**EASY LEVEL PYTHON PROGRAMS**

**1.Hello World**

# Hello World Program

print("Hello, World!")

Output:

Hello, World!

**2.Basic Arithmetic Operations**

# Basic Arithmetic Operations

a = 10

b = 5

print("Addition:", a + b)

print("Subtraction:", a - b)

print("Multiplication:", a \* b)

print("Division:", a / b)

Output:

Addition: 15

Subtraction: 5

Multiplication: 50

Division: 2.0

**3.Simple Input/Output**

# Simple Input/Output

user\_input = input("Enter something: ") # Input: Hello

print("You entered:", user\_input)

Output:

Enter something: Hello

You entered: Hello

**4.Calculating the Area of a Circle**

# Calculating the Area of a Circle

import math

radius = float(input("Enter the radius of the circle: ")) # Input: 5

area = math.pi \* radius \*\* 2

print("Area of the circle is:", area)

Output:

Enter the radius of the circle: 5

Area of the circle is: 78.53981633974483

**5.Temperature Conversion (Celsius to Fahrenheit)**

# Temperature Conversion (Celsius to Fahrenheit)

celsius = float(input("Enter temperature in Celsius: ")) # Input: 25

fahrenheit = (celsius \* 9/5) + 32

print("Temperature in Fahrenheit is:", fahrenheit)

Output:

Enter temperature in Celsius: 25

Temperature in Fahrenheit is: 77.0

**6.Finding Maximum of Two Numbers**

# Finding Maximum of Two Numbers

num1 = float(input("Enter first number: ")) # Input: 10

num2 = float(input("Enter second number: ")) # Input: 20

maximum = max(num1, num2)

print("The maximum of the two numbers is:", maximum)

Output:

Enter first number: 10

Enter second number: 20

The maximum of the two numbers is: 20.0

**7.Simple Interest Calculation**

# Simple Interest Calculation

P = float(input("Enter the principal amount: ")) # Input: 1000

R = float(input("Enter the rate of interest: ")) # Input: 5

T = float(input("Enter the time in years: ")) # Input: 3

simple\_interest = (P \* R \* T) / 100

print("Simple Interest is:", simple\_interest)

Output:

Enter the principal amount: 1000

Enter the rate of interest: 5

Enter the time in years: 3

Simple Interest is: 150.0

**8.Even or Odd**

# Even or Odd

number = int(input("Enter a number: ")) # Input: 4

if number % 2 == 0:

print("The number is even.")

else:

print("The number is odd.")

Output:

Enter a number: 4

The number is even.

**9.Sum of N Natural Numbers**

# Sum of N Natural Numbers

n = int(input("Enter a number: ")) # Input: 5

sum\_of\_n = n \* (n + 1) / 2

print("Sum of first", n, "natural numbers is:", sum\_of\_n)

Output:

Enter a number: 5

Sum of first 5 natural numbers is: 15.0

**10.Swap Two Variables**

# Swap Two Variables

a = input("Enter the value of a: ") # Input: 5

b = input("Enter the value of b: ") # Input: 10

a, b = b, a

print("After swapping, value of a:", a)

print("After swapping, value of b:", b)

Output:

Enter the value of a: 5

Enter the value of b: 10

After swapping, value of a: 10

After swapping, value of b: 5

**11.Vowel or Consonant**

# Vowel or Consonant

char = input("Enter a character: ").lower() # Input: a

if char in {'a', 'e', 'i', 'o', 'u'}:

print("The character is a vowel.")

else:

print("The character is a consonant.")

Output:

Enter a character: a

The character is a vowel.

**12.Simple Calculator**

# Simple Calculator

num1 = float(input("Enter first number: ")) # Input: 5

num2 = float(input("Enter second number: ")) # Input: 3

operation = input("Enter operation (+, -, \*, /): ") # Input: +

if operation == '+':

print("Result:", num1 + num2)

elif operation == '-':

print("Result:", num1 - num2)

elif operation == '\*':

print("Result:", num1 \* num2)

elif operation == '/':

print("Result:", num1 / num2)

else:

print("Invalid operation")

Output:

Enter first number: 5

Enter second number: 3

Enter operation (+, -, \*, /): +

Result: 8.0

**13.Leap Year Check**

# Leap Year Check

year = int(input("Enter a year: ")) # Input: 2020

if (year % 4 == 0 and year % 100 != 0) or (year % 400 == 0):

print("The year is a leap year.")

else:

print("The year is not a leap year.")

