```
'data science'

print('Hello World ',' welcome to 60days python',sep='&',end='|')

x = 'Machine Learning'

print('Data Science',x, sep=' &' )
```

```
     Data Science  &Machine Learning
```

```
# local variable power

a = 5
def fun1():
  a = 50
  print(a)

fun1()
##################
b = 8
def fun2():
  b = 18
  print(b)

fun2()
###############
c = 19
def fun3():
  c = 2
  print(c)

fun3()
#############
d = 80
def fun4():
  d = 8
  print(d)

fun4()
############
e = 9
def fun5():
  e = 3
  print(e)

fun5()
###########
f = 30
def fun6():
```

```
def fun6():
  f = 3
  print(f)

fun6()
############
g = 9
def fun7():
  g = 6
  return g

fun7()
```

```
50
18
2
8
3
3
6
```

```
#find() Built-in Function

a = 'Rakibul islm Rafi'
a.find('i',0,3)

b = 'I Love Python'
b.find('P',0,9)

c = 'I love Data Science'
c.find('S',0,3)

D = 'Blue Whale'
D.find('W',3,9)
```

```
5
```

```
#Split() Built-in function

A = 'I Love Bangladesh'
A.split()

B = 'I Love Darkness'
B.split()

C = 'I Love Data Science'
C.split()[-1]

D = 'I Love Machine Learning'
D.split()[2:]
```

```
['Machine', 'Learning']
```

```
#isinstance built-in function check the data types

A = 10
B = 20.5
C = 60j
D = True

isinstance(D,bool)
isinstance(A,int)
isinstance(B,float)
isinstance(C,bool)
```

```
False
```

```
# list item index
Multiple_list_1 = [1,2,3,4,5,[complex,True],[9,8,7,6,5]]
Multiple_list_1[-2]

Multiple_list_2 = [complex,(int,float),[1,2,3,4,5],[1,1,1,1,1],(True,False),('A','B')]
Multiple_list_2[-3]

Multiple_list_3 = [1,2,3,4,5,[1,2,3,4,5,6,7,8,9,10,[5,5,5,5,5,5,5,5]]]
Multiple_list_3[-1][-1]
```

```
[5, 5, 5, 5, 5, 5, 5, 5]
```

```
#list item looping

list_1 = [1,2,3,4,5,6,7,8,9,10]

for i in list_1:
  print(i)

list_2 = ['Apple','Ball','Cat','Dog']

for i in list_2:
  print(i)
  if i =='Apple':
    break
```

```
Apple
```

```
# Set
set_ = {
    1,2,3,4,5,6
}
set_

set_2 = {
```

```
    'C#','C++','java','Python'
}
set_2
isinstance(set_2,set)
```

```
 True
```

```
# Dictonary

Dic_1 = {
    'Name' : 'Rakibul islam Rafi',
    'Age' : 16,
    'Class' : 8,
    'School' : 'Jhangirnagor School & Collage'
}

Dic_1
type(Dic_1)

Dic_2 = {
    'A' : 'Apple',
    'B' : 'Ball',
    'C' : 'Cat',
    'D' : 'Dog',
    'E' : 'Eagle',
    'F' : 'Fan',
    'H' : 'Horse',
    'I' : 'IceCream'
}

Dic_2.items()
Dic_2.keys()
Dic_2.values()
Dic_2
```

```
 {'A': 'Apple',
  'B': 'Ball',
  'C': 'Cat',
  'D': 'Dog',
  'E': 'Eagle',
  'F': 'Fan',
  'H': 'Horse',
  'I': 'IceCream'}
```

```
list_1 = [1,2,3,4,5]
3 in list_1

list_2 = ['A','B','C','D','E']
'E' in list_2

list_1 is list_2
```

```
list_3 = 10
list_4 = 10

list_3 is list_4
```

```
True
```

```
import math as math

math.floor(10.2)
math.floor(20.5)
math.floor(6.9)

math.ceil(9.1)
math.ceil(7.3)
math.ceil(8.1)
```

```
9
```

```
a = float(input('enter the length of a rectangle:'))
b = float(input('enter the breath of a rectangle:'))

if a==b:
  print('It is a square')

else:
  print('It is not a Squre')
```

```
enter the length of a rectangle:70
enter the breath of a rectangle:15
It is not a Squre
```

```
Dept = 'Data Science'

if Dept == 'Data Science':
  print('you have great future!')
else:
  print('Worried')
```

```
you have great future!
```

```
num = float(input('Enter Any number : '))

if num % 2 == 0:
  if num % 5 == 0:
    print(num, 'Divisible by 5 and 2')
  else:
    print('No 1')

else:
```

```
  print('No 2')
```

```
     Enter Any number : 6
     No 1
```

```
amout = 0

net_unit = float(input('Enter your unite Value : '))

if net_unit <= 100:
  net_unit = 0
  print('amount is ',amout)

elif net_unit > 100 and net_unit <= 200:
  amount = (net_unit - 100) * 5
  print('amount is',amount)

elif net_unit > 200:
  amount = ((net_unit - 100)* 10) + 500
  print('amount is ', amount)
```

```
     Enter your unite Value : 210
     amount is  1600.0
```

```
length = float(input('Enter the length : '))

breadth = float(input('Enter the bredth : '))

if length == breadth:
  print("Yes, it's Squre ")

else:
