

# Python Introduction

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Thursday, 10 March 2024

Mayank Aggarwal

“The best way to learn a language is to speak to natives.”

The guy learning python:





# Today's Agenda

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1. Python Introduction
2. "Hello World"

## An Introduction to Python

- Necessity Of Programming
- What Is Python ?
- Why And Who Created It ?
- What Python Can Do ?
- Why Should I Learn Python In 2018 ?
- Important Features

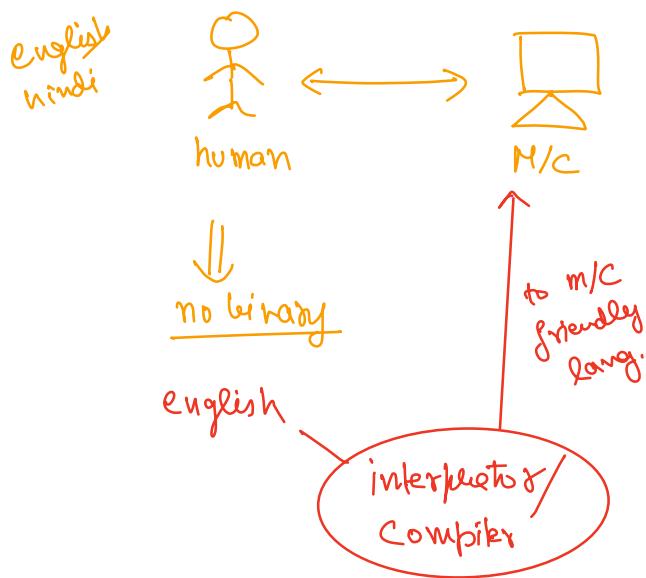
2024

## Necessity of Programming

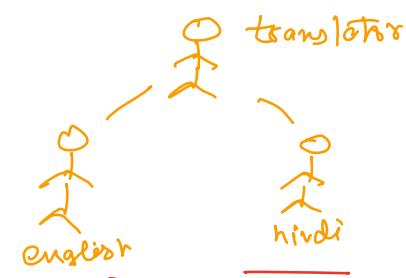
\_\_\_\_\_ ⇒ "hello world"

\_\_\_\_\_ ⇒ Amazon, Zomato  
Zoom

Python  
C++  
Golang  
Java  
C  
TypeScript  
JS  
Rust  
C#



Binary 0/1  
0010010



Syntax  
Rules  
OOPS  
Design Patterns

} ⇒ very close to real life



# Why Do We Need Programming ?

- To communicate with digital machines and make them work accordingly
- Today in the programming world , we have more than 800 languages available. RI

- And every language is designed to fulfill a particular kind of requirement

Java → SD  
~~Python~~ → GD / ML

# Brief History Of Programming Language

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- **C language** was primarily designed to develop “**System Software**” like Operating Systems, Device Drivers etc.
- To remove security problems with “C” language , **C++ language** was designed.
- It is an Object Oriented Language which provides **data security** and can be used to solve **real world problems**.
- Many popular softwares like **Adobe Acrobat** , **Winamp Media Player**, **Internet Explorer**, **Mozilla Firefox** etc. were designed in **C++**
- Courtesy: <http://www.stroustrup.com/applications.html>

# What is Python ?

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- Python is a general purpose and powerful programming language.
- It is free and open-source.  
    → free open source code available
- Python is considered as one of the most versatile programming language as it can be used to develop almost any kind of application including desktop application, web applications, CAD, Image processing and many more.

Computer aided  
design

# Who created Python ?

- Developed by **Guido van Rossum** , a Dutch scientist
- Created at **Center For Mathematics and Research** , Netherland
- It is inspired by another programming language called **ABC**

Benevolent dictator  
for life



# Why was Python created ?

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- Guido started Python development as a hobby in 1989
- But since then it has grown to become one of the most polished languages of the computing world.



Python

Java

Newton  
2 months  
II  
Calculus

# How Python got it's name?

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- The name Python is inspired from Guido's favorite **Comedy TV show** called "**Monty Python's Flying Circus**"
- Guido wanted a name that was short, unique, and slightly mysterious, so he decided to call the language Python.



