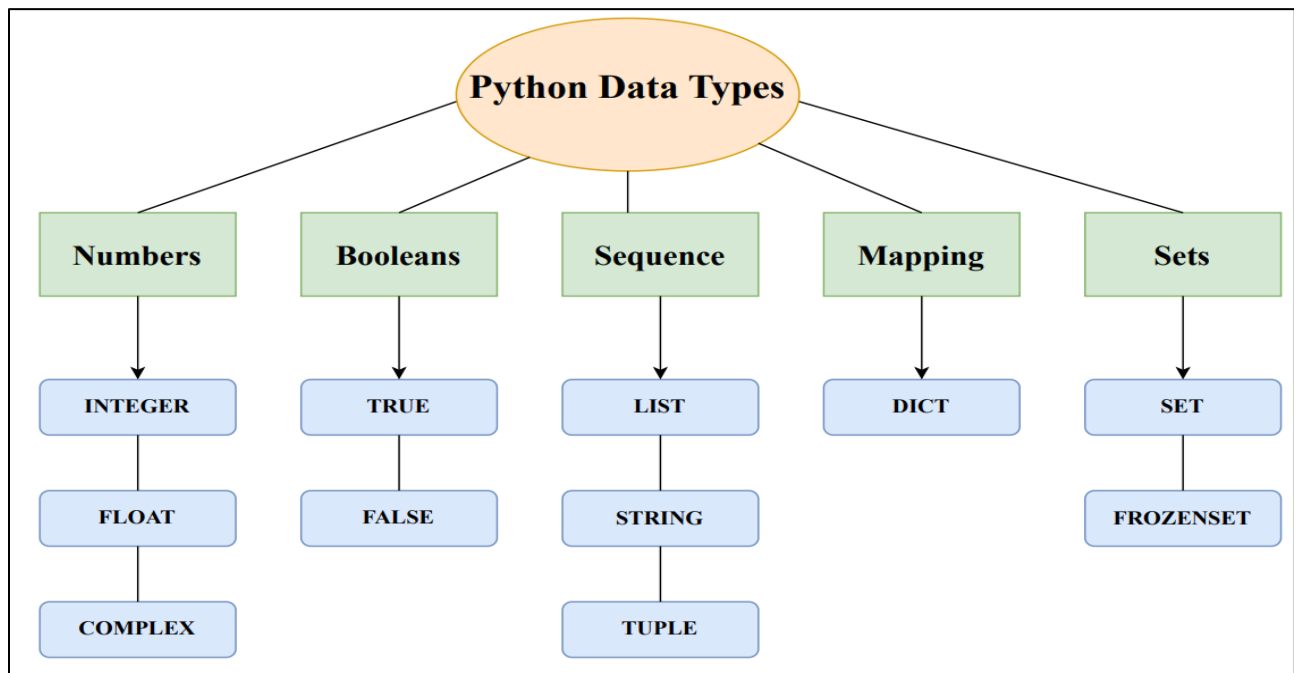
Anaconda is the number 1 IDE choice for Python programmers. Anaconda is used in many applications, user interfaces, Machine learning, artificial intelligence, and Data science. Anaconda has many applications like Jupyter, spyder, PyCharm Professional, AWS, Data Spell and R Studio. These applications are very important for many companies and professional individuals.

Let's start Learning Python

1. Our first program will be how to print anything in python. Let's print Hello World by Alex. In this, we are using a print() function, which is predefined in Python vast libraries. We don't have to import any library to use this function.

```
>>> print("Hello World by Alex mercer")
Hello World by Alex mercer
```

2. Let's learn about data types in Python. Python has many data types from integer to frozen sets. The flow chart below will give some basic Python programming data sets.



- Let's start with numbers and then go to the last sets.
 1. Numbers - Numbers in Python contain three types of data sets integer, float and complex numbers as basic data types. Integer contains normal numbers without any decimal or a point in it, mains 1,2,3,4,5 and many more but not 1.2,3.1, etc. Float point numbers are different from integers as they can contain integers, but in the form of decimals, means 1.0,2.00, and 1.22 is its example. Complex numbers mean unreal or imaginary numbers. Python allows complex numbers to be stored and can be calculated in it. Python takes complex numbers in from a+bj where a and b can be natural numbers.