Output:

Enter a year: 2020

The year is a leap year.

**14.Sum of Digits**

# Sum of Digits

number = input("Enter a number: ") # Input: 123

sum\_of\_digits = sum(int(digit) for digit in number)

print("Sum of digits is:", sum\_of\_digits)

Output:

Enter a number: 123

Sum of digits is: 6

**15.Reverse a String**

# Reverse a String

string = input("Enter a string: ") # Input: hello

reversed\_string = string[::-1]

print("Reversed string is:", reversed\_string)

Output:

Enter a string: hello

Reversed string is: olleh

**16.Find the Largest of Three Numbers**

# Find the Largest of Three Numbers

num1 = float(input("Enter first number: ")) # Input: 3

num2 = float(input("Enter second number: ")) # Input: 6

num3 = float(input("Enter third number: ")) # Input: 9

largest = max(num1, num2, num3)

print("The largest number is:", largest)

Output:

Enter first number: 3

Enter second number: 6

Enter third number: 9

The largest number is: 9.0

**17.Check if a Number is Positive, Negative, or Zero**

# Check if a Number is Positive, Negative, or Zero

number = float(input("Enter a number: ")) # Input: -5

if number > 0:

print("The number is positive.")

elif number < 0:

print("The number is negative.")

else:

print("The number is zero.")

Output:

Enter a number: -5

The number is negative.

**18.Count Vowels in a String**

# Count Vowels in a String

string = input("Enter a string: ").lower() # Input: hello

vowels = 'aeiou'

count = sum(1 for char in string if char in vowels)

print("Number of vowels in the string:", count)

Output:

Enter a string: hello

Number of vowels in the string: 2

**19.Calculate Compound Interest**

# Calculate Compound Interest

P = float(input("Enter the principal amount: ")) # Input: 1000

R = float(input("Enter the rate of interest: ")) # Input: 5

T = float(input("Enter the time in years: ")) # Input: 2

compound\_interest = P \* (1 + R / 100) \*\* T

print("Compound Interest is:", compound\_interest)

Output:

Enter the principal amount: 1000

Enter the rate of interest: 5

Enter the time in years: 2

Compound Interest is: 1102.5

**20.Find ASCII Value of a Character**

# Find ASCII Value of a Character

char = input("Enter a character: ") # Input: A

ascii\_value = ord(char)

print("The ASCII value of", char, "is:", ascii\_value)

Output:

Enter a character: A

The ASCII value of A is: 65

**MEDIUM LEVEL PYTHON PROGRAMS**

**1. Fibonacci Sequence**

# Fibonacci Sequence

n = int(input("Enter the number of terms: ")) # Input: 10

a, b = 0, 1

print("Fibonacci Sequence:")

for \_ in range(n):

print(a, end=' ')

a, b = b, a + b

Output:

Enter the number of terms: 10

Fibonacci Sequence:

0 1 1 2 3 5 8 13 21 34

**2.Prime Number Check**

# Prime Number Check

num = int(input("Enter a number: ")) # Input: 29

if num > 1:

for i in range(2, int(num\*\*0.5) + 1):

if num % i == 0:

print(num, "is not a prime number")

break

else:

print(num, "is a prime number")

else:

print(num, "is not a prime number")

Output:

Enter a number: 29

29 is a prime number

**3.Factorial of a Number**

# Factorial of a Number

num = int(input("Enter a number: ")) # Input: 5

factorial = 1

for i in range(1, num + 1):

factorial \*= i

print("Factorial of", num, "is", factorial)

Output:

Enter a number: 5

Factorial of 5 is 120

**4.Palindrome Checker**

# Palindrome Checker

string = input("Enter a string: ") # Input: madam

if string == string[::-1]:

print(string, "is a palindrome")

else:

print(string, "is not a palindrome")

Output:

Enter a string: madam

madam is a palindrome

**5.Bubble Sort**

# Bubble Sort

arr = [64, 34, 25, 12, 22, 11, 90]

n = len(arr)

for i in range(n):

for j in range(0, n-i-1):

if arr[j] > arr[j+1]:

arr[j], arr[j+1] = arr[j+1], arr[j]

print("Sorted array is:", arr)

Output:

Sorted array is: [11, 12, 22, 25, 34, 64, 90]

**6.Basic File Handling**

# Basic File Handling

with open('example.txt', 'w') as file:

file.write("Hello, World!")

with open('example.txt', 'r') as file:

content = file.read()

print("File content:", content)

Output:

File content: Hello, World!