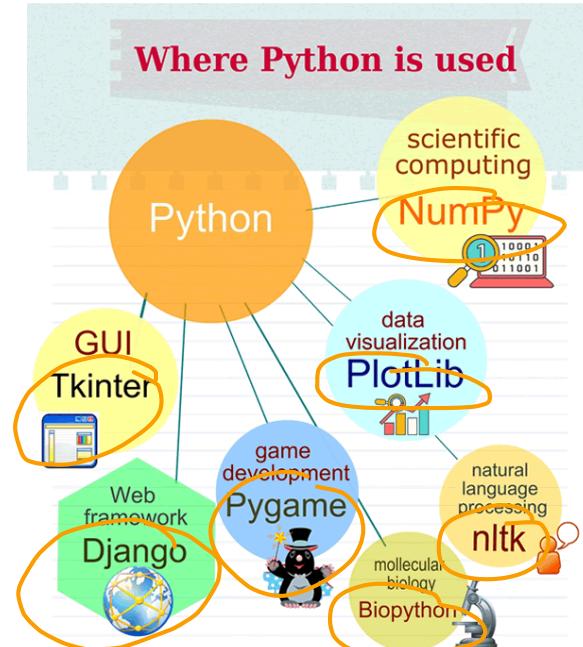
# Who manages Python today ?

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- From version 2.1 onwards , python is managed by Python Software Foundation situated in Delaware , USA
- It is a non-profit organization devoted to the growth and enhancement of Python language
- Their website is <http://www.python.org>

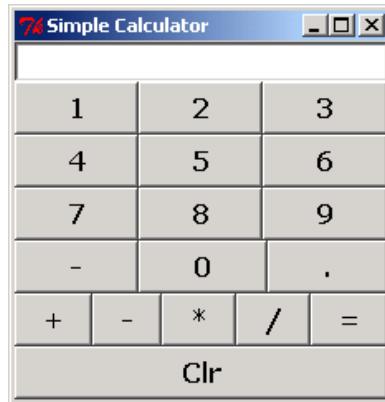
# What Python can do ?

- **GUI Application**
  - **Web Application**
  - **Data Analysis** pandas , num
  - **Machine Learning** AI, Shallow, Deep
  - **Raspberry Pi**
  - **Game Development**
- GUI  
MS DOS  
GUI



# GUI In Python

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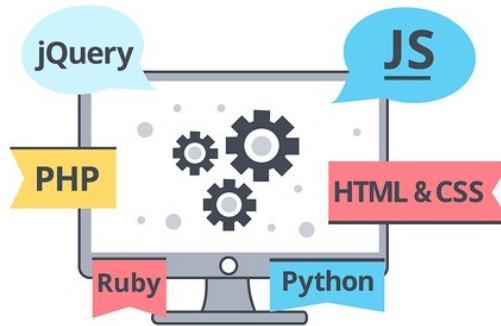


- Python is used for GUI apps all the time.
- It has famous libraries like PyQT , Tkinter to build desktop apps.

# Web Application in Python



WEB DESIGN

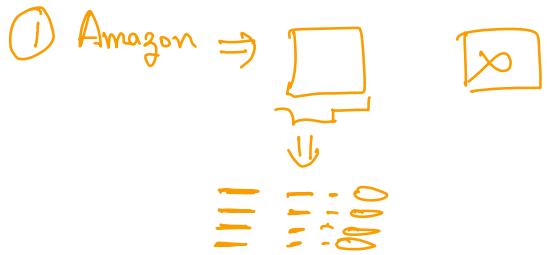


DEVELOPMENT

- We can use Python to create web applications on many levels of complexity
- There are many excellent Python frameworks like Django, FastAPI and Flask for this purpose

