"PYTHON"

CODING BUGS NOTES GALLERY

I want to speak with the computer

Language = Python

- Guido van Rossum
- 1991.

Syntax:-

import pandas as pd.

Programming language application :-

Gaming, Banking, Machine learning

Basic variables.

Data → collection of the facts.

Ex: My name is poorna.

How to store the data

"Poorna" → string

56 → Integer

True/False → Boolean

variables.

Data/values can be stored in temporary storage spaces called variables.

Student = "Poorna"

Name associated & address associated

Student → Name of the variable.

10 = a } a+b = 30
20 = b } a-b = -10 multiple operations
a*b = 200 on variables
a/b =

3) Decision Making statements.

if	else
it's raining :	go out and play
sit inside	

if	else
marks > 70 :	give practice test
Get ice-cream	

if --- else pseudo code

```
if(condition){
statements to be executed
}

else{
statements to be executed
}
```

If the "if" condition is true
at that time it will execute the statements
inside if
else if it is false
It will execute the statements inside else

4) looping statements.

are used to repeat a task multiple times.

While, Repeat, each

While loop pseudo code

```
while(TRUE){
 keep executing statements
 }
```

5) Functions in programming

Function is a block of code which performs a specific task.

6) OOP concepts.

I am surrounded with the objects

Mobile, laptop, bag, bike, dog, cat

object have
- → Property
- → Behaviour

class is a template for real world entities.

Phone

Properties	Behaviour
* color	* Make calls
* cost	* we can text
* Behaviour	* Watch video
	* Play games

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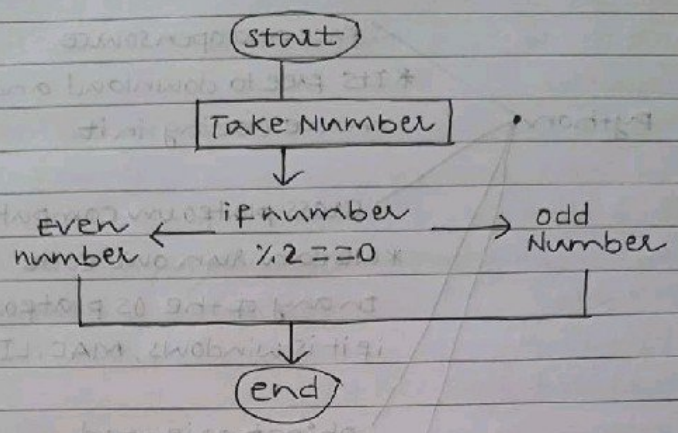
object
It has a specific template
* objects are specific instances of a class

Phone would be the class
specific instances would be the objects
Brands of phone Apple
samsung
Nokia
google pixel
Tesla
Apple is the brand of phone which is object
o/p b/w objects
All having
Different values for properties
Different values for Behaviour

6) Algorithmic approach to solve problem:
step by step approach
to solve a problem is known as Algorithm.

input —— steps to be followed —— output

Algorithm to find if number even/odd.



7 Introduction to python.

Python

- free and open source
  * Its free to download and to make coding in it
- cross platform compatible
  * we can run our code in any of the OS platform if it is windows, MAC, LINUX
- object oriented
  * By using the object we can get solution for the problem
- large standard library
  It provides much more libraries which, we are in need

IDE - Integrated Development Environment
Python, Pycharm, Anaconda
↓ webpage Distribution

8) Intro to Jupyter notebook.

kernel executes the program.

Print(" This is poorna")
This is poorna

9) Variables and Data-types in python.

variables.

a = "Poorna"
a 'a' is a variable
→ Poorna
a = "chandru"
a
→ chandru
a = "Gowda"
a
→ Gowda

Data types in python
every variable is associated with the data'

1) Integers (int) Integer values
1, 2, 3, 4, 5, 100, 1000, 999

2) Float →
6.19, 3.14, 9.32, 8.674

3) Boolean →
True, False

4) String (" " mention it inside double quote)
"Poorna" 'Chandru' 'Earth'

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* a1 = 100
a1
→ 100
type(a1)
→ int

* a1 = 3.14
a1
→ 3.14
type(3.14)
→ Float

a1 = 3.14
type(a1)
→ Float

* a1 = True
a1
→ True
type(a1)
→ Bool

* a1 = "Poorna"
a1
→ 'Poorna'
type(a1)
→ Str

* Complex number
Both Real and Imaginary part
a1 = 6+9j
a1
→ 6+9j
type(a1)
→ complex

(10) operators in python:

Arithmetic operator
Relational operator
logical operator
we can perform various types of operations by using above mentioned operators.

Arithmetic operator
a=10
b=20
Arithmetic or mathematic operations
(+, −, *, /)
a+b → 30 (10+20)
a−b → −10 (10−20)
b−a → 10 (20−10)
a*b → 200 (10*20)
a/b → 0.5 (10/20) → we should use forward slash

Relational operators
(>, <, ==, !=)
a=10
b=20
a>b → False, b>a → True (20>10)

a<b → True (10<20)

a==b → False (10 is not equal to 20)

a!=b → True

a=100
b=100
a==b → True (100==100, a==b)

Logical operators.
→ logical operator "and", "or" and "not"

→ Bitwise operator "&", "|"

& And operator
a= True (1)
b=False (0)
a&b → False
b&a → False
b&b → False
a&a → True

w.r.t the And operator we get a true value only when both the operands are true

| or operator
It will give use the true result when either of the operands is true or both of the operands are true

we will get a False result w.r.t the or operator only when both the operands are false
a= True (1)
b= False (0)
a|b → True (either one value having true)
b|a → True (a is true)
a|a → True (both the operands are true
b|b → False

(11) Tokens in python

smallest meaningful component in a program

Keywords
Identifiers
Literals
operators

(1) Keywords

→ are special reserved words

It will give meaningful Information for the compiler or Interpretter.