**7.Dictionary Operations**

# Dictionary Operations

my\_dict = {'name': 'John', 'age': 25}

print("Original dictionary:", my\_dict)

my\_dict['age'] = 26

print("Updated dictionary:", my\_dict)

my\_dict['city'] = 'New York'

print("Extended dictionary:", my\_dict)

Output:

Original dictionary: {'name': 'John', 'age': 25}

Updated dictionary: {'name': 'John', 'age': 26}

Extended dictionary: {'name': 'John', 'age': 26, 'city': 'New York'}

**8.Armstrong Number**

# Armstrong Number

num = int(input("Enter a number: ")) # Input: 153

sum\_of\_cubes = sum(int(digit)\*\*3 for digit in str(num))

if num == sum\_of\_cubes:

print(num, "is an Armstrong number")

else:

print(num, "is not an Armstrong number")

Output:

Enter a number: 153

153 is an Armstrong number

**9.GCD of Two Numbers**

# GCD of Two Numbers

def gcd(a, b):

while b:

a, b = b, a % b

return a

a = int(input("Enter first number: ")) # Input: 54

b = int(input("Enter second number: ")) # Input: 24

print("GCD of", a, "and", b, "is", gcd(a, b))

Output:

Enter first number: 54

Enter second number: 24

GCD of 54 and 24 is 6

**10.LCM of Two Numbers**

# LCM of Two Numbers

def gcd(a, b):

while b:

a, b = b, a % b

return a

def lcm(a, b):

return abs(a \* b) // gcd(a, b)

a = int(input("Enter first number: ")) # Input: 54

b = int(input("Enter second number: ")) # Input: 24

print("LCM of", a, "and", b, "is", lcm(a, b))

Output:

Enter first number: 54

Enter second number: 24

LCM of 54 and 24 is 216

**11.Check if a Number is Perfect**

# Check if a Number is Perfect

num = int(input("Enter a number: ")) # Input: 28

sum\_of\_divisors = sum(i for i in range(1, num) if num % i == 0)

if sum\_of\_divisors == num:

print(num, "is a perfect number")

else:

print(num, "is not a perfect number")

Output:

Enter a number: 28

28 is a perfect number

**12.Count the Number of Each Vowel in a String**

# Count the Number of Each Vowel in a String

string = input("Enter a string: ").lower() # Input: hello world

vowels = 'aeiou'

vowel\_count = {v: string.count(v) for v in vowels}

print("Vowel counts:", vowel\_count)

Output:

Enter a string: hello world

Vowel counts: {'a': 0, 'e': 1, 'i': 0, 'o': 2, 'u': 0}

**13.Find the Sum of an Array**

# Find the Sum of an Array

arr = [1, 2, 3, 4, 5]

sum\_of\_array = sum(arr)

print("Sum of the array is:", sum\_of\_array)

Output:

Sum of the array is: 15

**14.Transpose of a Matrix**

# Transpose of a Matrix

matrix = [

[1, 2, 3],

[4, 5, 6],

[7, 8, 9]

]

transpose = [[matrix[j][i] for j in range(len(matrix))] for i in range(len(matrix[0]))]

print("Original matrix:", matrix)

print("Transposed matrix:", transpose)

Output:

Original matrix: [[1, 2, 3], [4, 5, 6], [7, 8, 9]]

Transposed matrix: [[1, 4, 7], [2, 5, 8], [3, 6, 9]]

**15.Remove Punctuations from a String**

# Remove Punctuations from a String

import string

input\_str = input("Enter a string: ") # Input: hello, world!

output\_str = ''.join(char for char in input\_str if char not in string.punctuation)

print("String without punctuation:", output\_str)

Output:

Enter a string: hello, world!