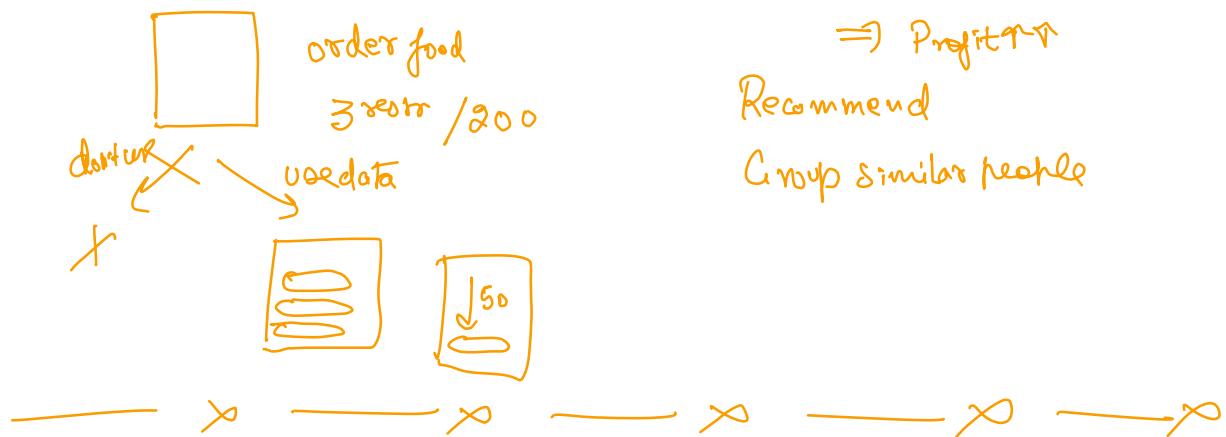
 Data  
Value

3<sup>rd</sup> Year



Harry + Fantastic Beast

② Swiggy / Zomato



Business decision

$\Rightarrow$  Profit ↑

Recommend

Group similar people

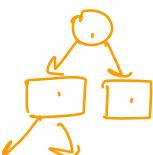
DSA

Struct



String int char

Algorithm

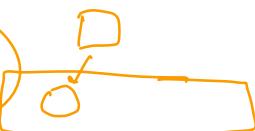


Zoom

$\rightarrow$  Raising

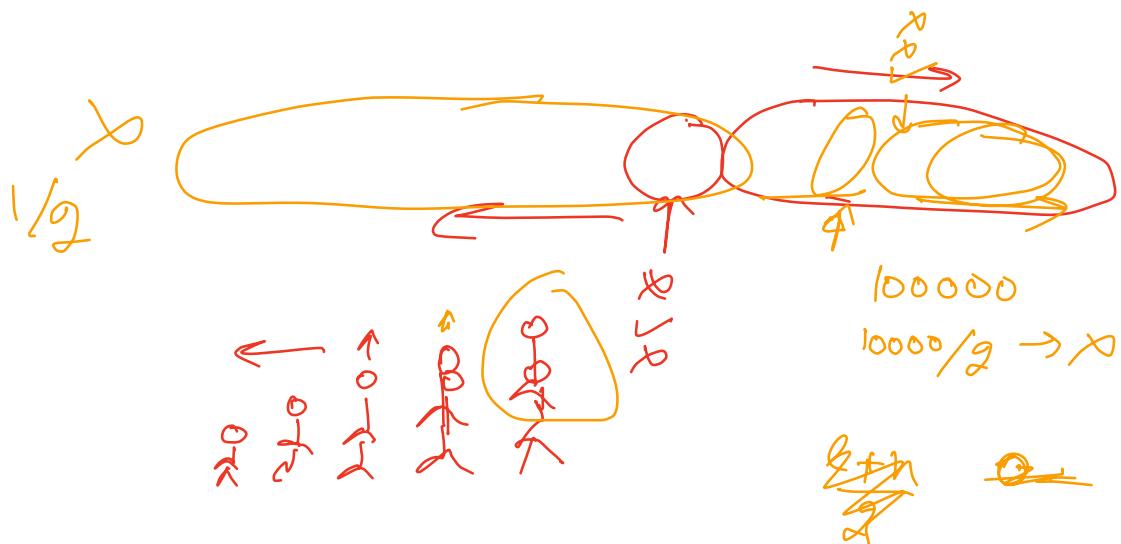


A  $\rightarrow$

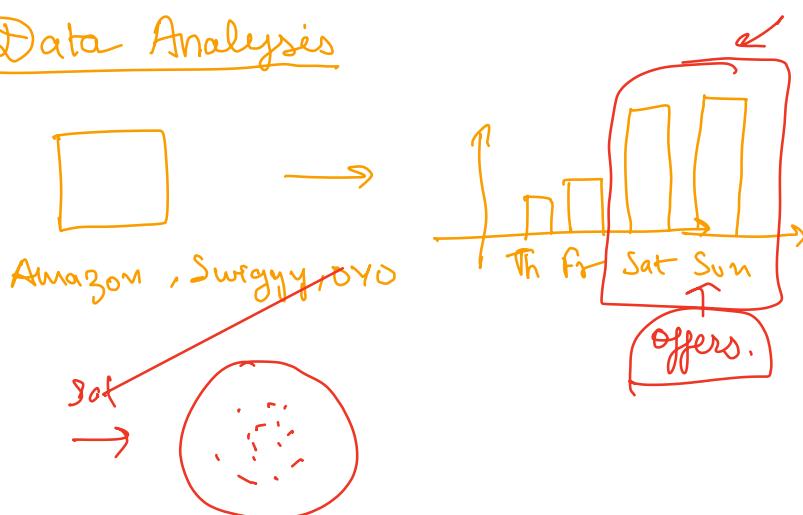


$10^{10}$  numbers       $\log_2(10)$   
 $\rightarrow 10^{10}$  comparison      10 comparisons.

$\mu$   
 $\sigma$



### Data Analysis



Swaggy

7-9 am  
12-3 pm  
7-9 pm

}  $\Rightarrow$  offers.



