In [1]:
```
#1) basic calculator, performing addition, subtraction,multiplication, and division
```

In [1]:
```
print("choose operation:+,-,*,/")
op=input("operation:")
num1=float(input("First number:"))
num2=float(input("second number:"))
if op == '+':
    print("Result:", num1 + num2)
elif op == '-':
    print("Result:", num1 - num2)
elif op == '*':
    print("Result:", num1 * num2)
elif op == '/':
    if num2 != 0:
        print("Result:", num1 / num2)
    else:
        print("Error: Cannot divide by zero")
else:
    print("Invalid operation")
```

```
choose operation:+,-,*,/
Result: 3.0
```

In [ ]:
```
# 2) Decimal to Binary
```

In [2]:
```
num = int(input("Enter a decimal number: "))
print("Binary equivalent:", bin(num)[2:])
```

```
Binary equivalent: 110
```

In [ ]:
```
# 3) Age Category
```

In [3]:
```
age = int(input("Enter your age: "))
if age < 18:
    print("You are a minor.")
elif age < 60:
    print("You are an adult.")
else:
    print("You are a senior.")
```

```
You are an adult.
```

In [ ]:
```
# 4) Swap without third variable
```

In [6]:
```
a = int(input("Enter first number: "))
b = int(input("Enter second number: "))
a, b = b, a
print("Swapped values:", a, b)
```

```
Swapped values: 23 34
```

In [ ]:
```
# 5) Fibonacci (first 10 numbers)
```

In [7]:
```
a, b = 0, 1
for _ in range(10):
    print(a, end=' ')
    a, b = b, a + b
```

```
0 1 1 2 3 5 8 13 21 34
```

In [ ]:
```
# 6) Prime Number Check
```

In [8]:
```
n = int(input("\nEnter a number: "))
if n > 1:
    for i in range(2, n):
        if n % i == 0:
            print("Not Prime")
            break
    else:
        print("Prime")
else:
    print("Not Prime")
```

```
Not Prime
```

In [ ]:
```
# 7) Check Sum with Logical Operators
```

In [9]:
```
a = int(input("Enter first number: "))
b = int(input("Enter second number: "))
c = int(input("Enter third number: "))
print("Third is sum of first two:", c == (a + b))
```

```
Third is sum of first two: False
```

In [ ]:
```
# 8) Custom factorial module
```

In [16]:
```
import factorial_module

num = int(input("Enter number to find factorial: "))
print("Factorial:", factorial_module.factorial(num))
```

```
Factorial: 24
```

In [ ]:
```
# 9) Division with zero check
```

In [18]:
```
a = int(input("Enter numerator: "))
b = int(input("Enter denominator: "))
if b != 0:
    print("Result:", a / b)
else:
    print("Division by zero is not allowed.")
```

```
Division by zero is not allowed.
```

In [ ]:
```
# 10) Max in List
```

In [17]:
```
def find_max(numbers):
    if not numbers:
        return "List is empty"
```

```
    max_val = numbers[0]
    for num in numbers:
        if num > max_val:
            max_val = num
    return max_val
nums = list(map(int, input("Enter numbers separated by space: ").split()))
print("Maximum value:", find_max(nums))
```

```
Maximum value: 9
```

In [ ]:
```
# 11) Greeting with default age
```

In [16]:
```
def greet(name,age=25):
    print(f"Hello,{name}! You are {age} years old.")

greet("Alice")
greet("Ray", 30)
```

```
Hello,Alice! You are 25 years old.
Hello,Ray! You are 30 years old.
```

In [4]:
```
# 12) count the number of vowels in a string
def count_vowels(text):
    vowels = 'aeiouAEIOU'
    count = 0
    for char in text:
        if char in vowels:
            count += 1
    return count
string = input("Enter a string: ")
print("Number of vowels:", count_vowels(string))
```

```
Number of vowels: 4
```

In [5]:
```
# 13) Multiplication table up to (number × 10)
num = int(input("Enter a number: "))
print(f"Multiplication Table for {num}")
for i in range(1, 11):
    print(f"{num} x {i} = {num * i}")
```

```
Multiplication Table for 10
10 x 1 = 10
10 x 2 = 20
10 x 3 = 30
10 x 4 = 40
10 x 5 = 50
10 x 6 = 60
10 x 7 = 70
10 x 8 = 80
10 x 9 = 90
10 x 10 = 100
```

In [6]:
```
# 14) Right-angled triangle pattern
rows = int(input("Enter number of rows: "))
for i in range(1, rows + 1):
    print('*' * i)
```

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

In [7]:
```python
# 15) Pyramid pattern
rows = int(input("Enter number of rows: "))
for i in range(1, rows + 1):
    spaces = ' ' * (rows - i)
    stars = '*' * (2 * i - 1)
    print(spaces + stars)
```

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

In [8]:
```python
# 1) Palindrome number
def is_palindrome(x):
    return str(x) == str(x)[::-1]
print(is_palindrome(121))
print(is_palindrome(123))
```

```
True
False
```

In [11]:
```python
# 2) Single number
nums = [2, 3, 5, 2, 3]
for num in nums:
    if nums.count(num) == 1:
        print(num)
        break
```

```
5
```

In [12]:
```python
# 3) Two sum
nums = [2, 7, 11, 15]
target = 9

for i in range(len(nums)):
    for j in range(i + 1, len(nums)):
        if nums[i] + nums[j] == target:
            print(i, j)
            break
```

```
0 1
```

In [13]:
```python
# 4) Happy Number
def is_happy(n):
    seen = set()
    while n != 1 and n not in seen:
        seen.add(n)
        n = sum(int(digit) ** 2 for digit in str(n))
    return n == 1
print(is_happy(19))  # True
```

```
True
```

In [15]:
```python
# 5)Duplicate number
def contains_duplicate(nums):
    return len(nums) != len(set(nums))
print(contains_duplicate([1, 2, 3, 1]))
print(contains_duplicate([1, 2, 3]))
```

```
True
False
```

In [ ]:
```
```