  print("No, it's not Squre")
```

```
     Enter the length : 20
     Enter the bredth : 20
     Yes, it's Squre
```

```
Number_list_1 = [16,11,22,18,9,8,10]
Number_list_1.sort()

for i in Number_list_1:
  print(i)

Alphabet_list_2 = ['A','C','D','B','J','Z','S']
Alphabet_list_2.sort()

for x in Alphabet_list_2:
  print(x)
```

```
8
9
10
11
16
18
22
A
B
C
D
J
S
Z
```

```
#everse

list_1 = [1,2,3,4,5,6,7,8,9,10]

list_1.reverse()
for i in list_1:
  print(i)

list_2 = ['A','C','B','D','E','F','G','H','I']
list_2.sort()
list_2.reverse()
list_2
```

```
10
9
8
7
6
5
4
3
2
1
['I', 'H', 'G', 'F', 'E', 'D', 'C', 'B', 'A']
```

```
for y in range(-100,-10,2):
  print(y)
```

```
data = 'I Love Pyton'

for x in data:
  print(x)
```

```
I
```

```
L
o
v
e

P
y
t
o
n
```

```
list_1 = [1,2,3,4,5]
sum_1 = 0

for i in list_1:
  sum_1 = sum_1 + i
  print(f'sum_1 : {i}')
print(f'Total Sum_1 : {sum_1}')
######################
sum_2 = 0
for x in range(10):
  sum_2 = sum_2 + x

print(f' Sum_2 : {sum_2}')
######################
sum_3 = 0

for i in range(20):
  sum_3 = sum_3 + i

print(f'Sum_3 : {sum_3}')
```

```
sum_1 : 1
sum_1 : 2
sum_1 : 3
sum_1 : 4
sum_1 : 5
Total Sum_1 : 15
 Sum_2 : 45
Sum_3 : 190
```

```
for i in range(7):
  print(i,'I Love Childhood')

for y in range(10):
  print('2016 is Amazing Childhood')

for x in range(20):
  print('2017 is wonderful memory')
```

```
i = 0
while i <= 5:
  print(i,'Hello')
  i = i + 1


x = 0

while x <= 10:
  print(x)
  x = x + 1


print('Rakibul islam ' , ' Data Science',sep='&')
print('I love Python ',' Data Science',sep="For")
print('Rakibul ',' Rafi',sep='islam')
print('I ',' Bangladesh',sep='Love')
print('----------------------------------------')
A = 'My name is'
print(A,'Rakibul islam Rafi')

B = 'Python'
print('I Love',B)

C = 'I Love'
print(C,'Data Science')

print('----------------------------------------')

print(id(B))
print(id(A))
print(id(C))

print(['----------------------------------------'])
A,B,C = 10,100,1000
print(A,B,C)

D,E,F,G = 20,200,2000,20000
print(D,E,F,G)

X,Y,Z = 5,50,500
print(X,Y,Z)
print(['----------------------------------------'])

X = 100

def fun_1():
    X = 1
    print(X)
fun_1()
```

```
fun_1()
# -----------------------
Y = 200

def fun_2():
    Y = 2
    print(Y)
fun_2()

Z = 300

def fun_3():
    Z = 3
    print(Z)
fun_3()

A = 400

def fun_4():
    A = 4
    print(A)
fun_4()

B = 500

def fun_5():
    B = 5
    print(B)
fun_5()
print(['----------------------------------------'])

A = 50
B = 70
print(A+B)

C = 40
D = 20
print(C+D)

# X = int(input('__ :'))
# Y = int(input('__ :'))
# print(X + Y)
print(['----------------------------------------'])

A = 'Rakibul islam Rafi'
A.find('i',2,5)

B = 'I Love Python'
B.find('P',3,10)

C = 'I Love Bangladesh'
```

```
C.find('d',8,14)

D = 'I Love Data Science'
D.index('L')
print(['----------------------------------------'])

A = 'Name : Rakibul islam Rafi'
A.split()[-1]

B = 'I Love Bangladesh'
B.split()[-2]

C = 'I Love Data Science'

C.split()[-2]

D = 'I Love virtual reality'
D.split()[-1]

E = 'I Love Darkness'
E.split()[-1]

print(['----------------------------------------'])
import math as mt

A = 10.5
mt.ceil(A)

B = 150.1
mt.ceil(B)

C = 170.0
mt.ceil(C)

D = 149.4
mt.ceil(D)

X = 16.8
mt.floor(X)

Y = 14.5
mt.floor(Y)

Z = 17.8
mt.floor(Z)

print(['----------------------------------------'])

a = 11
b = 10
a is not b
```

```
a is not b

c = 14
d = 14
c is d

x = 18
y = 18
x is not y

z = 15
y = 15

z is y

print(['----------------------------------------'])

list_1 = [1,2,3,4,5,6,7,8,9]
5 in list_1

list_2 =['Python','C++','Java','C#','Javascript']
'Python' in list_2

list_3 = ['Data Science','Machine Learning','Computer Vison']
'Machine Learning' in list_3

list_4 = [1,5,9,5,8,7]
5 in list_4

list_5 = [50,60,80,46]
35 is not list_5

print(['----------------------------------------'])

Set_1 = {
    10,20,30,40,50,60,70,80,90,100
}
50 in Set_1

Set_3 = {
    1,2,3,4,5,6,7,8,9,10
}
9 in Set_3

Set_4 = {
    5,6,10,8,90,40,60