Open Time

User < > hotel inside

Close Time

User < > hotel < > time

User < > hotel

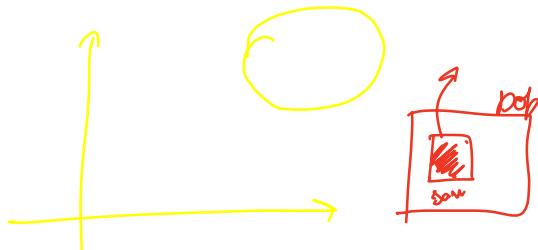
User < > hotel < > looking

\* 1 million

Data Analysis

vs

Data Science



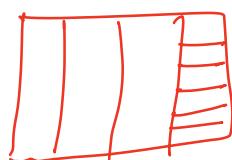
DAU  
MAU

Bur  
Rev/

EBITDA

Mathematics  
(insights)

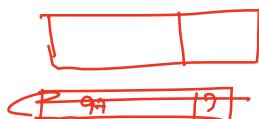
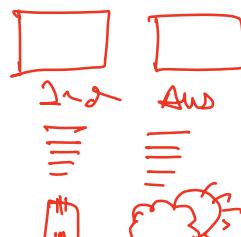
Data Science



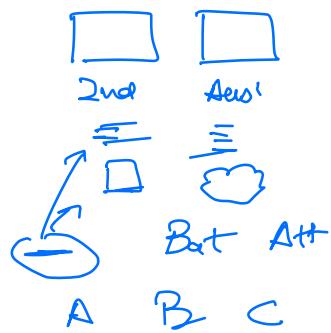
Goal

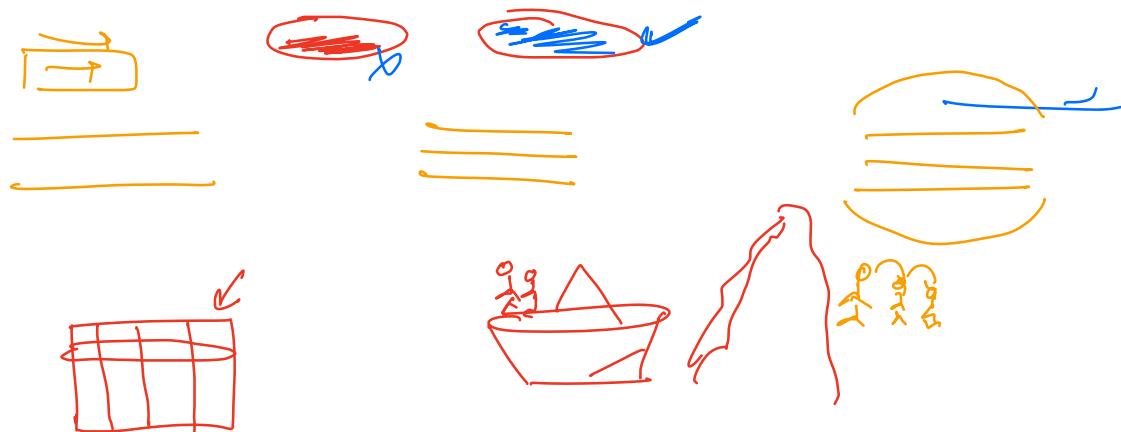
Team  $\Rightarrow$  Stadium  
Best 11

ML  
Prediction

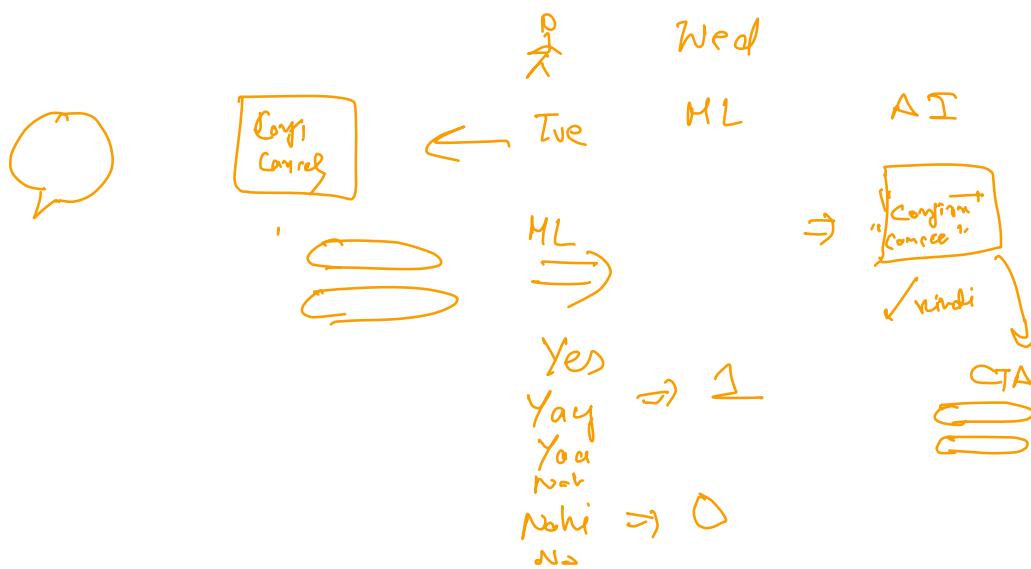
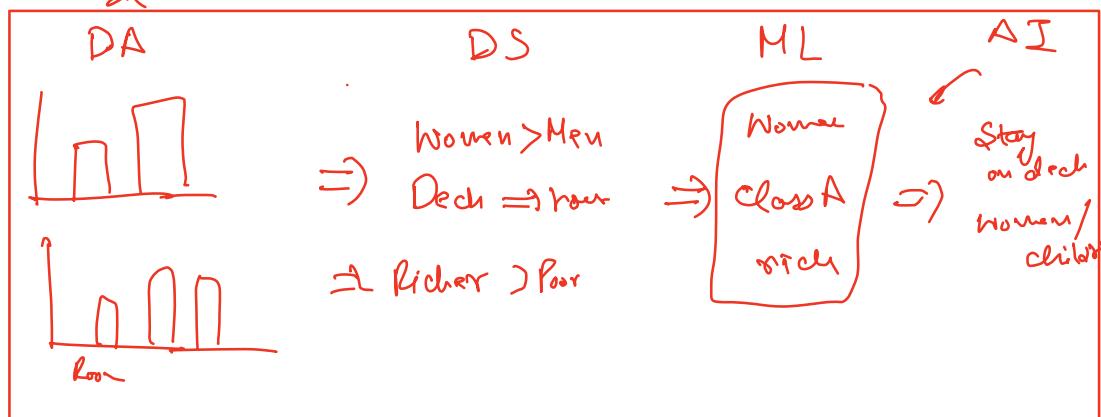


AI  
Smart coach