False	class	Finally	is	Return
None	continue	For	lambda	Try
True	def	From	Nonlocal	While
and	del	Global	Not	with
as	elif	If	or	yield

(2) Identifiers.

are names used for variables, functions or objects

Rules →

No special character except _ (identifiers)

Identifiers are case sensitive

First letter cannot be a digit

Poorna is his Identifier

Poorna is being Identified by his name

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③ Python literals

→ constants in python (Donot change)

a1 = "Poorna" → It is a string literal

↳ a1 is a variable

a1 = 123 → Numeric literal

a1 = True → Boolean literal

⑫ Strings in python

→ are sequence of characters enclosed within single quotes (' '), double quotes (" ") or triple quotes (''' ''')

'Hello world'

" This is poorna"

''' I am going to kerala tomorrow '''

b1 = 'Hello world'

b1 → 'Hello world'

b1 = " This is poorna"

b1 → ' This is poorna'

b1 = ''' This is a multiline
string
'''

b1 → ' this is a multiline\nstring\n'

Extracting the Individual characters.

Indexing in python starts with 0, not 1.

```
                 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
My_string = "My_name_is_poorna
                -17 -16 -15 -14 -13 -12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1
```

My_string[0] → 'M'

My_string[-1] → 'a'

My_string[4] → 'n'

I want to extract name

So the indexing is done like this

n starts with 3

ends with e → 6

_ → 7

The first element would be inclusive (n)

The last element would be exclusive (_)

My_string[3:7] → 'name'

* Now I want poorna

My_string[11:17] → 'Poorna'

String Functions.

len(My_string) → 17

My_string.upper() → 'MY NAME IS POORNA'

My_string.lower() → 'my name is poorna'

* Replacing a substring

my_string.replace("y","a")
→ 'Ma name is poorna'

* Number of occurrences of substring

new_string = "hello hello hello world"
new_string.count("hello")
→ 3

* Finding the Index of substring

s1 = "This is poorna"
s1.find("poorna")
→ 8

* Splitting a string

fruit = "I like apples, Mangoes, banana, grapes, cherries"
fruit.split(", ")
→ ['I like apples', 'Mangoes', 'banana', 'grapes', 'cherries']

(13) Tuples in python.

Data-structures in python

- → Tuple
- → List
- → Dictionary
- → set

Tuple

is an ordered collection of elements enclosed within ()

* Tuples are Immutable
  once you create the tuple, you can't change the value inside the tuple
* Heterogenous mixture of different elements.

#Tuple

tupl = (100, "b", True, "c", False)

tupl → (100, 'b', True, 'c', False)

type(tupl) → tuple.

Extract Individual elements

tupl[0] → 100

tupl[1] → 'b'

tupl[-1] → False

tupl[1:3] → 'b', True

tupl[2] = "hello"

we will get error "tuple" object does not support item assignment.

* Finding length of Tuple

```
tup1 = (100, "b", True, "c", False)
len(tup1) → 5
```

* Concatenating tuples

```
tup1 = (1, 2, 3)
tup2 = (4, 5, 6)
tup1 + tup2
→ (1, 2, 3, 4, 5, 6)
```

* Repeating Tuple elements

```
tup1 = ("Poorna", 300)
tup1*3
→ ('Poorna', 300, 'Poorna', 300, 'Poorna', 300)
```

* Reapeating and concatenating

```
tup1 = ("Poorna", 300)
tup2 = (4, 5, 6)
tup1*3 + tup2
→ ('Poorna', 300, 'Poorna', 300, 'Poorna', 300, 4, 5, 6)
```

* Tuple Functions.

minimum value

```
tup1 = (1, 2, 3, 4, 5)
min(tup1)
→ 1
```

Maximum value

```
tup1 = (1, 2, 3, 4, 5)
max(tup1)
→ 5
```

(14) List in python.

list is an ordered collection of elements enclosed within [ ]

* lists are mutable

we can add, subtract, multiply values inside the list.

```
l1 = [1, "Poorna", 3.14, True, 5+9j]
type(l1) → list
```

* Extracting Individual elements

```
l1[-1] → 5+9j
l1[1:4] → ['Poorna', 3.14, True]
```

* Modifying a list

changing the element of 0th index

```
l1 = [1, "a", 2, "b", 3, "c"]
l1[0] → 100
l1 →
  ['100', 'a', 2, 'b', 3, 'c']
```

Appending a new element

```
l1 = [1, "a", 2, "b", 3, "c"]
l1.append("poorna")
l1
→ [1, 'a', 2, 'b', 3, 'c', 'Poorna']
```

Popping the last element

```
l1 = [1, "a", 2, "b", 3, "c"]
l1.pop()
l1
→ [1, 'a', 2, 'b', 3]
```

* Reversing elements of a list

```
L1 = [1, "a", 2, "b", 3, "c"]
L1.reverse()
L1
→ ['c', 3, 'b', 2, 'a', 1]
```

* Inserting element at a specified index

```
L1 = [1, "a", 2, "b", 3, "c"]
L1.insert(1, "poorna")
→ [1, 'poorna', 'a', 2, 'b', 3, 'c']
```