}
5 in Set_4

Set_5 = {
    'Python','Java','C++','C#','Kotlin'
```

```
}
'C++' in Set_5

Set_6 = {
    'Data Science','AI','Machine Learning','Cyber Security'
}
'Police' in Set_6

10>5 and 3!=1
5<2 and 8<9
8>5 and 8>=8
4>1 and 8==8
8>2 and 8!=4

7>2 or 8==5
5!=14 or 4>2
7!=7 or 8!=8

5!=7 & 7<4
4==4 & 4!=9
8==8 & 2!=8
5 > 2 & 30<20
60>20 & 30<25

a = float(input('enter the length of a rectangle:'))
b = float(input('enter the breadth of a rectangle:'))

if a == b:
  print("Yes, it's a Squre")
else:
  print("No, it's not Squre")



dept = input('Enter Your Depertment Subject : ')

dept.lower()
if dept == 'data science':
  print('you have great future!')

else:
  print('Worried')

marrige_situation = input('Enter the  future Situation : ')

if marrige_situation == 'Type of Anannya':
  print('Never ever Acepet, Quick rejected \n')

elif marrige_situation == 'Type of Neela Apu':
  print('congratulations, have a great future! \n')
```

```
elif  marrige_situation == 'Neela types not found':
  print('Create an entirely virtual environment for my life. \n')

elif marrige_situation == 'Could not create virtual environment':
  print('Go to palestine and fight \n')

else:
  print('invalid Syntex \n')

monthly_salary = float(input('Enter My Minimum Monthly Salary : '))

if monthly_salary > 250000:
  print('Neela Apu will get like you')
else:
  print("Give up hope")
  print('However, Never Give up')

rows = 6
# outer loop
for x in range(rows):
  # inner loop
  for y in range(x+1):
    print('#',end=' ')
  print(' ')

###############

rows = 5

# outer loop
for i in range(rows):
  # inner loop
  for y in range(i + 1):
    print('%',end=' ')
  print(' ')
```

```
    #
    # #
    # # #
    # # # #
    # # # # #
    # # # # # #
    %
    % %
    % % %
    % % % %
    % % % % %
```

```
rows = 4
# outer loop
for x in range(rows):
```

```
for x in range(rows):
  # inner loop
  for y in range(x+1):
    print('#',end=' ')
  print(' ')
```

```
    #
    # #
    # # #
    # # # #
```

```
row = 10

# outer loop
for x in range(row):
  # inner loop
  for y in range(x+1):
    print('*', end=' ')
  print(' ')
```

```
    *
    * *
    * * *
    * * * *
    * * * * *
    * * * * * *
    * * * * * * *
    * * * * * * * *
    * * * * * * * * *
    * * * * * * * * * *
```

```
rows = 5

# outer loop
for x in range(rows):
  # inner loop
  for y in range(x+1):
    print('@',end=' ')
  print(' ')
```

```
    @
    @ @
    @ @ @
    @ @ @ @
    @ @ @ @ @
```

```
row = 15

# outer loop
for x in range(row):
  # inner loop
  for y in range(x+1):
```

```
    print('*',end=' ')
  print(' ')
```

```
*
* *
* * *
* * * *
* * * * *
* * * * * *
* * * * * * *
* * * * * * * *
* * * * * * * * *
* * * * * * * * * *
* * * * * * * * * * *
* * * * * * * * * * * *
* * * * * * * * * * * * *
```

```
list_1 = [2,5,8,10]
list_1

isinstance(list_1,list)
type(list_1)

list_1[0]
list_1[-1]
list_1[:]
list_1[0:2]
```

```
[2, 5]
```

```
list_2 = [2,3,6,7,10]

list_2[2] = 5
list_2
```

```
list_3 = [1,2,3,4,6,7,9,10]

for x in list_3:
  print(x)

list_3.insert(4,5)
list_3.insert(7,8)
list_3
```

```
list_4 = ['Apple','Ball','Cat','Dog','Egg','Fan']

for i in list_4:
  print(i)

list_4[4] = 'Eagle'
list_4[3] = 'Data Science'
list_4
```

```
Apple
Ball
Cat
Dog
Egg
Fan
['Apple', 'Ball', 'Cat', 'Data Science', 'Eagle', 'Fan']
```

```
list_5 = [1,2,3,4,5]

list_5.append(4)
list_5
```

```
[1, 2, 3, 4, 5, 4]
```

```
list_6 = ['A','B','C']

list_6.pop()
list_6

list_6 = ['Data Science','Machine learning','Cyber Security']
list_6.pop(-1)
list_6.pop(-1)
list_6
```

```
['Data Science']
```

```
l1 = list(('Ai',1,2,3,4,(5,4,8,9,8,9)))
l1[-1]

l1 = list((12,3,5,True,5,1,5,1,5,False,(bool,5,9,70)))
l1[-1]
```

```
(bool, 5, 9, 70)
```

```
list_1 = []

n = int(input('Enter your total index: '))

for i in range(n):
```

```
for i in range(n):
  new = input()
  list_1.append(new)
print(list_1)

#%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

list_2 = []

for x in range(5):
  list_2.append(x)