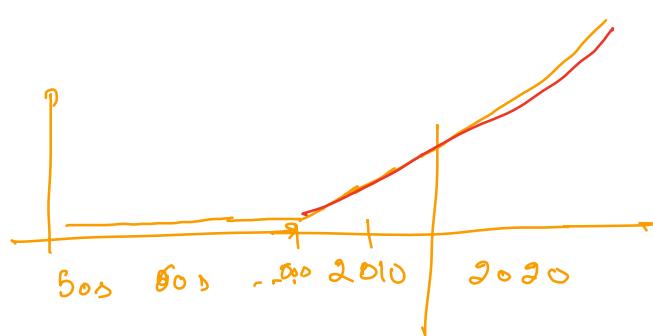
 → Live / Die



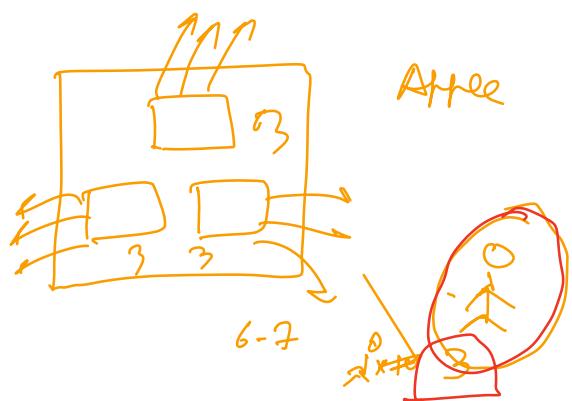
AI

ML

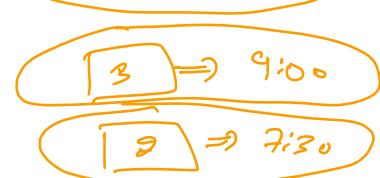
Data  
Science



2015      Data Scientist



After

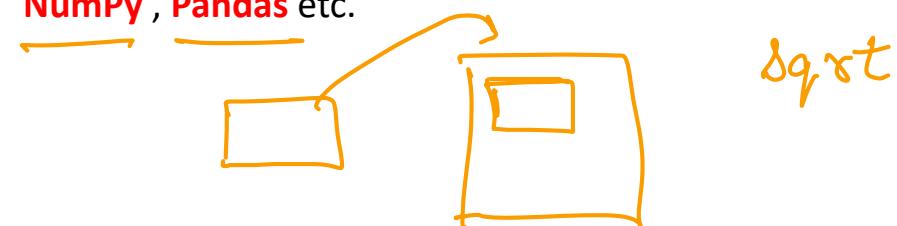


Data

# Data Analysis In Python



- Data Analysis is about making predictions with data
- Python is the leading language of choice for many data scientists
- It has grown in popularity due to it's excellent libraries like NumPy , Pandas etc.



# Machine Learning In Python



Machine learning is a field of AI (**Artificial Intelligence**) by using which **software applications** can learn to increase their accuracy for the expecting outcomes.

