Analytics Club IITM
Data Science and Deep Learning

COMPUTER VISION AND INTELLIGENCE GROUP

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INTRO TO PYTHON

WEBOPS AND BLOCKCHAIN CLUB
IIT MADRAS

THE PROGRAMMING CLUB

What is Python?

Python is a high level programming languange created by Guido Van rossum. (Now he works for microsoft :))

Why Python?

It's easier to learn and use in comparison to other languages like C++ or Java, due to its simpler syntax.

It has a huge, rapidly growing supportive community

It has a large number of libraries and frameworks made by third parties. This makes it even easier to use python

"HELLO WORLD"

print("HELLO WORLD")

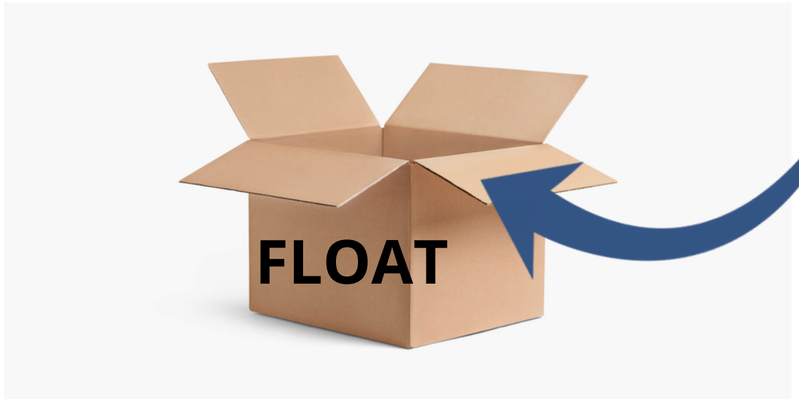
The print() function prints the specified message to the screen.

CONTENTS

- Data types
- Operators
- Conditional Statements
- Loops
- Functions
- Classes
- Lists
- Tuples
- Dictionary
- Python Library

Data Types

- Variables are classified using data types
- Each data type gives a variable different properties
- Using data types lets us know what is expected from each variable;



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The most commonly used data types are :

Numeric:

- int (integers)
- float (decimal values)
- Complex

Strings (characters, words and sentences)

Bool (boolean values, i.e. True or False)

Sequential Data Types:

- list
- tuple
- range
- set (Sets)

dict (Dictionaries)

OPERATORS

Operators perform processes on variables and constants

There are mainly 3 types of operators

1)Arithmetic operators (+,-,/,*,%,**)
2)Comparison operators (<.>,==)
3)Logical operators(AND, OR,NOT)

CONDITIONAL STATEMENTS

Conditional Statements are used in decision making.

The 3 keywords used in conditional statements are :

- If
- Elif
- Else

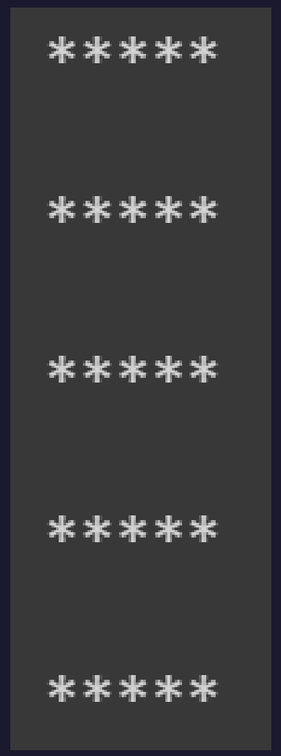
LOOPS

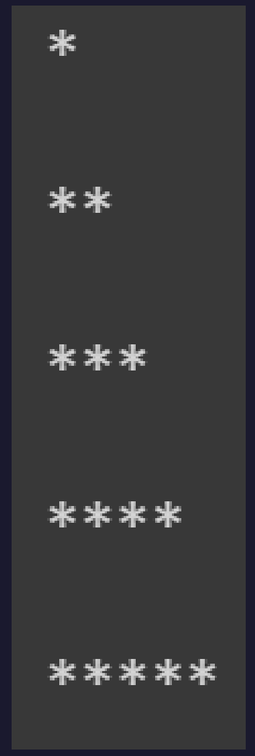
Looping means repeating
something over and over until
a particular condition is
satisfied.