print(list_2)
#--------------------------------
list_3 = []

for i in range(9):
  list_3.append(i)
print(list_3)
#--------------------------------
list_4 = []
n = int(input('index : '))
for y in range(n):
  new = input()
  new = list_4.append(new)
list_4
```

```
Enter your total index: 2
2
2
['2', '2']
[0, 1, 2, 3, 4]
[0, 1, 2, 3, 4, 5, 6, 7, 8]
index : 2
2
3
['2', '3']
```

```
sum = 0
for x in [1,2,3,4,5]:
      sum = sum + x

print(sum)
```

```
15
```

```
sum = 0
t = [1,1,5,8,7]
for x in t:
      sum = sum + x

print(sum)
```

```
22
```

```
sum_ = 0
int_ = [1,5,3,4,6]

for x in int_:
  sum_ = sum_ + x
print(sum_)
```

```
19
```

```
sum_ = 0
int_list = [5,10,10,5]

for i in int_list:
  sum_ = sum_ + i
print(sum_)
```

```
30
```

```
S = 0
l = [8,9,8,10,5,6,40]

for y in l:
  S = S + y
print(S)
```

```
86
```

```
V = 0
T = [1,2,3,4,5]

for i in T:
  V = V + i
print(V)
```

```
15
```

```
O = 0
E = [80,60,20,30]

for x in E:
  O = O + x
print(O)
```

```
190
```

```
Y = 0
```

```
E = [1,2,3,4,5]

for x in E:
  Y = Y + x

print(Y)
```

```
     15
```

```
D = 0
S = [40,40]

for i in S:
  D = D + i

print(D)
```

```
row = 20

# outer loop
for x in range(row):
  # inner loop
  for y in range(x+1):
    print('#',end=' ')
  print('')
```

```
W = 0
R = [15,15,15]

for i in R:
  W = W + i

print(W)
```

```
     45
```

```
row = 5

# outer loop
for i in range(row):
  # inner loop
  for y in range(i+1):
    print('#',end=' ')
  print(' ')
```

```
#
# #
# # #
# # # #
# # # # #
```

```
P = 0
V = [4,5,6,9,18,2,5,6,89]

for x in V:
  P = P + x
print(P)
```

```
144
```

```
Reverse_iteam = ['Python','Java','C++','C#']
Reverse_iteam.reverse()
Reverse_iteam.remove('C++')
Reverse_iteam
```

```
iteams = ['DS','AI','ML','CS']
iteams.pop(-1)
iteams
```

```
['DS', 'AI', 'ML']
```

```
# Empty list
list_1 = []

for x in range(10):
  list_1.append(x)

list_1
```

```
[0, 1, 2, 3, 4, 5, 6, 7, 8, 9]
```

```
list_2 = []

for i in range(20):
  list_2.append(i)
list_2
```

```
[0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19]
```

```
T = [15841,2582894,352641,5548484,8418,541841,148941,1564156,15615615]
list_3 = []
```

```
for y in T:
  list_3.append(y)
list_3
```

```
[15841, 2582894, 352641, 5548484, 8418, 541841, 148941, 1564156, 15615615]
```

```
l4 = [ x for x in range(10)]
l4
```

```
[0, 1, 2, 3, 4, 5, 6, 7, 8, 9]
```

```
rows = 30


for i in range(rows):
  # inner loop
  for x in range(i+1):
    print('!',end=' ')
  print(' ')
```

```
! 
! ! 
! ! ! 
! ! ! ! 
! ! ! ! ! 
! ! ! ! ! ! 
! ! ! ! ! ! ! 
! ! ! ! ! ! ! ! 
! ! ! ! ! ! ! ! ! 
! ! ! ! ! ! ! ! ! ! 
! ! ! ! ! ! ! ! ! ! ! 
! ! ! ! ! ! ! ! ! ! ! ! 
! ! ! ! ! ! ! ! ! ! ! ! ! 
! ! ! ! ! ! ! ! ! ! ! ! ! ! 
! ! ! ! ! ! ! ! ! ! ! ! ! ! ! 
! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! 
! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! 
! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! 
! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! 
! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! 
! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! 
! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! 
! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! 
! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! 
! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! 
! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! 
! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! 
! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! 
! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! 
! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! 
! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! 
! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! 
! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! 
! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! 
! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! 
! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! ! 
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```