* Sorting a list

```
L1 = ["Mango", "cherry", "banana", "guava"]
L1.sort()
→ ['banana', 'cherry', 'guava', 'Mango']
```

* Concatenating lists

```
L1 = [1, 2, 3]
L2 = ["a", "b", "c"]
L1+L2
→ [1, 2, 3, 'a', 'b', 'c']
```

* Repeating elements

```
L1 = [1, "a", True]
L1*3
→ [1, 'a', True, 1, 'a', True, 1, 'a', True]
```

(15) Dictionary in python.

is an unordered collection of key-value pairs enclosed with { }

* Dictionary is mutable

key ← pair → value

```
fruit ={"apple":50,"banana":30,"orange":40,"peach":100}
type(fruit) ⟶ dict
```

* Extracting keys

```
fruit ={"apple":50,"banana":30,"orange":40,"guava":60}
fruit.keys()
⟶
dict-keys(['Apple','orange','banana','guava])
```

* Extracting values

```
fruit={"apple":50,"banana":30,"orange":40,"guava":60}
fruit.values()
⟶
dict_values([50,30,40,60])
```

```
fruit.items()
⟶
dict_items([('apple',50),('banana',30),('orange',40),('guava',60)])
```

* Adding a new element.

```
fruit={"Apple":10,"orange":20,"Banana":30}
fruit["Mango"]=50
fruit →
{'Apple':10,'orange':20,'Banana':30,'Mango':50}
```

* Changing an existing element

```
fruit={"Apple":10,"orange":20}
fruit["Apple"]=100
fruit →
{'Apple':100,'orange':20}
```

* update one dictonary's element with another

```
fruit1={"Apple":10,"orange":20}
fruit2={"cherry":30,"Banana":40}

fruit.update(fruit2)
fruit1 →
{'Apple':10,'orange':20,'cherry':30,'Banana':40}
```

* Popping an element (Removing)

```
fruit={"Apple":10,"orange":20,"Banana":30}
fruit.pop("orange")
fruit →
{"Apple':10,'Banana':30}
```

Set in python

Set is an unordered and unindexed collection of elements eclosed with { }

* Duplicates are not allowed in set

```
S1 = {1, "Poorna", "Poorna", 1}
S1 ⟶
{1, "Poorna"}
```

We can see, duplicates are not allowed in set

Set operations.

* Adding a new element

```
S1 = {1, "a", True, 2, "b", False}
S1.add("Hello")
S1 ⟶
{1, 2, False, 'Hello', 'a', 'b'}
```

→ There is no proper sequence in set so the indexing is not possible in sets.

* Updating multiple elements

```
S1 = {1, "a", True, 2, "b", False}
S1.update([10, 20, 30])
S1 ⟶
{1, 10, 2, 20, 30, False, 'a', 'b'}
```

* Removing an element

```
S1 = {1, "a", True, 2, "b", False}
S1.remove("b")
S1
{1, 2, False, 'a'}
```

set functions.

* union and Intersection

* union

s1 = {1, 2, 3}

s2 = {"a", "b", "c"}

s1.union(s2) ⟶

{1, 2, 3, 'a', 'b', 'c'}

Basically concatenating two sets.

* Intersection

s1 = {1, 2, 3, 4, 5, 6}

s2 = {5, 6, 7, 8, 9}

s1.intersection(s2) ⟶

{5, 6}

To find out the common elements between two sets.

If statement in python

* If statement

if
it's raining
sit inside

else
go out and play

①
```
a=10
b=20
if a>b:
    print("a is greater than b")
if b>a:
    print("b is greater than a")

if a>b:
    print("a is greater than b")
else:
    print("a is not greater than b")
```

Run →

```
a is not greater than b
```

else if → we will use it when
we want to check the multiple statements.

② a=10
b=20
c=30
if(a>b and & a>c):
    print("a is the greatest")
elif (b>a & b>c):
    print("b is the greatest")
else:
    print("c is greatest")
Run → c is the greatest

* Now can see how can we use this Conditional statements with List, Tuple and dictionary

→ tupl=(1,2,3,4) (with tuple)
if 2 in tupl:
    print("2 is present in tuple")
Run → 2 is present in tuple

→ tupl=(1,2,3,4)
if 6 in tupl:
    print("6 is present in tuple")
else:
    print("6 is not present in tuple")
Run → 6 is not present in tuple

with list if with list

```
* li = [1,2,3,4,5]
  if li[1]==2:
      li[1]=li[1]+100
  li → [1,102,3,4,5]

* li=[1,2,3,4,5]
  if li[4]==10:
      li[1]=li[1]+100
  else:
      li[4]=li[4]+500
  li → [1,102,3,4,505]
```

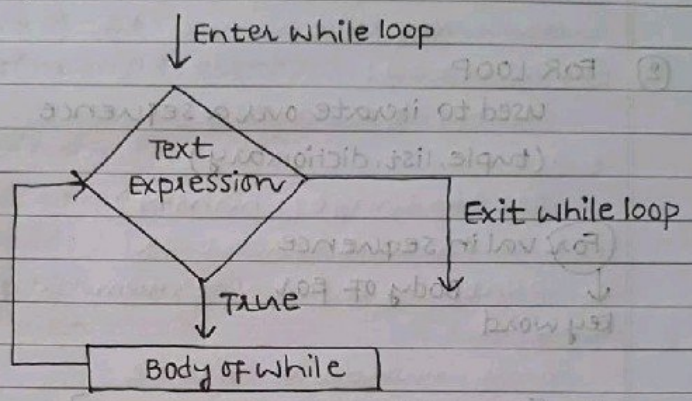
if with dictionary

```
* dl = {"a":1,"b":2,"c":3}
  if dl["b"]==2:
      dl["b"]=dl["b"]+100
  dl → {'a':1,'b':102,'c':3}
```

LOOPING STATEMENTS IN PYTHON:

used to repeat a task multiple times.