It is heavily used in **Face recognition** , **music recommendation** , **medical data** etc.

Python has many wonderful libraries to implement ML algos like **SciKit-Learn** ,  
**Tensorflow** etc.

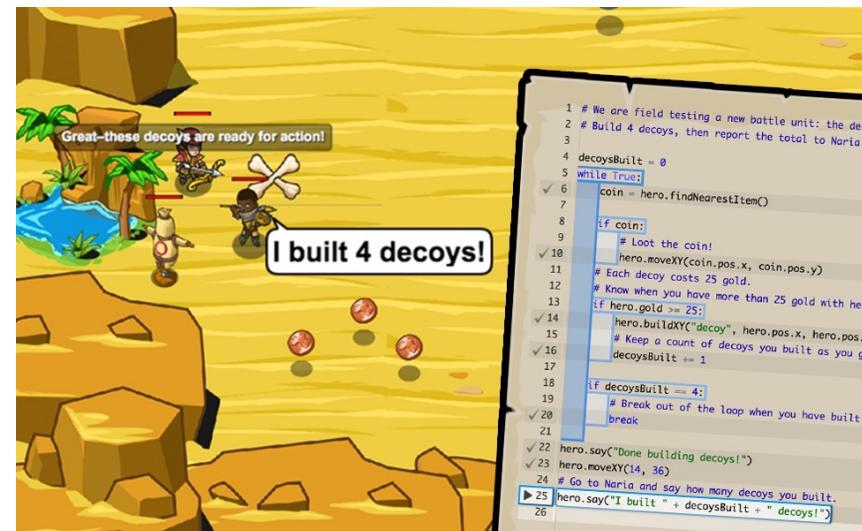
**maths**  
**Linear algorithm**

# Game Development In Python

We can write whole games in **Python** using  
**PyGame**.

Popular games developed in Python are:

**Bridge Commander**  
**Civilization IV**  
**Battlefield 2**  
**Eve Online**  
**Freedom Force**



# Why should I learn Python ?

Most popular programming

Opens lots of doors

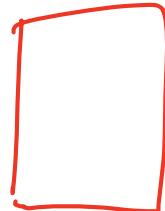
Big corporates prefer Python

Means **PYTHON IS THE FUTURE**

TIOBE Index 2022

Programming Language	Ratings	Change
 Python	17.18%	+5.41%
 C	15.08%	+4.35%
 Java	11.98%	+1.26%
 C++	10.75%	+2.46%
 C#	4.25%	-1.81%
 Visual Basic	4.11%	-1.61%
 JavaScript	2.74%	+0.08%
 Assembly language	2.18%	-0.34%
 SQL	1.82%	-0.30%
 PHP	1.69%	-0.12%

# Who uses Python today ?



Who all are using Python?



The slide displays a collection of company logos, each associated with Python usage. The logos are arranged in three rows: the top row includes NASA, Yahoo!, Google, and YouTube; the middle row includes reddit, BitTorrent, IBM, and Dropbox; the bottom row includes Red Hat, Canonical, Netflix, and Quora. A small Mozilla Firefox logo is also centered at the bottom. Above the logos, the text "Who all are using Python?" is written in a light gray box. Below the logos, the text "and the list goes on..." is centered.

and the list goes on...

Almost  
all companies.

# Features Of Python

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- Simple
- Dynamically Typed
- Robust      Strong
- Supports multiple programming paradigms
- Compiled as well as Interpreted
- Cross Platform
- Extensible
- Embedded
- Extensive Library

# Simple

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- **Python** is very simple
- As compared to other popular languages like **Java** and **C++**, it is easier to code in **Python**.
- **Python** code is comparatively 3 to 5 times smaller than **C/C++/Java** code

# Print Hello World!



IN C

```
#include <stdio.h>
int main(){
    printf("Hello World!");
    return 0;
}
```



IN JAVA

```
public class HelloWorld{
    public static void main( String[] args ) {
        System.out.println( "Hello World!" );
    }
}
```



IN PYTHON

```
print('Hello World!')
```

print('Hello World!')

# Swap 2 Nos



**C**

IN C

```
int a=10,b=20,temp;  
temp=a;  
a=b;  
b=temp;
```

**Java**

IN JAVA

```
int a=10,b=20,temp;  
temp=a;  
a=b;  
b=temp;
```

**python**

IN PYTHON

```
a,b=10,20  
a,b=b,a
```

int  
float

swap

no.