```
thistuple = ("FAU",True,9,1,2,3,4,5,"Study Mart")
thistuple

type(thistuple)
```

```
tuple
```

```
class Employee:
  def __init__(self,Name,Age,Company):
    self.Name = Name
    self.Age = Age
    self.Company = Company

class Person:
  def __init__(self,Name,Age,Gender):
    self.Name = Name
    self.Age = Age
    self.Gender = Gender

class Cat:
  def __init__(self,Name,Color):
    self.Name = Name
    self.Color = Color

class Dog:
  def __init__(self,Name,Age,Color,Type):
    self.Name = Name
    self.Age = Age
    self.Color
    self.Type

class Car:
  def __init__(self,Name,Model,Weight):
    self.Name = Name
    self.Model = Model
    self.Weight = Weight

from os import spawnle
kirk = ["James Kirk", 34, "Captain", 2265]
spock = ["Spock", 35, "Science Officer", 2254]
mccoy = ["Leonard McCoy", "Chief Medical Officer", 2266]

kirk[-4]
spock[-2]
mccoy[-3]

for i in kirk,spock,mccoy:
  print(i)
```

```
['James Kirk', 34, 'Captain', 2265]
['Spock', 35, 'Science Officer', 2254]
```

```
['Spock', 99, 'Science Officer', 2254]
['Leonard McCoy', 'Chief Medical Officer', 2266]
```

```
class Dog:
  H = 'Hello World'

  def __init__(self,Name,Age):
    self.Name = Name
    self.Age = Age
```

```
class Product:
  pass

item = Product()
item
type(item)
```

```
__main__.Product
```

```
class Product:
  pass

item = Product()
item

item.price = 80
item.price
```

```
80
```

```
class Product:
  def __init__(self,Name,Price,quantity):
    self.Name = Name
    self.Price = Price
    self.quantity = quantity
    print('Initializer')

item1 = Product('Mobile Phone',8000,10)
item2 = Product('Laptop',10000,100)
```

```
item1.Price
item.Name
```

```
Initializer
Initializer
'Mobile Phone'
```

```
class Person:
  pass
  print('Initialize')
```

```
  print( 'Initialize' )