① while loop =



Syntax

```
while condition :
        Execute statements
```

*
```
i=1
while i<=10:
    print(i)
    i=i+1
```

→ 1 2 3 4 5 6 7 8 9 10

*
```
i=1
n=2
while i<=10:
    print(n,"*",i,"=",n*i)
    i=i+1
```

→
2*1 = 2
2*2 = 4
2*3 = 6
2*4 = 8
2*5 = 10
2*6 = 12
2*7 = 14
2*8 = 16
2*9 = 18
2*20 = 40
2*10 = 20

```
* L1 = [1,2,3,4,5]; i=0
while i < len(L1):
    L1[i] = L1[i] +100
    i=i+1
L1 ⟶ [101, 102, 103, 104, 105]
```

② FOR LOOP

used to iterate over a sequence

(tuple, list, dictionary)

```
For val in sequence
↓          Body of for
keyword
```

```
* L1 = ["apple", "Banana", "orange"]
for i in L1:
    print(i)
⟶ apple
  banana
  orange
```

* nested for loop

```
L1 = ["orange", "blue", "green"]
L2 = ["book", "chair", "phone"]
for i in L1:
    for j in L2:        ⟶ orange book
        print(i,j)          chair
                            phone
                        blue book
                            chair
                            phone
                        green book
                            chair
                            phone
```

Basic problems in python

① check even or odd :

```
num = int(input("Enter a number: "))
if(num%2)==0:        %→Remainder
    print(num," is even")
else:
    print(num," is odd")
```

→ Enter a number: 5
5 is odd

→ Enter a number: 8
8 is even

② check positive, negative or 0

```
num = float(input("Enter a number: "))
if num>0:
    print("positive number")
elif num==0:
    print("zero")
else:
    print("Negative number")
```

→ Enter a number: 8
Positive number

→ 0
zero

→ Enter a number: -5
Negative number

③ Factorial of a number.

```
num = int(input("Enter a number: "))
factorial = 1
if num<0:
    print("Sorry, Factorial dosen't exist for
          Negative number")
elif num==0:
    print("The Factorial of 0 is 1")
else:
    for i in range(1,num+1):
        factorial = factorial*i
    print("The factorial of", num, "is", factorial)
```

→ Enter a number 4 4x3x2

24

→ Enter a number

3628800

(4) Reversing a number

```
n=int(input("Enter number: "))
rev=0
while(n>0):
    dig=n%10
    rev=rev*10+dig
    n=n//10
print("Reverse of the number:", rev)
```

n = 123 → 321

(5) check if it is a palindrome (12321)

```
n=int(input("Enter a number: "))
temp=n
rev=0
while(n>0):
    dig=n%10
    rev=rev*10+dig
    n=n//10
if(temp==rev):
  print("The number is a palindrome!")
else:
  print("The number is not a palindrome!")
```

	n	rev
121//10 = rem(1)	121	0*10+1 = 0+1 = 01
12//10 = 2	12	1*10+2 = 10+2 = 12
	1	12*10+1 = 120+1 = 121

dig
1
2
1

Enter a number: 121

The number is a palindrome

⑥ Fibonacci 0 1 1 2 3 5 8

```
n=int(input("Enter number: "))
a=0
b=1
if n<0:
    print("Incorrect input")
elif n==0:
    print(a)
elif n==1:
    print(a)
else:
  for i in range(2,n):
      c=a+b
      a=b
      b=c
    print(b)
```

→ Enter a number: 7

8

a	b	c
0	1	1
1	1	2
1	2	3
2	3	5

Functions in python.

Block of code which performs a specific task.

Normal function

Lambda function

Normal function syntax

```
def function_name:
        Execute statements
```

Lambda function syntax

```
Lambda arguements : expression
```

```
def hello():
    print("Hello world")
hello()
Hello world
```

```
def add10(x):        ← parameter
    return x+10
add(10(10)
20
```

keyword

```
def even_odd(x):
    if x%2==0:
        print(x, "is even")
    else:
        print(x, "is odd")
```

→ even_odd(5)

5 is odd

Lambda functions, (filter, map, reduce)

```
g = lambda x: x*x*x
print(g(7))
```

343

Main function of lambda operations

lambda functions with filter takes two parameter

```
li=[5,7,22,97,54,62,77,23,73,61]
final_list=list(filter(lambda x:(x%2!=0),li))
print(final_list)
```

1st 2nd

extracting the odd numbers.

→

[5, 7, 97, 77, 23, 73, 61]

```
#lambda with map

li=[5,7,22,97,54,62,77,23,73,61]
final_list = list(map(lambda x:x*2,li))
print(final_list)
→
[10,14,44,194,108,124,154,46,146,122]

# lambda with reduce
from functools import reduce
li=[5,8,10,20,50,100]
sum= reduce((lambda x,y:x+y),li)
print(sum)
→ 193
```

Object oriented programming

OOPs in python.

we are surrounded with objects
like (mobile, laptop, bike, key, pen, dog, book)

classes :-

class is a template for real world entities

class

Attribute | Properties — Behaviour | Method

Phone

Properties	Behaviour
* color	* Make calls
* cost	* Watch videos
* Battery life	* Play games

class is a user defined datatype
↳ It is a datatype which we can create by ourselves

objects:-

objects are specific instances of a class.