2. Booleans - booleans in Python only means true or false. This means a statement can be

```
In [2]: x=1 # Integer
        a=1.3 # Float
        b=4+6j # Complex
        print(x)
        print(type(x))
        print(a)
        print(type(a))
        print(b)
        print(type(b))

1
<class 'int'>
1.3
<class 'float'>
(4+6j)
<class 'complex'>
```

true or false. For example-

```
In [3]: print(5>2)
        print(2>3)

True
False
```

3. Sequence - Sequence data type is used for storing data in an ordered way. There are many types of sequences with different capabilities and storage types. Let's learn about them one by one. First is Strings. The string is a sequence data type that stores characters in single quotes or dual quotes. The string is immutable, so we can't change the characters inside it. The second sequence data type is List. List is a data storage type in which multiple data can be stored a one time. It is a mutable data type we can change the data stored in it. To make a list, you have to store it in square brackets. The third sequence data type is a Tuple, the tuple is just like a list, but immutable means you can't change any value or data once stored in it. Let's take a look at the interpreter for more understanding.

```
In [10]: name="alex"
         print(name)

alex

In [12]: name[0]="b" # this will give error as string is immutable

-----
TypeError                                 Traceback (most recent call last)
Cell In[12], line 1
----> 1 name[0]="b"

TypeError: 'str' object does not support item assignment
```

```
In [1]: l1=["alex","mercer"]
        print(l1)

        ['alex', 'mercer']

In [2]: l1[0]="AM"
        print(l1)

        ['AM', 'mercer']
```

```
In [16]: t1=(1,2,3,4) #TUPLE
         print(t1)

         (1, 2, 3, 4)

In [17]: t1[1]=2 # this will throw error
         print(t1)

-----
TypeError                                 Traceback (most recent call last)
Cell In[17], line 1
----> 1 t1[1]=2 # this will throw error
      2 print(t1)

TypeError: 'tuple' object does not support item assignment
```

4. Mapping - This is a data type in which you have to map a value to a variable, and the most used mapping type is a dictionary. The dictionary is a type of data structure in which you store values in the form of a key and its value pair. Let's take a look at an interpreter for understanding of dictionary and how to declare it in Python. It is mutable

```
In [18]: dic1={'a':1,'b':3,'a':4,'c':3} # Basic dictionary form key:value pair
         print(dic1)

         {'a': 4, 'b': 3, 'c': 3}

In [19]: dic1['a']=6 # it will change the value from 1 to 6
         print(dic1)

         {'a': 6, 'b': 3, 'c': 3}
```

so we can change the value of the pair also in it.

5. Sets- This is a unique unordered datatype in which we can store elements or values. This set is the same as mathematics sets, and Python allows every math function that is used in maths. These maths functions are union, difference, and many more. The set is changeable by its own function that is dedicated to the set only. There is also another type of set function called frozen set. The frozen set is the same as the set but unchangeable. Let's learn both sets in Python.

```
In [23]: a={1,2,3,4,5}
         print(type(a))

         <class 'set'>

In [26]: mylist = {'apple', 'banana', 'cherry'}
         x = frozenset(mylist)
         print(mylist)
         print(type(mylist))

         {'banana', 'apple', 'cherry'}
         <class 'set'>
```

Input and output in Python

Input is one of the basic things that a coder should know. Taking input in coding is taking some info from a user that will need to do some operations after that, some output will be given. If we are taking some input, we must store it somewhere, so we use a variable. For output, we use the print() function that will give output to the user. Let's learn all about input and output in a proper manner.

Let's learn how to take proper input in Python Interpreter

```
In [6]: r=input("enter a string:")
         print(r)

         enter a string:alex mercer
         alex mercer

In [8]: print(type(r)) # python automatically will take str for any data if you not mention it

         <class 'str'>

In [9]: a=int(input("enter a number:"))
         print(a)
         print(type(a))

         enter a number:2345
         2345
         <class 'int'>
```

Basic maths operations in Python

Python allows basic maths operations. This means any coder can use basic maths operations in python. Python also has a math library which has many functions that ease the workload of creating any function that will do the same work. Let's see these basic operations and math libraries in Python.


```
In [33]: # Basic Operations in python.  
a=1+2  
s=5-4  
m=6*2  
d=8/2  
print(a)  
print(s)  
print(m)  
print(d)  
  
3  
1  
12  
4.0
```

```
In [37]: import math # this is how any one can import a library by using import statement  
print(math.factorial(3))  
print(math.pow(2,3))  
print(math.log10(10))  
print(math.sqrt(25))  
  
6  
8.0  
1.0  
5.0
```

Control flow

This is the most important thing, as Python doesn't use curly braces for coding blocks like other programming languages. Python uses the concept of indentation, which decides the control flow of Python code. If you by mistake make something wrong in indentation it will bring an error. Let's learn about these control flows in Python and indentation also -

```
In [38]: x = 10 # this code will give output " x is greater than 5"  
if x > 5:  
    print("x is greater than 5")  
else:  
    print("x is not greater than 5")
```

x is greater than 5

```
In [39]: x = 10 # this code will give us oindentaion error, so always make sure to give proper indentaion  
  
if x > 5:  
print("x is greater than 5")  
else:  
print("x is not greater than 5")
```

```
Cell In[39], line 4  
    print("x is greater than 5")  
    ^
```