Person_1 = Person()
Person_1.name = 'Safin'
Person_1.age = 16
Person_1.gender = 'Male'
print(Person_1.name)
print(Person_1.age)



Person_2 = Person()
Person_2.name = 'RAFI'
Person_2.age = 16
Person_2.gender = 'Male'
print(Person_2.name)
print(Person_2.age)

Person_3 = Person()
Person_3.name = 'Arafat'
Person_3.age = 16
Person_3.gender = 'Male'

Person_4 = Person()
Person_4.name = 'Amtahaman'
Person_4.age = 15.9
Person_4.gender = 'Male'

print(Person_4.gender)
print(Person_4.name)
```

```
Initialize
Safin
16
RAFI
16
Male
Amtahaman
```

```
class Cat:
  def __init__(self, name,age,color):
    self.name = name
    self.age = age
    self.color = color


Cat_1 = Cat('Mew',2.3,'Brown')

Cat_2 = Cat('Miw',3,'Black')

Cat_3 = Cat('Pew',2,'White')
```

```
Car_4 = Cat('Gew',3.5,'Black & white')

print(Cat_1.name)

print(Cat_2.color)

print(Cat_3.age)

print(Car_4.color)
```

```
Mew
Black
2
Black & white
```

```
rows = 20

# outer loop
for x in range(rows):
  # inner loop
  for y in range(x+1):
    print('#',end=' ')
  print(' ')
```

```
#
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```

```
sum = 0
list_ = [1,2,3,4,5,6,7,8]

for i in list_:
  sum = sum + i
```

```
  print(i,sum)

class Phone:
  def __init__(self,name,Ram,Storage,Price,Quantity):
    self.name = name
    self.Ram = Ram
    self.Storage = Storage
    self.Price = Price
    self.Quantity = Quantity

  def total_price(self):
    return self.Price * self.Quantity


Samsung = Phone('Samsung Glaxy','16GB','128GB',20000,20)
Apple = Phone('I Phone X','32GB','256GB',350000,350)
mI = Phone('MI','8GB','16GB',160000,14)
Hornor = Phone('Hornor','4GB','16GB',14000,15)
Realme = Phone('Realme','16GB','64GB',16000,23)

print(Samsung.total_price())
print(Apple.total_price())
print(Realme.total_price())

print(Apple.Storage)
```

```
400000
122500000
368000
256GB
```

```
class Product:
  def __init__(self,name,price):
    self.name = name
    self.price = price

Phone = Product('Smart Phone',15000)
print(Phone.name)
```

```
Smart Phone
```

```
class Employee:
  print('Initializer')
  def __init__(self,name,age):
    self.name = name
    self.age = age
```

```
Initializer
```

```
class Dog:
```

```
class Dog:
    pass

Dog()
```

```
<__main__.Dog at 0x7ee2e6ccd060>
```

```
class Cat:
  pass

a = Cat()
b = Cat()

a == b
```

```
False
```

```
set_3 = {
    'Python','C++','Java',(10,10,10,)
}
set_3.add(100000)
set_3
```

```
{(10, 10, 10), 100000, 'C++', 'Java', 'Python'}
```

```
class Person():
  pass

a = Person()
b = Person()

a == b
```

```
False
```

```
class Product:
  def __init__(self,name,price: float,quantity: int):

    assert price >= 0, 'Price must be greather than 0'

    self.name = name
    self.price = price
    self.quantity = quantity

  def total_price(self):
    return self.price * self.quantity


item1 = Product('Mobile Phone',8000,10)
item2 = Product('Laptop',25000,20)
```

```
print(item1.total_price())
```

```
80000
```

```
# Array in python

import array as arr

ar1 = arr.array('i',[1,2,3,4,5,6])
ar1

ar2 = arr.array('f',[1,2,3,4,5])
ar2

ar3 = arr.array('f',[10,20,30,40,50])
ar3[2]

ar4 = arr.array('i',[9,8,7,6,5])
ar4[0] = 10
ar4

ar5 = [1,2,3,4,5,6,7,8,9,10]
ar5[:5]

ar6 = arr.array('f',[1,2,3,4,5,6,7])

ar7 = arr.array('f',[1,2,3,4,5])
ar7.remove(5)
ar7


r = arr.array('i',[])

items = int(input())

for i in range(items):
  val = int(input())
  r.append(val)
  # print(val)

print(r)
```

```
3
10
20
30
array('i', [10, 20, 30])
```

```
# Dictionary
```

```
# Dictionary

Dic = {
    'name': 'Rakibul islam',