There are 2 types of loops in Python

- For loop - When no. of iterations are known.
- While loop - When no. of iterations are not known.
  Loop is terminated based on criteria.

LOOPS





FUNCTIONS

Imagine a situation where , there are 10 different pairs of numbers and you want to find the sum of those pairs of numbers.

Is there a shorter way to do this ?

FUNCTIONS

- Functions are modules of code that accomplish a specific task.
- A function executes only when it is called.
- Functions usually take inputs (data), process it, and output (or return) result. Once a function is written, it can be used over and over again.

Arguments

The input values that we give to the function are called argument.
The arguments must always be passed in the order it is defined in the function unless it is defined in the function

Types of arguments :

- **Default arguments :**
  we can mention the default value of the parameter , when the argument is not passed to the function.
- **Keyword arguments :**
  In this type, we can pass the arguments along with the name of the parameter and hence the ordering is not important.

CLASSES AND OBJECTS

WHAT ARE OBJECTS?

WHAT ARE OBJECTS?

Chromium tyres

Orange paint

Iridium tip

WHAT ARE CLASSES?

Classes contain blueprints that are used to make objects

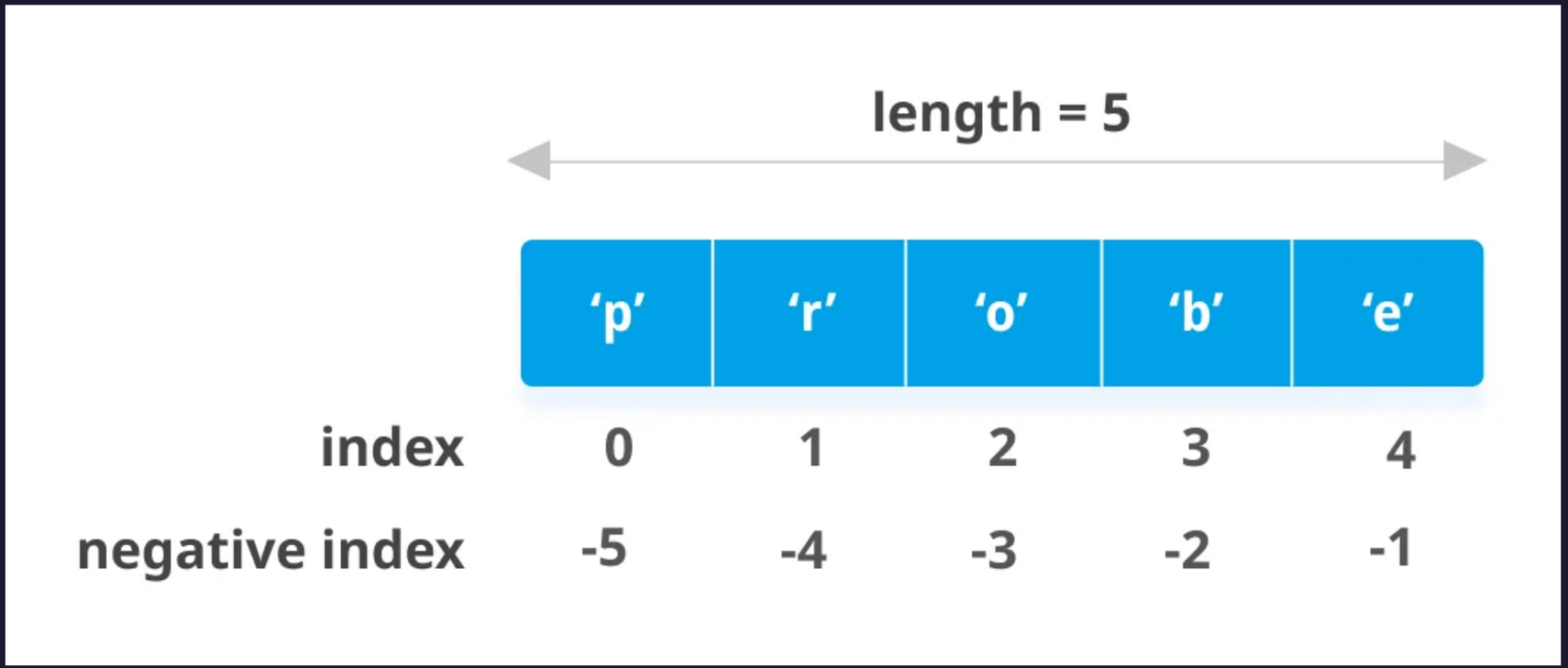
For eg.
lets make a car (object).
we need some basic info like color, brand etc ie the blue print(classes)

