Basic Syntax & IO:

```
print("Hello,World!")
```

```
Hello,World!
```

```
name = input("Enter your name: ")
print(name)
```

```
Enter your name: ganesh
ganesh
```

```
a=10
b=20
a,b=b,a
print("a = ",a)
print("b = ",b)
```

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

```
a=10
if(a % 2 ==0):
  print(a ,"is even")
else:
  print(a ,"is odd")
```

```
10 is even
```

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

```
20 is greater than 10
```

Operators:

```
a=10
b=20
print("a + b = ",a+b)
print("a - b = ",a-b)
print("a * b = ",a*b)
print("a / b = ",a/b)
print("a % b = ",a%b)
print("a ** b =",a**b)
```

```
a + b =  30
a - b =  -10
a * b =  200
a / b =  0.5
```

```
a % b =  10
a ** b = 100000000000000000000
```

```
a=2
print("Square:",a**2)
print("Cube:",a**3)
```

```
Square: 4
Cube: 8
```

```
c=25
print("Celsius:",25)
f = (c * 9/5) + 32
print("Fahrenheit:",f)
```

```
Celsius: 25
Fahrenheit: 77.0
```

```
a=2
print("km:",2)
miles=a*0.621371
print("miles:",miles)
```

```
km: 2
miles: 1.242742
```

```
n=289
if n>0:
  print(n,"is positive")
elif n<0:
  print(n,"is negative")
else:
  print(n,"is zero")
```

```
289 is positive
```

Conditional Statements:

```
a=2
b=3
c=4
if a>b and a>c:
  print(a,"is largest")
elif b>a and b>c:
  print(b,"is largest")
else:
  print(c,"is largest")
```

```
4 is largest
```

```
n=1949
if (n%4==0 and n%100!=0) or (n%400==0):
  print(n,"is a leap year")
else:
```

```
  print(n,"is not a leap year")
```

```
1949 is not a leap year
```

```
b = input("Enter a character: ")
if b in "aeiouAEIOU":
  print(b,"is a vowel")
else:
  print(b,"is a consonant")
```

```
Enter a character: u
u is a vowel
```

```
maths = float(input("Enter Maths Marks: "))
science = float(input("Enter Science Marks: "))
english = float(input("Enter English Marks: "))

def grade(m):
    if m >= 90:
        return 'A'
    elif m >= 80:
        return 'B'
    elif m >= 70:
        return 'C'
    elif m >= 60:
        return 'D'
    elif m >= 50:
        return 'E'
    else:
        return 'F'

print("Maths:", grade(maths))
print("Science:", grade(science))
print("English:", grade(english))
```

```
Enter Maths Marks: 85
Enter Science Marks: 78
Enter English Marks: 92
Maths: B
Science: C
English: A
```

```
a=int(input("Enter a num: "))
if a % 5 == 0, a % 11 == 0:
  print(a,"is divisible by both 5 and 11")
else:
  print(a,"is not divisible by both 5 and 11")
```

```
Enter a num: 55
55 is divisible by both 5 and 11
```

loops:

```
a=int(input("Enter number: "))
for i in range(1,a+1):
```

```
  print(i)
```

```
Enter number: 10
1
2
3
4
5
6
7
8
9
10
```

```
a=int(input("Enter number: "))
for i in range(2,a+2,2):
  print(i)
```

```
Enter number: 10
2
4
6
8
10
```

```
a=int(input("Enter number: "))
sum=a * (a+1) / 2
print(sum)
```

```
Enter number: 3
6.0
```

```
a=int(input("Enter number: "))
fact=1
for i in range(1,a+1):
  fact=fact*i
print(fact)
```

```
Enter number: 4
24
```

```
a=int(input("Enter number: "))
for i in range(1,11):
  print(a,"x",i,"=",a*i)
```

```
Enter number: 2
2 x 1 = 2
2 x 2 = 4
2 x 3 = 6
2 x 4 = 8
2 x 5 = 10
2 x 6 = 12
2 x 7 = 14
2 x 8 = 16
2 x 9 = 18
```

```
2 x 10 = 20
```

Strings

```
a=input("Enter a string: ")
print(a[::-1])

str=""
for i in a:
  str=i+str
print(str)
```

```
Enter a string: ganesh
hsenag
hsenag
```

```
a=input("Enter a string:")
count=0
for i in a:
  if i in "aeiouAEIOU":
    count=count+1
print(count)
```

```
Enter a string:ganesh
2
```

```
a=input("Enter a string:")
if a==a[::-1]:
  print(a,"is a palindrome")
else:
  print(a,"is not a plaindrome")
```

```
Enter a string:ganesh
ganesh is not a plaindrome
```

```
a=input("Enter a string: ")
print(a.swapcase())
```

```
Enter a string: ganesh
GANESH
```

```
a=input("Enter a string: ")
count=0
for i in a:
  count+=1
print(count)
```

```
Enter a string: ganesh
6
```