$A \Rightarrow 01010$

$65 \Rightarrow$  [ ]

a b  
x y z

$A = \underline{101010}$  ← ~~000~~

~~000~~

$\wedge$

int	str	char
1, 2, 3	mayank	A, B, C

int  $a = 10$

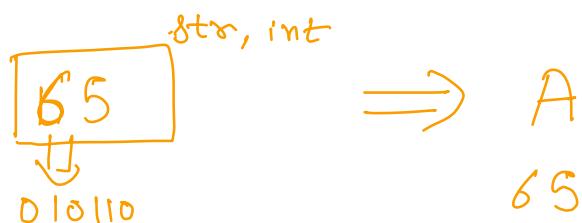
$a = 10$

$a = 15 \quad \checkmark$

$a = "mayank"$

$o = 16 \quad \checkmark$

$a = "mayank" \times$



# Dynamically Typed

## Dynamically typed vs Statically typed

### Statically Typed (C/C++/Java)

- Need to declare variable type before using it
- Cannot change variable type at runtime
- Variable can hold only one type of value throughout its lifetime

### Dynamically Typed – Python

- Do not need to declare variable type
- Can change variable type at runtime
- Variable can hold different types of value throughout its lifetime

$a = 10$  ↴

$a = "moyank"$

# Dynamically Typed

---

IN C

int a;  
a=10; → ✓  
a="World"; ↗ error

IN Python

a=10 ✓  
a="World" ✓

# Robust

10

“10”

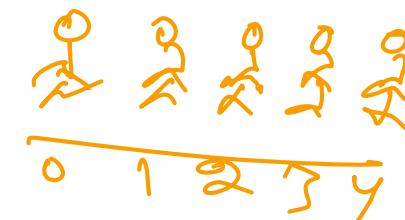
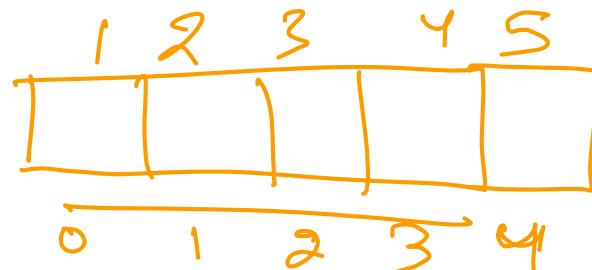
Python has very strict rules which every program must

compulsorily follow and if these rules are violated then Python terminates the code by generating “Exception”

To understand python's robustness , guess the output of the

following /C++ code:

```
int arr[5];
int i;
for(i=0;i<=9;i++)
{
    arr[i]=i+1;
}
```

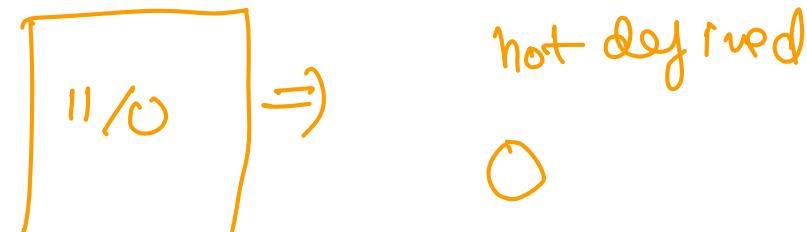
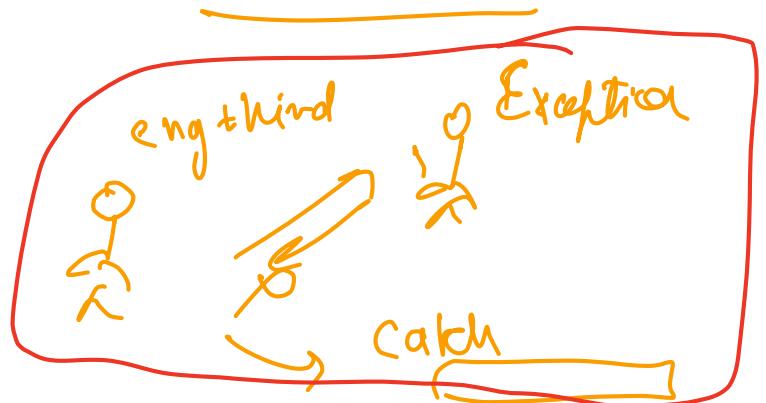


# Python exceptions

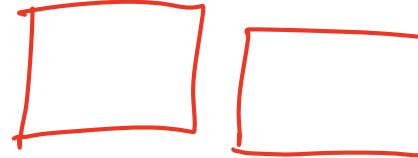
In Python if we write the same code then it will generate **Exception** terminating the code

Exception :- array index of range

Due to this other running programs on the computer do not get affected and the system remains safe and secure



# Supports Multiple Programming Paradigms



Python supports both procedure-oriented and object-oriented programming which is one of the key python features.