IndentationError: expected an indented block after 'if' statement on line 3

Loops in Python

Python contains two main types of loops: for loop and while loop. For loop is used to iterate over a sequence(list, tuples and strings) or other iterable operations. The For loop with range() function can

generate a sequence and iterate over it. Let's take a look at the For loop in Python interpreter for a proper understanding of the for loop and range function-

```
In [4]: name=["ALEX","MERCER","AM"]
        for i in name:
            print(i)

ALEX
MERCER
AM

In [5]: for i in range(5):
        print(i)

0
1
2
3
4
```

While Loop is also a type of loop, in this loop, code will only execute when a condition is met or true. Let's learn more about this while loop in the interpreter.

```
In [44]: c=0
        while c<5:# in this coder set a condition and that condition is true. therefore, it will execute
            print(c)
            c+=1

0
1
2
3
4

In [45]: c=6
        while c<5:# no output because condition is false
            print(c)
            c+=1 # while Loop will not give any error for the condition if not met

In [ ]:
```

Loop control statements

Python provides control statements for modifying or customising the behaviour of loops.

Types of loop control statements are -

1. Break - This statement helps in stopping or terminating the code prematurely.
2. Continue - It will skip the rest of the code inside the loop for the current iteration and continue with the next iteration.
3. If, else and else if - these statements help in setting conditions and will only execute the code if the condition is true.

```
In [46]: for i in range(10):  
         if i == 5:  
             break # Code will only run from 0 to 4 after that it will stopped.  
         print(i)  
  
0  
1  
2  
3  
4  
  
In [47]: for i in range(5):  
         if i == 2:  
             continue # this will stop the code at i==2 then continue after it  
         print(i)  
  
0  
1  
3  
4  
  
In [49]: x=1  
         if x>0:  
             print("a")  
         elif x<0:  
             print("b")  
         else:  
             print("c")  
  
a
```

Functions

In Python function is a block of code that is only used to do or perform a specific task. The function provides modularity in a code, making it short and easy to read and maintain. In function, we create a program that will do the same task, which can be used in future. The function is used for creating programs for future uses. Creating a function can help make code shorter and easier to read. There are two types of functions: prebuilt or predefined and User-Defined functions.

Pre-built Functions - Python programming language has vast libraries of different functions that will help in coding. These functions and libraries are the main reason for Python user friendly. There are many predefined functions in Python let's take the example of a maths library that contains many mathematical functions.

```
In [50]: import math #Pre-Defined libraries for pre-built functions  
         print(math.factorial(3))  
         print(math.pow(2,3))  
         print(math.log10(10))  
         print(math.sqrt(25))  
  
6  
8.0  
1.0  
5.0
```

User-defined functions: When functions are created by the user to do some tasks which can be used again or can be saved for future purposes. To create a function in Python, we have to use the Def() function. Let's create many functions in our Jupyter interpreter.

```
In [52]: def sumtwonumbers(a,b):# we are creating a basic adding two numbers function
          s=a+b
          return s

          x=sumtwonumbers(200,3456)# in this we are already giving two numbers
          print("sum of two numbers is",x)

          sum of two numbers is 3656
```

```
In [53]: def sumtwonumbers(a,b):# same as above one but we are taking inputs from User not gibing ourself
          s=a+b
          return s
          y=int(input("Enter the First number :"))
          z=int(input("Enter the Second number :"))
          x=sumtwonumbers(y,z)
          print("sum of two numbers is",x)

          Enter the First number :12
          Enter the Second number :23
          sum of two numbers is 35
```

```
In [56]: def areaofsquare(s):
          area=s*s
          return area
          a=int(input("enter the square side :"))
          x=areaofsquare(a)
          print("area of square is",x)

          enter the square side :7
          area of square is 49
```

```
In [57]: def areaoftriangle(b,h):
          area=0.5*(b*h)
          return area
          x=int(input("enter the base of triangle:"))
          y=int(input("enter the height of triangle:"))
          a=areaoftriangle(x,y)
          print("area of triangle is",a)

          enter the base of triangle:34
          enter the height of triangle:56
          area of triangle is 952.0
```

With using def function we can create many functions that are very useful for many coders. Def() function is used by many of the coders to create new functions and then create libraries for Python. Python is an open-source programming language so it allows coders to create functions and add them to their libraries to maintain its user-friendliness.

Conclusion

In conclusion, python is one of the most important programming languages nowadays. Python is the base for creating artificial intelligence and machine learning models for our many Automation works. To make sure that all the students get help in writing Python assignments, visit our website, "India Assignment Help".

What we have discussed and learned in these notes is the most basic. If you want to get help with any assignments regarding intermediate and Advanced Python. Go to our website, “India Assignment Help”, for more information about this Assignment help. We at India Assignment help provide all the academic help for our students to make sure they get full marks on their assignments.

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