    'School': 'Jhangirnagor School & Collage'
}

Dic.keys()
Dic.values()
Dic.items()


Dic.update({'class': 8})
Dic

# Dic2 = Dic.copy()
# Dic2
```

```
{'name': 'Rakibul islam',
 'School': 'Jhangirnagor School & Collage',
 'class': 8}
```

```
Dic = {
    'name' : 'Rakibul islam',
    'age': 15,
    'class': 8
}

for i in Dic:
  print(Dic[i])
```

```
Rakibul islam
15
8
```

```
n = int(input())
d = {}

for i in range(n):
  key = input()
  value = input()
  d[key] = value
print(d)


name = ['majbah','shakil','sohan']
vaesity = ['diu','aiub','diu']

z = list(zip(name,vaesity))
z

Alphabet = ['A','B','C','D','E','F','G','H','I']
```

```
Alphabet = ['A','B','C','D','E','F','G','H','I']
Word = ['Apple','Ball','Cat','Dog','Eagle','Fry','Goat','Hen','IceCream']

Zip_ = list(zip(Alphabet,Word))
Zip_
```

```
Alpha = ['D','C','F','l']
Animals = ['Dog','Cat','Fish','lion']

zipp = dict(zip(Alpha,Animals))
zipp.keys()
zipp.values()
```

```
dict_values(['Dog', 'Cat', 'Fish', 'lion'])
```

```
for i in range(1,10):
  if i == 5:
    break
  print(i)
```

```
1
2
3
4
```

```
for i in range(1,100):
  if i == 11:
    break
  print(i*3)
```

```
sen = "I Love Bangladesh and USA"

for i in sen.split():
  if i == "and" :
    break
  print(i)
```

```
I
Love
Bangladesh
```

```
num = [1,2,3,4,5,6,7,8,9,10]

[i for i in num if i%2==0]
```

```
num2 = [1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20]

for i in num2:
  if i%2==0:
    print(i)
```

```
num3 = [1,2,3,4,5,6,7,8,9,10]

for i in num3:
  if i%2 != 0:
    print(i)
```

```
1
3
5
7
9
```

```
sen2 = 'i love bangladesh'

for i in sen2.split():
  if i == 'love':
     continue
  print(i)
```

```
i
bangladesh
```

```
bool_list = [True,False,False,True,False]

any_ture = any(bool_list)
any_ture
```

```
all_true = all(bool_list)
all_true
```

```
False
```

```
def dept():
  print('Data Science')
  print('Machine Learning')

dept()
```

```
Data Science
Machine Learning
```

```
def loop_():
  for i in range(1,10):
    if i%2 == 0:
      print(i)

loop_()
```

```
2
4
6
```

```
8
```

```
def dept_with_names(name):
  print(f'my major is {name}')

dept_with_names('ML & AI')
dept_with_names('ML & AI')
```

```
my major is ML & AI
my major is ML & AI
```

```
def fun_():
  print(2+2)
  print('initializer')
fun_()
```

```
4
initializer
```

```
def dept(name):
  print(f'my major is {name}')

dept('Data Science & machine learning')
dept('Machine learning')
```

```
my major is Data Science & machine learning
my major is Machine learning
```

```
def name():
  print('Rafi')
  return 'Rafi'

name()
```

```
Rafi
'Rafi'
```

```
def add_num():
  a = 10
  b = 20
  return a + b

add_num()
```

```
30
```

```
def sub_num():
  a = 30
```

```
  b = 15
  result = a - b
  return result

sub_num()
```

```
     15
```

```
def user_input():
  x1 = int(input())
  x2 = int(input())
  y1 = int(input())
  y2 = int(input())

  return y1,x2

user_input()
```

```
     1
     2
     3
     4
     (3, 2)
```

```
def input_():
  x1 = int(input())
  x2 = int(input())
  y1 = int(input())
  y2 = int(input())
  return (x1,y1),(x2,y2)

input_()
```

```
     1
     2
     3
     4
     ((1, 3), (2, 4))
```

```
def fact(x):
  result = 1
  if x == 1 or x == 0:
    print(f'The {x} is = 1')
  else:
    for i in range(x):
      result = result * (i+1)
    return result


fact(0)
```

```
     The 0 is = 1
```

```
def revove_duplicates(input_list):
  uniqe_list = []

  for item in input_list:
    if item not in uniqe_list:
      uniqe_list.append(item)

  return uniqe_list

input_list = [1,1,1,2,3,3,4,2,3,7]