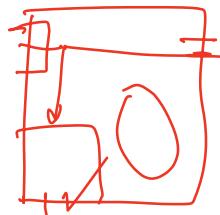
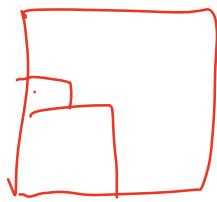
*pack*

In procedure-oriented languages, the program is built around procedures or functions which are nothing but reusable pieces of programs.

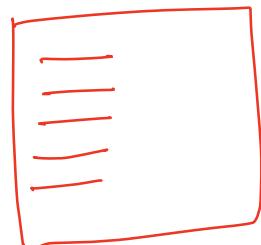
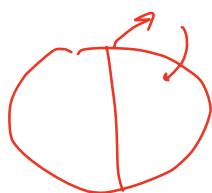


In object-oriented languages, the program is built around objects which combine data and functionality.

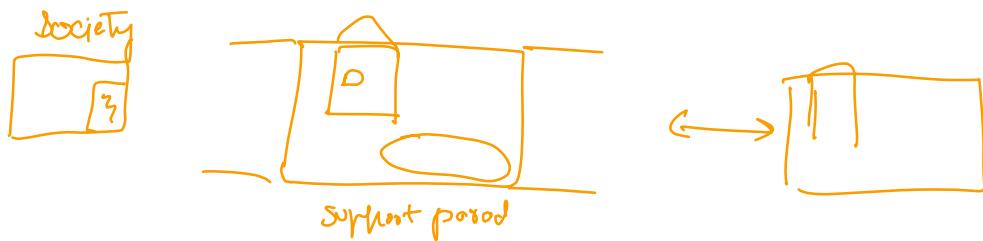




wash our  
hands

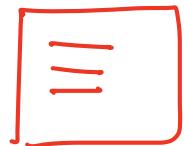


programming paradigms ⇒ OOPS  
⇒ Functional  
⇒ \_\_\_\_\_

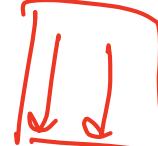


# Compiled As Well As Interpreted

Python uses both a compiler as well as interpreter for converting our source and running it

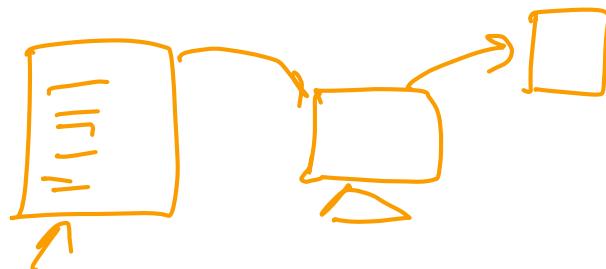


Interpreter



Compiler

However, the compilation part is hidden from the programmer, so mostly people say it is an interpreted language

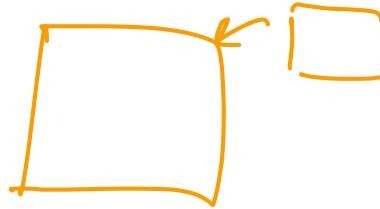


# Cross Platform

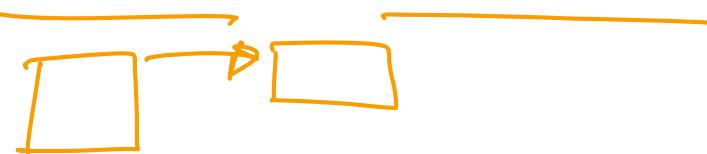
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- Let's assume we've written a Python code for our **Windows machine**.
- Now, if we want to run it on a **Mac**, we don't need to make changes to it for the same.
- In other words, we can take one code and run it on any machine, **there is no need to write different code for different machines**.
- This makes Python a **cross platform language**

# Extensible

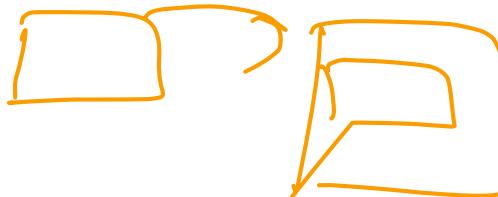


- Python allows us to call C/C++/Java code from a Python code and thus we say it is an extensible language
- We generally use this feature when we need a critical piece of code to run very fast .
- So we can code that part of our program in C or C++ and then use it from our Python program.



# Embedded

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- We just saw that we can put code in other languages in our Python source code.
- However, it is also possible to put our Python code in a source code in a different language like C++.
- This allows us to integrate Python feature into our program of the other language.

# Extensive Library

numpy  
Pandas  
Scikit-learn  
matplotlib

- The Python Standard Library is huge indeed.
- It can help you do various things like Database Programming , E-mailing ,GUI Programming etc

Community Support  $\Rightarrow$   
Gen AI  $\xrightarrow{\text{Eng}}$

Eng & Hindi

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Thank you