mobile $\xrightarrow{\text{we could have}}$ Apple, nokia, samsung

↓ is our class

different brands

↓

objects of the class phone

Creating the first class.

```
#creating a class phone

class phone :
    def make_call(self):
    print("Making phone call")
    def play_game(self):
    print("playing game")

p1 = phone()

#invoking methods through object
p1.make_call
→ Making phone call
p1.play_game
→ Playing game
```

methods

Referencing call

keyword

name of object

name of object

name of the method

Adding parameters to a class method

```
class Phone:
    def set-color(self, color):
        self.color = color

    def set-cost(self, cost):
        self.cost = cost

    def show-color(self):
        return self.color

    def show-cost(self):
        return self.cost

    def make-call(self):
        print("Making phone call")

    def play-game(self):
        print("playing game")

P2 = Phone()

P2.assign
P2.set-color('blue')
P2.set-colost(500)
P2.show-color() → 'blue'
P2.show-cost() → 500
```

creating a class with constructor

```
class Employee :
    def __init__(self, name, age, salary, gender):
        ↳ init method acts as constructor
                                    ↓
                                spcl type of
                                function
        self.name = name
        self.age = age
        self.salary = salary
        self.gender = gender

    def employee_details(self):
        print("Name of employee is ", self.name)
        print("Age of employee is ", self.age)
        print("salary of employee is ", self.salary)
        print("Gender of employee is", self.gender)

e1 = Employee("Poorna", 23, 1,00,000, 'Male')
↓ instantiating the 'e1' object

e1.employee_details() → Invoking 'employee_details'
                        method.

        Name of employee is poorna
        age of employee is 23
        salary of employee is 1,00,000
        gender of employee is Male
```

Inheritance in python

With Inheritance one class can derive the properties of the another class.

```
class vehicle:
    def __init__(self,mileage,cost):
        self.mileage=mileage
        self.cost=cost

    def show_details(self):
        print("I am a vehicle")
        print("Mileage of vehicle is", self.mileage)
        print("cost of vehicle is", self.cost)

v1=vehicle(500,500)
v1.show_details()
```

→

```
I am a vehicle
Mileage of vehicle is 500
cost of vehicle is 500
```

Creating the child class

```
class car(vehicle):
    def show_car(self):
        print("I am a car")

c1 = car(200,1200)      → Instantiating the object
c1.show_details()         for child class
I am a vehicle
Mileage of vehicle is 200
cost of vehicle is 1200

c1.show_car()           → Invoking the child
I am a car                class method
```

over-riding init method.

```
class car(vehicle):
    def __init__(self, mileage, cost, tyres, hp):
        super().__init__(mileage, cost)
        self.tyres = tyres
        self.hp = hp

    def show_car_details(self):
        print("I am a car")
        print("Number of tyres are", self.tyres)
        print("value of hp is", self.hp)
```

#invoking show_details()
method from parent class

```
c1 = car(20, 12000, 4, 300)
c1.show_details()
```

→

```
I am a vehicle
Mileage of vehicle is 20
cost of vehicle is 12000
```

#invoking show_car_details()
method from child class

```
c1.show_car_details()
```

→

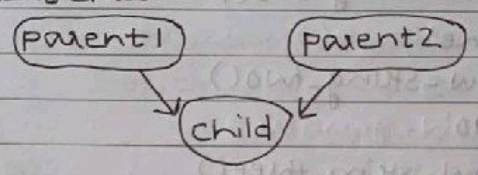
```
I am a car
Number of tyres are 4
value of hp is 300
```

Types of Inheritance

Single Inheritance
Multiple Inheritance
Multi-level Inheritance
hybrid Inheritance

Multiple Inheritance

The child inherits from More than 1 parent class.




```
class parent1():
    def assign_string_one(self,str1):
        self.str1 = str1
                                    (Parent class 1)
    def show-string_one(self):
        return self.str1

class parent2():
    def assign-string_two(self,str2):
        self.str2 = str2
    def show-string_two(self):      (Parent class 2)
        return self.str2

class derived (Parent1, parent2):
    def assign-string_three(self,str3),
        self.str3 = str3
    def show_string_three(self);
        return self.str3
```

creating the object of the child class

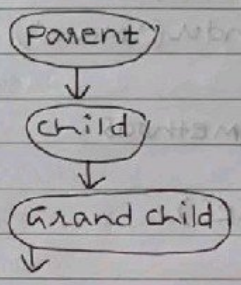
```
d1. Derived
d1.assign-string-one("one")
d1. assign-string-two("two")
d1. assign-string-three("three")
```

Invoking methods

```
d1.show_string-one()
→ 'one'
d1.show-string_two()
→ 'two'
d1.show_string-three()
→ 'three'
```

Multi-level Inheritance

We have parent, child and grandchild Relationship



It have both the properties of child and the parent.