String without punctuation: hello world

**ADVANCED LEVEL PYTHON PROGRAMS**

**1.Matrix Multiplication**

# Matrix Multiplication

A = [

[1, 2, 3],

[4, 5, 6],

[7, 8, 9]

]

B = [

[9, 8, 7],

[6, 5, 4],

[3, 2, 1]

]

result = [[0 for \_ in range(len(B[0]))] for \_ in range(len(A))]

for i in range(len(A)):

for j in range(len(B[0])):

for k in range(len(B)):

result[i][j] += A[i][k] \* B[k][j]

print("Result of matrix multiplication:")

for row in result:

print(row)

**output:**

Result of matrix multiplication:

[30, 24, 18]

[84, 69, 54]

[138, 114, 90

**2. Merge Sort**

# Merge Sort

def merge\_sort(arr):

if len(arr) > 1:

mid = len(arr) // 2

L = arr[:mid]

R = arr[mid:]

merge\_sort(L)

merge\_sort(R)

i = j = k = 0

while i < len(L) and j < len(R):

if L[i] < R[j]:

arr[k] = L[i]

i += 1

else:

arr[k] = R[j]

j += 1

k += 1

while i < len(L):

arr[k] = L[i]

i += 1

k += 1

while j < len(R):

arr[k] = R[j]

j += 1

k += 1

arr = [12, 11, 13, 5, 6, 7]

print("Given array:", arr)

merge\_sort(arr)

print("Sorted array:", arr)

**output:**

Given array: [12, 11, 13, 5, 6, 7]

Sorted array: [5, 6, 7, 11, 12, 13]

**3. Tic-Tac-Toe Game**

# Tic-Tac-Toe Game

def print\_board(board):

for row in board:

print(' '.join(row))

def check\_win(board):

for row in board:

if row.count(row[0]) == len(row) and row[0] != ' ':

return True

for col in range(len(board)):

check\_col = [board[row][col] for row in range(len(board))]

if check\_col.count(check\_col[0]) == len(check\_col) and check\_col[0] != ' ':

return True

if all(board[i][i] == board[0][0] and board[0][0] != ' ' for i in range(len(board))):

return True

if all(board[i][len(board) - i - 1] == board[0][len(board) - 1] and board[0][len(board) - 1] != ' ' for i in range(len(board))):

return True

return False

def tic\_tac\_toe():

board = [[' ' for \_ in range(3)] for \_ in range(3)]

current\_player = 'X'

for \_ in range(9):

print\_board(board)

row = int(input(f"Player {current\_player}, enter the row (0, 1, 2): ")) # Input: 1

col = int(input(f"Player {current\_player}, enter the column (0, 1, 2): ")) # Input: 1

if board[row][col] == ' ':

board[row][col] = current\_player

if check\_win(board):

print\_board(board)

print(f"Player {current\_player} wins!")

return

current\_player = 'O' if current\_player == 'X' else 'X'

else:

print("Invalid move. Try again.")

print\_board(board)

print("It's a draw!")

tic\_tac\_toe()

**Output:**

Player X, enter the row (0, 1, 2): 1

Player X, enter the column (0, 1, 2): 1

(continues until win or draw)

**4. Web Scraping with BeautifulSoup**

# Web Scraping with BeautifulSoup

import requests

from bs4 import BeautifulSoup

url = 'https://www.example.com'

response = requests.get(url)

soup = BeautifulSoup(response.text, 'html.parser')

titles = soup.find\_all('h1')

print("Page titles:")

for title in titles:

print(title.get\_text())

Output:

Page titles:

Example Domain

(other titles if present)

**5. Data Analysis with Pandas:**

# Data Analysis with Pandas

import pandas as pd

data = {

'Name': ['Alice', 'Bob', 'Charlie', 'David', 'Eva'],

'Age': [24, 27, 22, 32, 29],

'City': ['New York', 'Los Angeles', 'Chicago', 'Houston', 'Phoenix']

}

df = pd.DataFrame(data)

print("DataFrame:\n", df)

print("\nDescriptive Statistics:\n", df.describe())

print("\nFilter Age > 25:\n", df[df['Age'] > 25])

print("\nGroup by City:\n", df.groupby('City').mean())

output:

DataFrame:

Name Age City

0 Alice 24 New York

1 Bob 27 Los Angeles

2 Charlie 22 Chicago

3 David 32 Houston

4 Eva 29 Phoenix

Descriptive Statistics:

Age

count 5.000000

mean 26.800000

std 3.962323

min 22.000000

25% 24.000000

50% 27.000000

75% 29.000000

max 32.000000

Filter Age > 25:

Name Age City

1 Bob 27 Los Angeles

3 David 32 Houston

4 Eva 29 Phoenix

Group by City:

Age

City

Chicago 22.0

Houston 32.0

Los Angeles 27.0

New York 24.0

Phoenix 29.0