revove_duplicates(input_list)
print(f'Real list {input_list}')
print(f'Uniqe list {revove_duplicates(input_list)}')
```

```
     Real list [1, 1, 1, 2, 3, 3, 4, 2, 3, 7]
     Uniqe list [1, 2, 3, 4, 7]
```

```
# list_reverse

def reverse_list(original_list):
  return original_list.reverse()

list_1 = [1,2,3,4,5]
list_2 = [1,2,3,4,5,6,7,8,9,10]
list_3 = [6,7,8,9,10]

reverse_list(list_1)
reverse_list(list_2)
reverse_list(list_3)

list_2
```

```
     [10, 9, 8, 7, 6, 5, 4, 3, 2, 1]
```

```
# list findout even number


def even_num(even):
  for i in even:
    if i%2 == 0:
      print(f'is even {i}')


r = range(50)
t = even_num(r)
```

```
     is even 0
     is even 2
     is even 4
     is even 6
     is even 8
     is even 10
     is even 12
     is even 14
     is even 16
     is even 18
     is even 20
     is even 22
     is even 24
     is even 26
     is even 28
     is even 30
     is even 32
     is even 34
     is even 36
     is even 38
     is even 40
     is even 42
     is even 44
     is even 46
     is even 48
```

```
def odd_num(odd):
  for i in odd:
    if i%2 != 0:
      print(f'is Odd {i}')

o_r_1 = range(10)
r_1 = odd_num(o_r_1)

# another range
```

```
     is Odd 1
     is Odd 3
     is Odd 5
     is Odd 7
     is Odd 9
```

```
# list concatenate using function


# list_1 = [1,2,3]
# list_2 = [4,5,6]

# Output : concatanet_list: [1,2,3,4,5,6]


def concatenate_list(list_1,list_2):
```

```
def concatenate_list(list_1,list_2):
  return list_1 + list_2


l1 = [1,2,3]
l2 = [4,5,6]
concatenate_list(l1,l2)
```

```
[1, 2, 3, 4, 5, 6]
```

```
# list sum using Function
# Assiment

list_ = []
U_Input = int(input('Enter your total index: '))

for i in range(U_Input):
  new = int(input())
  list_.append(new)


def sum():
  sum = 0
  for i in list_:
    sum = sum + i
  print(sum)
print('-----------------')
sum()
```

```
Enter your total index: 5
1
2
3
4
5
-----------------
15
```

```
# parameters vs Arguments

def add_num(a,b): #parameters
  print(a + b)

n1 = 10
n2 = 20

add_num(n1,n2)


a = 5
b = 10
def add_num(x,y):
```

```
def add_num(x,y):
  print(x)

add_num(a,b)

s = 20
y = 10
def pri(a,b):
  print(b)

pri(s,y)

def hi(x,y):
  print(y)

hi(90,100)

def hello(x,y):
  print(y)

hello(10,30)
```

```
30
5
10
100
30
```

```
# keyword Arguments

def Cat_(name,age,color):
  print(name)
  print(age)
  print(color)

Cat_('Pogol',5,'Black & White')

def Dog_(name,age,gender):
  print(name)
  print(age)
  print(gender)

Dog_('Rono',2,'male')

def Person_(name,age,class_):
  print(name)
  print(age)
  print(class_)

Person_('Unknown',5,14)

def Product_(name,price,color):
```

```
def Product_(name,price,color):
  print(name)
  print(price)
  print(color)

Product_('CocaCola',40,'red')
```

```
Pogol
5
Black & White
Rono
2
male
Unknown
5
14
CocaCola
40
red
```

```
# anonymous Function

a = lambda x,y: x*y
a(4,5)

b = lambda c,z: c+z
b(10,60)

t = lambda u,p: u-p
t(70,60)

o = lambda i,r: i**r
o(3,2)

v = lambda b,l: b+l
v(80,10)

g = lambda e,p: e//p
g(25,5)
```

```
5
```

```
Furite_list = []

index_input = int(input('Enter your furite index : '))

for i in range(index_input):
  item_in = input()
  item_in = Furite_list.append(item_in)
print(Furite_list)
```

```
Enter your furite index : 2
```

```
1
2
['1', '2']
```

```
Empty_Number_list = []

index_input = int(input('Enter The Number index :'))

for x in range(index_input):
  item_input = input()
  item_input = Empty_Number_list.append(item_input)

print(Empty_Number_list)
```

```
Enter The Number index :5
1
2
3
4
5
['1', '2', '3', '4', '5']
```