Lists:

```
list=[1,2,3,4,5]
largest=max(list)
print(largest)
```

```
5
```

```
list=[1,2,3,4,5]
largest=min(list)
print(largest)
```

```
1
```

```
list=[1,2,3,4,5]
sum=0
for i in list:
  sum+=i
print(sum)
```

```
15
```

```
list=[2,45,36,100]
list.sort()
print(list)
```

```
[2, 36, 45, 100]
```

```
numbers = [1, 2, 2, 3, 4, 4, 5]
unq_list = []
for num in numbers:
    if num not in unq_list:
        unq_list.append(num)
print(unq_list)
```

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

Tuples:

```
tuple = (1,2,3,4)
print("Maximum:",max(tuple))
print("Minimum:",min(tuple))
```

```
Maximum: 4
Minimum: 1
```

```
tuple=(1,2,3,4)
lst = list(tuple)
print(lst)
```

```
---------------------------------------------------------------------------
TypeError                                 Traceback (most recent call last)
/tmp/ipython-input-3383975958.py in <cell line: 0>()
      1 tuple=(1,2,3,4)
----> 2 lst = list(tuple)
      3 print(lst)

TypeError: 'list' object is not callable
```

```
tuple = (1,2,3,4,3,5)
count = tuple.count(3)
print(count)
```

```
2
```

```
tuple = (1,2,3,4,5)
index = tuple.index(5)
print(index)
```

```
4
```

```
tuple = (1,2,3,4,5)
reversed_tuple = tuple[::-1]
print(reversed_tuple)
```

```
(5, 4, 3, 2, 1)
```

Sets:

```
set1 = set()
print("Empty set:", set1)
```

```
Empty set: set()
```

```
A = {1, 2, 3, 4}
B = {3, 4, 5, 6}
print("Union:", A | B)
```

```
Union: {1, 2, 3, 4, 5, 6}
```

```
print("Intersection:", A & B)
```

```
Intersection: {3, 4}
```

```
print("Difference (A - B):", A - B)
```

```
Difference (A - B): {1, 2}
```

```
print("Is A subset of B?", A.issubset(B))
```

```
Is A subset of B? False
```

```
A.discard(2)
print("Set A after discarding 2:", A)
```

```
Set A after discarding 2: {1, 3, 4}
```

Dictionaries:

```
student_marks = {"Maths": 85, "Science": 78, "English": 92}
print("Dictionary:", student_marks)
print("Keys:", student_marks.keys())
print("Values:", student_marks.values())
```

```
Dictionary: {'Maths': 85, 'Science': 78, 'English': 92}
Keys: dict_keys(['Maths', 'Science', 'English'])
Values: dict_values([85, 78, 92])
```

```
sum_of_dict_values = sum(student_marks.values())
print("Sum of values:", sum_of_dict_values)
```

```
other_marks = {"Hindi": 88, "Social": 76}
merged_dict = {**student_marks, **other_marks}
print("Merged Dictionary:", merged_dict)
```

```
Merged Dictionary: {'Maths': 85, 'Science': 78, 'English': 92, 'Hindi': 88,
```

```
sorted_dict = dict(sorted(merged_dict.items(), key=lambda item: item[1]))
print("Dictionary sorted by values:", sorted_dict)
```

```
Dictionary sorted by values: {'Social': 76, 'Science': 78, 'Maths': 85, 'Hi
```

```
my_dict = {"apple": 3, "banana": 2, "cherry": 3, "date": 1, "banana": 4}
value_counts = {}
for value in my_dict.values():
  if value in value_counts:
      value_counts[value] += 1
  else:
      value_counts[value] = 1
print("Value counts:", value_counts)
```

```
Value counts: {3: 2, 4: 1, 1: 1}
```

Mathematical Programs:

```
n = int(input("Enter a number: "))
if n>1:
  for i in range(2,n):
    if n%i==0:
      print(n,"is not a prime number")
      break
  else:
    print(n,"is a prime number")
```

```
Enter a number: 2
2 is a prime number
```

```
num=int(input("Enter a number: "))
sum_of_digits = 0
while num > 0:
  digit = num % 10
  sum_of_digits += digit
  num //= 10
print("Sum of digits:", sum_of_digits)
```

```
Enter a number: 1234
Sum of digits: 10
```

```
a, b = 12, 18
def lcm(x, y):
  greater = max(x, y)
  while True:
      if greater % x == 0 and greater % y == 0:
          return greater
      greater += 1
print("LCM:", lcm(a, b))
```

```
LCM: 36
```

```
import math
print("GCD:", math.gcd(a, b))
```

```
GCD: 6
```