- Classes are made of two things
  fields or attributes.
  eg. Color of the car etc.

- Methods.
  eg.Driving modes in the car.

Lists

A list is a collections of entries that is ordered and can be changed. They also allow duplicate entries. Entries of a list don't need to be of the same datatype.



Tuples

- A tuple is a collection of entries which are ordered in the same way as lists but cannot be changed.

- All the regular list operations apply to tuples except for those which attempt to change it's own value

Dictionaries

A dictionary is a collection of key value pairs which is ordered, changable and does not allow duplicate members.

In dictionaries,keys are immutable and the values are mutable

Name	Phone Number
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Dale Hassur	(340) 593-7208
Rutter Maddra	(447) 289-2223
Rosemarie Trett	(647) 592-9991
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Anna-diane Abra	(310) 788-2541
Renard De Rugg	(757) 544-0020
Felecia Guillet	(413) 838-3183
Jolie Juanico	(206) 172-8987
Hedi McMurtyr	(759) 206-9814
Portie Andino	(897) 243-2551

List Vs Set Vs Dictionary Vs Tuple

Lists	Sets	Dictionaries	Tuples
List = [10, 12, 15]	Set = {1, 23, 34} Print(set) -> {1, 23,24} Set = {1, 1} print(set) -> {1}	Dict = {"Ram": 26, "mary": 24}	Words = ("spam", "egss") Or Words = "spam", "eggs"
Access: print(list[0])	Print(set). Set elements can't be indexed.	print(dict["ram"])	Print(words[0])
Can contains duplicate elements	Can't contain duplicate elements. Faster compared to Lists	Can't contain duplicate keys, but can contain duplicate values	Can contains duplicate elements. Faster compared to Lists
List[0] = 100	set.add(7)	Dict["Ram"] = 27	Words[0] = "care" ->Type Error
Mutable	Mutable	Mutable	Immutable - Values can't be changed once assigned
List = []	Set = set()	Dict = {}	Words = ()
Slicing can be done print(list[1:2]) -> [12]	Slicing: Not done.	Slicing: Not done	Slicing can also be done on tuples
Usage: Use lists if you have a collection of data that doesn't need random access. Use lists when you need a simple, iterable collection that is modified frequently.	Usage: - Membership testing and the elimination of duplicate entries. - when you need uniqueness for the elements.	Usage: - When you need a logical association b/w key:value pair. - when you need fast lookup for your data, based on a custom key. - when your data is being constantly modified.	Usage: Use tuples when your data cannot change. A tuple is used in comibnation with a dictionary, for example, a tuple might represent a key, because its immutable.

Python Libraries

- NumPy
- Pandas
- OpenCV
- Matplotlib
- Scipy
- Tensorflow
- PyTorch

and many more...

When you finish writing your code and find out there's already a library which does it.