Parent class

```
class parent():
    def assign_name(self,name):
        self.name = name
    def show_name (self):
        return self.name
```

child class:

```
class child(parent):
    def assign_age (self,age):
        self.age = age
    def show_age (self):
        return self.age
```

Grand child class

```
class grandchild(child):
    def assign_gender(self,gender):
        self.gender = gender
    def show_gender(self):
        return self.name
```

g1. ch grandchild()

g1.assign_name("Poorna")
g1.assign_age(25)
g1.assign_gender("Male")

Invoking class methods

g1.show_name()
→ Poorna
g1.show_age()
→ 25
g1.show_gender()
→ Male

Continuation of python

(26) **Array in python**

All the value of same type.

if we have int array, we should only have int array

if we have float array, we should only have float array.

```
import array as ar
ar.array
```

(or) i-signed integer (-1 to +1)

```
from array import *
```

I-unsigned integer

```
vals = array('i',[5,9,8,42])
print(vals)
```

* `print(vals.buffer_info())`

→ (Address, size)

* `print(typecode)`

→ i → we are working with integer

* `from array import *`

```
vals = array('i',[5,9,-8,4,2])
vals.reverse()
print(vals)
```

→ array('i',[2,4,-8,9,5])

```
vals= array('i',[5,9,-8,4,2])
for i in range(5):
    print(i)
```

→ 5
9
-8
4
2

* when we dont know the range

```
for i in range(len(vals)):
    print(vals[i])
```

```
for e in vals:
    print(e)
```

* Can we work with character
  u - unicode

* from array import *

```
vals = array('u',['a','e','i'])
for e in vals:
    print(e) → a
               e
               i
```

* If I want to create a new array using the old array

```
from array import *
vals = ('i',[5,9,8,4,2])
newarr = array(vals.typecode,(a for a in vals))
for e in newarr:                (a*a for a in vals))
 print e
```

---

using while loop

```
while i<len(newarr):
    print(newarr[i])
    i=i+1
```

(27) inserting element in array
searching for element in array
in python

we can create a blank array

```
from array import *
ar = array('i',[])
n = int(input("Enter the length of the array"))
for i in range(5): range(n):
    x = int(input("Enter the next value"))
    ar.append(x)
print(ar)
val = int(input("Enter the value for search"))
k=0
for e in ar:
    if e==val:
        print(k)
        break
    k=k+1
print(ar.index(val))
```

single dimensional
one row and multiple columns

multi dimensional array
multiple rows and multiple columns

Exception Handling

What is

Compile time error → a = hello" (Problem in syntax)

Runtime error → L=[1,2,3]print(L[4])

logical error → 4+4|2 (Problem with logic)
6

Exceptions:- Runtime errors as exception
There is an error occuring during the execution of the particular task

Exception handling.

Keywords -
try:
except :
else: } optional
finally: }

try:-
Contains operations
except:-
What has to be done
Write that code here.

Types of error

1) n,x = 5,6,"Poorna"
value error = too many values to unpack

2) L=[1,2,3]
L[4]
index error = list index out of range

python.org

(3) b=10
a
Name error: name a is not defined.

(4) import poorna
module not found error = no module named 'poorna'

(5) 2+'3'
Type error: unsupported operand type for +
'int' and 'str'.

Program

(*) import math
#enter negetive number to check what happens

```
num=int(input ("Enter number to comput of
        factorial: "))
try:
    print(math.factorial(num))
except valueerror:
    print ("cannot compute the factorial of
        negetive numbers")
```

(*) Program

```
import math

num = int(input("Enter no to compute factorial of : "))
valid_input = false

while not_valid_input:
 true:
        print(math.factorial(num))
        valid_input = True
 except valueerror
        print("cannot compute the factorial
                of negative nos")
        num = int(input("please re-enter: "))
```

(*) Program

```
def getmonth():
    month = int(input("Enter current month (1-12): "));
    if month<1 or month>12
            raise value error
    return month

valid = False
monthname = ("Jan", "Feb", "march", "Ap", "may", "June",
            "July", "Aug", "sept", "Nov", "Dec")
while not valid
    try:
        month = getmonth()
        print("The month you entered is",
                month_name[month-1])
        valid1 = True
    except valueError:
        print("Invalid month only|n")
```

(*) program

```
def getMonth():
    Month=int(input("Enter current month (1-12): "))
    if month<1 or month>12:
        raise ValueError("Invalid Month value")
    return month

valid=False
month_name=("Jan",
            "Dec")
While not valid:
try:
    month=getMonth()
    print("The month you entered is",
          month_name[month-1])
    valid=True
exceptValueError as ev_msg:
    print(ev_msg)
```

↳ This an object of value error

(*) Program

→ Creating my own exception class

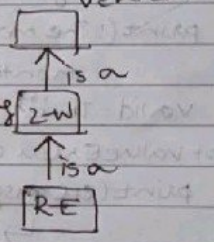
```
class UserDefinedException(Exception):
    def __init__(self,message):
        self.message=message
try:
    s=input("Enter name: ")
    if(s=="") :
        raise UserDefinedException("No empty string Allowed")
    else:
        print(s)
Except UserDefinedExceptionas msg:
    print("Error Message",msg)
```

① Guess the output

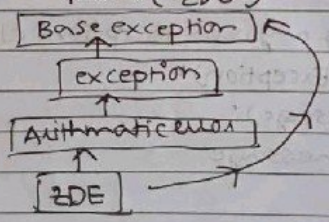
```
try:
    a = 5
    b = 5/0
except ZeroDivisionError:
        print("ZDE")
except BaseException:
        print("BE")
except Exception:
        print("E")
```

```
try:
    a = 5
    b = 5/0 → raise ZDE
except BaseException:
    print("BE")
except Exception:
    print("E")
except ZeroDivisionError:
    print("ZDE")
```

ZDE is a Base exception error



If tries to matching



ZDE is a Base exception error

* The else part will executed when no exception has been caught

4)
```
try:
    a=5
    b=5|5
except ZDE:
    print("ZDE")
except BaseException:
    print("BE")
except Exception:
    print("E")
else:
    print("ELSE")
```

5)
```
try:
    a=5
    b=5|0
except(BaseException,Exception,zeroDivisionError):
```