Functions:

```
def add(a, b):
    return a + b
print("Sum:", add(2, 3))
```

```
Sum: 5
```

```
def square(n):
    return n ** 2
print("Square:", square(2))
```

```
Square: 4
```

```
def greet(name="Guest"):
    print("Hello,", name)
greet()
greet("GANESH")
```

```
Hello, Guest
Hello, GANESH
```

```
def sum_all(*args):
    return sum(args)
print("Sum of all numbers:", sum_all(1, 2, 3, 4, 5))
```

```
def operations(a, b):
  return a+b, a-b, a*b, a/b
add_val, sub_val, mul_val, div_val = operations(10, 2)
print("Add:", add_val, "Sub:", sub_val, "Mul:", mul_val, "Div:", div_val)
```

```
Add: 12 Sub: 8 Mul: 20 Div: 5.0
```

Lambda Functions:

```
add = lambda a, b: a + b
print("Sum:", add(2, 5))
```

```
Sum: 7
```

```
maximum = lambda a, b: a if a > b else b
print("Maximum:", maximum(10, 20))
```

```
Maximum: 20
```

```
square = lambda x: x**2
print("Square:", square(2))
```

```
Square: 4
```

```
numbers = [1, 2, 3, 4, 5]
squared_numbers = list(map(lambda x: x**2, numbers))
print("Squared numbers using map():", squared_numbers)
```

```
numbers = [1, 2, 3, 4, 5]
even_numbers = list(filter(lambda x: x%2==0, numbers))
print("Even numbers using filter():", even_numbers)
```

```
---------------------------------------------------------------------------
TypeError                                 Traceback (most recent call last)
/tmp/ipython-input-2783932242.py in <cell line: 0>()
      1 numbers = [1, 2, 3, 4, 5]
----> 2 even_numbers = list(filter(lambda x: x%2==0, numbers))
      3 print("Even numbers using filter():", even_numbers)

TypeError: 'list' object is not callable
```

List Comprehensions:

```
numbers = [1, 2, 3, 4, 5, 8]
squares = [x**2 for x in numbers]
print("Squares:", squares)
```

```
Squares: [1, 4, 9, 16, 25, 64]
```

```
numbers = [1, 2, 3, 4, 5, 8]
evens = [x for x in numbers if x % 2 == 0]
print("Even numbers:", evens)
```

```
Even numbers: [2, 4, 8]
```

```
reversed_list = [numbers[i] for i in range(len(numbers)-1, -1, -1)]
print("Reversed list:", reversed_list)
```

```
Reversed list: [8, 5, 4, 3, 2, 1]
```

```
nested_list = [[1, 2], [3, 4], [5]]
flattened = [item for sublist in nested_list for item in sublist]
print("Flattened list:", flattened)
```

```
Flattened list: [1, 2, 3, 4, 5]
```

```
list1 = [1, 2, 3, 4]
list2 = [3, 4, 5, 6]
common = [x for x in list1 if x in list2]
print("Common elements:", common)
```

```
Common elements: [3, 4]
```

Miscellaneous:

```
a, b = 5, 10
a, b = b, a
print("After swapping: a =", a, "b =", b)
```

```
After swapping: a = 10 b = 5
```

```
sentence = "hello world hello python"
words = sentence.split()
```

```
word_count = {}
for word in words:
    word_count[word] = word_count.get(word, 0) + 1
print("Word occurrences:", word_count)
```

```
Word occurrences: {'hello': 2, 'world': 1, 'python': 1}
```

```
numbers = [10, 20, 4, 45, 99]
unique_numbers = list(set(numbers))
unique_numbers.sort()
second_largest = unique_numbers[-2]
print("Second largest number:", second_largest)
```

```
str1 = "listen"
str2 = "silent"
if sorted(str1) == sorted(str2):
  print(str1, "and", str2, "are anagrams")
else:
  print(str1, "and", str2, "are not anagrams")
```

```
listen and silent are anagrams
```

```
rows = int(input("Enter number of rows: "))
for i in range(rows):
  val = 1
  for j in range(i + 1):
      print(val, end=" ")
      val = val * (i - j) // (j + 1)
  print()
```

```
Enter number of rows: 5
1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
```