6)
```
try:
    a=5
    b=5|5
except:
    print("Hi")
else:
    print("Hello")
```

7)
```
try:
    a=5
    b=5|5
else
    print("Hello")
```
→ It will give us compile time error

⑧ try:
a = 5
b = 5/0
except:
print("Hi")
else:
print("Hello")
finally:
print("Namasthe")

whether there is exception is executed or not
finally will be executed.

try:
cook-biriyani()
except salt less error
except overcooked error
finally:
switchoff-stove

—| end |—
of exceptionhandling

(29) Ways of creating Arrays in Numpy
array(), linespace(), logspace(),
arange(), zeros(), ones()

```
from numpy import *
arr = array([1,2,3,4,5])
print(arr)
```

in array all the values should be of same type

* linspace() (start, stop, step)
arr = linspace(0,15,16) → dividing into the parts

* arange()
arr = arange(1,15, 2)
print(arr)
→ 1, 3, 5, 7, 9, 11, 13

* logspace()
arr = logspace(1,40,5)
print(arr)

* zeros() ones() → more efficient

arr = ones(5)
print(arr)
→ [1. 1. 1. 1. 1]

(30) Copying an Array in python

* from numpy import *

```
arr = array([1,2,3,4,5])
arr = arr + 5
print(arr)
```

→ [6 7 8 9 10]

* vectorized operation

```
from numpy import *
arr1 = array([1,2,3,4,5])
arr2 = array([5,4,3,2,1])
arr3 = arr1 + arr2
print(arr3)
```

→ [6, 6, 6, 6, 6]

* Mathematical operations in numpy

```
from numpy import *
arr1 = array([1,2,3,4,5])
print(arr1)
print(log(arr1))
print(sin(arr1))
print(cos(arr1))
print(sqrt(arr1))
print(sum(arr1))
print(min(arr1))
print(max(arr1))
unique, sort
```

* we can also concatenate

```
from numpy import *
arr1 = ([1,2,3,4,5])
arr2 = array([6,1,9,3,2])
print(concatenate([arr1,arr2]))
```

Copying

```
from numpy import *
arr1 = array([1,2,3,4,5])
arr2 = arr1.view()
print(arr1)
print(arr2)
```

view is a function that creats new array

Shallow copy

The both the array are interlinked

```
from numpy * import *
arr1 = array([2,6,8,1,3])
arr2 = arr1.view()
arr1[1] = 7
print(arr1) → 2, 7, 8, 1, 3
print(arr2) → 2, 7, 8, 1, 3
```

Deep copy

The both the arrays are not interlinked

```
from numpy import *
arr1 = array([1,2,3,4,5])
arr2 = arr1.copy()
arr1[1] = 7
print(arr1) → 1, 7, 3, 4, 5
print(arr2) → 1, 2, 3, 4, 5
```

(31) working with matrix

```
from numpy import *
arr = array([
            [1, 2, 3],
            [4, 5, 6]
            ])
print(arr)
print(arr.ndim) → show the no of dimenshon
print(arr1.shape) → 2 row, 3 columns
print(arr1.size) → 6 (counts the size)
```

I want to create 2d array into 1D array

(*) From numpy import *

```
arr = array([
            [1, 2, 3],
            [4, 5, 6]
            ])
arr2 = arr1.flatten()
print(arr2)
[1, 2, 3, 4, 5, 6]
```

arr2 is 1D

(*) To create 3D array from 1D array

```
From numpy import *
arr1 = array([
            [1, 2, 3, 6, 2, 9],
            [4, 5, 6, 7, 5, 3],
            ])
arr2 = arr1.flatten()
arr3 = arr2.reshape(3,4)
print(arr3)
```

matrix operations.

```
from numpy import *
m=matrix("1,2,3; 6,4,5; 1 6 7")
print(diagonal(m)) → [1 4 7]
print(m.min()) → 1
print(m.max()) → 7
```

```
from numpy import *
m1=matrix('1 2 3; 6 4 5; 1 6 7')
m2= matrix('1 2 3; 6 8 5; 2 6 7')
m3 = m1 * m2 ;
print(m3)
```

(32) Functions in python:

I want to define a function, later on

I want to call that function

func name

```
* def greet():
      print("Hello")
      print("Good Morning")
  greet()
```

sweet

parameter or arguement

```
* def add(x,y):
      c=x+y
      print(c)
  add(5,4) → 9
```

function can return a value

```
* def add(x,y):
      c=x+y
      return c
  result = add(5,4)
  print(result)
```

* from one function we can return multiple values

```
  def add_sub(x,y):
      c=x+y
      d=x-y
      return c,d
  result1, result2 = add_sub(5,4)
  print(result1, result2)
```

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(33) Function arguements in python

How to pass a parameter to function

```
def update(x):
    x=8
    print(x)
update(10)
```

(34) Types of Arguements.

a,b → Formal Arguement

```
def add(a,b):
    c=a+b
    print(c)
add(5,6) ⟶ 11
```

Arguement (Actual Arguement)

Position

```
def person(name, age):
    print(name)
    print(age)
person("Poorna", 23)
```

Keyword

```
person(age=28, name="Poorna")
```

default

```
* def person(name,age=18):
    print(name)
    print(age)
person("Poorna") ⟶ Poorna.
                   18
```

variable length argument

```
def sum(a,b):
    c=a+b
    print(c)
sum(5,6)
```

```
def sum(a, *b)
    c=a
    for i in b:
        c=c+i
    print(c)
sum(5,6,34,78) ⟶ 123
```

(35) ** kwargs

↑function

```
def person():
def person(name, **data):
    print(name)
    print(data)
person("navin", age=28, city="mumbai, mob=00)
```

(36) Global keywords.

scope

(a=10) → This a this is outside the fun is global

```
def something():
    (a=15) → Inside the fun is local variable
    print(a) ↳ we cannot use this out side

Print(a)
```

variable length argument

```
def sum(a,b):
    c=a+b
    print(c)
sum(5,6)
```

```
def sum(a, *b)
    c=a
    for i in b:
        c=c+i
    print(c)
sum(5,6,34,78) ⟶ 123
```

(35) ** kwargs

↑function

```
def person():
def person(name, **data):
    print(name)
    print(data)
person("navin", age=28, city="mumbai, mob=00)
```

(36) Global keywords.

scope

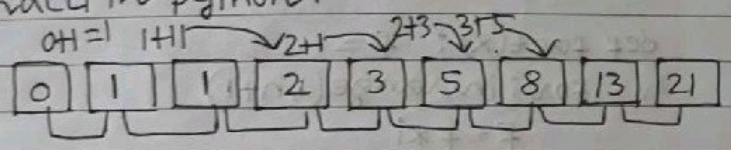
(a=10) → This a this is outside the fun is global

```
def something():
    (a=15) → Inside the fun is local variable
    print(a) ↳ we cannot use this out side

Print(a)
```

(37) Pass list to a function

(38) Fibonacci in python.



We should add 2 numbers to get next number

```
def fib(n):
    a=0
    b=1
    print(a)
    print(b)
    for i in range(2,n):
        c=a+b
        a=b
        b=c
        print(c)
fib(5)
```

(39) Factorial of a number.

$5! = 5*4*3*2*1 = 120$

$4! = 24$

```
def fact(x): f=1
    for i in range(1,n+1)
        f = f*i
    return f
x=4
result = fact(x)
print(result)
```

(40) Recursion in python

```
def greet():
    print("Hello")

import sys
sys.setrecursionlimit(2000)
print(sys.getrecursionlimit())
i=0
def greet():
    global i
    i+=1
    print("Hello",i)
    greet()
greet()
```

A function calling itself is Recursion.

(41) factorial using recursion.

```
def fact(n):
    if n==0
        return 1
    return n* fact(n-1)
result = fact(5)
print(result) ⟶ 120
```

(42) lambda ⟶ Anonymus function
function without names are called as Anonymus function (or) lambda.
"functions are objects" in python

```
f= lambda a : a*a
result = f(5)
print(result) ⟶ 25
```

(43) lambda,

(43) lambda
Filter
map
reduce.

```
def is_even(n):
    return n%2==0
nums=[3,2,6,8,4,6,2,9]

evens = filter(
evens = list(filter(is_even,nums))
print(evens)
```

```
nums = [3,2,6,8,4,6,2,9]
evens = list(filter(lambda n: n%2==0,nums))
print(evens)
doubles=list(map(lambda n: n*2, evens))
```

filter=

reduce

```
from functools import reduce

nums=[3,2,6,8,4,6,2,9]
evens=list(filter(lambda n: n%2==0,nums))
doubles=list(map(lambda n: n*2, evens))
print(doubles)
sum=reduce(lambda a,b: a+b, doubles)
print(sum)
```

CODING BUGS NOTES GALLERY

(44) Decorators:

functions are build to perform certain task

```
def div(a,b):
    print(a/b)
def smart_div(func):
    def inner(a,b):
        if a<b:
            a,b = b,a
        return func(a,b)
    return inner

div1 = smart_div(div)
div1(2,4)
```

→ It is taking it as a parameter

We can change the behaviour of existing function

45 Modules in python

ABCD

AC BD

A C B D

1 module will be file

```
a=9
b=7
```

new file

```
def add(a,b):
    return(a+b
def sub(a,b):
    return a-b
def multi(a,b):
    return a*b
def div(a,b):
    return a/b
```

```
import calc
a=9
b=7
c=calc.add(a,b)
```

```
from calc import *
a=9
b=7
c=sub(a,b)
```

→ 2

(46) --name-- = "--main--"
special variable --name--

print(--name--)
→ --main-- → starting point of program

(47) continued part

demo

```
from calc import add
def fun1():
    add()
    print("from fun1")
def fun2():
    print("from fun2")
fun1()
fun2()
def main()
    fun1()
    fun2()
main()
```

calc

```
def add():
    print("result 1 is", __name__)
def sub():
    print("result 2 is")
def main():
    print("in calc main")
    add()
    sub()
if __name__ == "__main__":
    main()
```

→ in calc main
result 1 is __main__
result 2 is

(6) Iterators in python

one value at a time

```
nums = [7, 8, 9, 5]
nums[0] → 7
nums[3] → 5
for i in nums:
    print(i) → 7
               8
               9
               5
```

```
nums = [7, 8, 9, 5]
it = iter(nums)
print(it.__~~num~~ next__()) → 7
print(next(it)) → 8
```

lets create own class.

```
class topten:
    def __init__(self):
        self.num = 1

    def __iter__(self):
        return self

    def __next__(self):
        if self.num <= 10:
            val = self.num
            self.num += 1
            return val
        else:
            raise StopIteration

values = Topten()
for i in values:
    print(i)
```

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(62) generators.

top10 perfect square

```
def topten():
    n=1
    while n<=10:
        sq = n*n
        yield sq
        n+=1
values = topten()
for i in values:
    print(i)
```

CODING BUGS NOTES GALLERY