# Python Basic Programming Case Studies

## Case Study 1: Odd or Even Checker

\*\*Problem:\*\* Write a Python program to solve the given problem.

\*\*Solution:\*\*

num = int(input("Enter a number: "))  
if num % 2 == 0:  
 print(f"{num} is Even")  
else:  
 print(f"{num} is Odd")

## Case Study 2: Temperature Converter

\*\*Problem:\*\* Write a Python program to solve the given problem.

\*\*Solution:\*\*

celsius = float(input("Enter temperature in Celsius: "))  
fahrenheit = (celsius \* 9/5) + 32  
print(f"{celsius}°C is equal to {fahrenheit}°F")

## Case Study 3: Factorial Calculator

\*\*Problem:\*\* Write a Python program to solve the given problem.

\*\*Solution:\*\*

def factorial(n):  
 return 1 if n == 0 else n \* factorial(n - 1)  
  
num = int(input("Enter a number: "))  
print(f"Factorial of {num} is {factorial(num)}")

## Case Study 4: Reverse a String

\*\*Problem:\*\* Write a Python program to solve the given problem.

\*\*Solution:\*\*

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

## Case Study 5: Find Maximum of Three Numbers

\*\*Problem:\*\* Write a Python program to solve the given problem.

\*\*Solution:\*\*

def max\_of\_three(a, b, c):  
 return max(a, b, c)  
  
print(max\_of\_three(10, 20, 15))

## Case Study 6: Prime Number Checker

\*\*Problem:\*\* Write a Python program to solve the given problem.

\*\*Solution:\*\*

num = int(input("Enter a number: "))  
if num > 1 and all(num % i != 0 for i in range(2, int(num\*\*0.5) + 1)):  
 print(f"{num} is a prime number")  
else:  
 print(f"{num} is not a prime number")

## Case Study 7: Fibonacci Series

\*\*Problem:\*\* Write a Python program to solve the given problem.

\*\*Solution:\*\*

def fibonacci(n):  
 a, b = 0, 1  
 for \_ in range(n):  
 print(a, end=" ")  
 a, b = b, a + b  
  
fibonacci(10)

## Case Study 8: Sum of Digits

\*\*Problem:\*\* Write a Python program to solve the given problem.

\*\*Solution:\*\*

num = input("Enter a number: ")  
print("Sum of digits:", sum(int(digit) for digit in num))

## Case Study 9: Armstrong Number Checker

\*\*Problem:\*\* Write a Python program to solve the given problem.

\*\*Solution:\*\*

num = int(input("Enter a number: "))  
sum\_of\_digits = sum(int(digit) \*\* len(str(num)) for digit in str(num))  
print(f"{num} is an Armstrong number" if num == sum\_of\_digits else f"{num} is not an Armstrong number")

## Case Study 10: Leap Year Checker

\*\*Problem:\*\* Write a Python program to solve the given problem.

\*\*Solution:\*\*

year = int(input("Enter a year: "))  
if (year % 4 == 0 and year % 100 != 0) or (year % 400 == 0):  
 print(f"{year} is a Leap Year")  
else:  
 print(f"{year} is not a Leap Year")

## Case Study 11: Palindrome String Checker

\*\*Problem:\*\* Write a Python program to solve the given problem.

\*\*Solution:\*\*

string = input("Enter a string: ")  
print(f"{string} is a Palindrome" if string == string[::-1] else f"{string} is not a Palindrome")

## Case Study 12: Simple Calculator

\*\*Problem:\*\* Write a Python program to solve the given problem.

\*\*Solution:\*\*

a = float(input("Enter first number: "))  
b = float(input("Enter second number: "))  
operation = input("Choose operation (+, -, \*, /): ")  
  
if operation == '+':  
 print(a + b)  
elif operation == '-':  
 print(a - b)  
elif operation == '\*':  
 print(a \* b)  
elif operation == '/':  
 print(a / b if b != 0 else "Division by zero not allowed")  
else:  
 print("Invalid operation")

## Case Study 13: List Sorting

\*\*Problem:\*\* Write a Python program to solve the given problem.

\*\*Solution:\*\*

numbers = [5, 3, 8, 1, 2, 9]  
numbers.sort()  
print("Sorted list:", numbers)

## Case Study 14: Find Duplicates in a List

\*\*Problem:\*\* Write a Python program to solve the given problem.

\*\*Solution:\*\*

numbers = [1, 2, 3, 2, 4, 5, 1, 6]  
duplicates = set([num for num in numbers if numbers.count(num) > 1])  
print("Duplicates:", duplicates)

## Case Study 15: Count Vowels in a String

\*\*Problem:\*\* Write a Python program to solve the given problem.

\*\*Solution:\*\*

string = input("Enter a string: ")  
vowel\_count = sum(1 for char in string.lower() if char in "aeiou")  
print(f"Number of vowels: {vowel\_count}")

## Case Study 16: Find Largest Element in a List

\*\*Problem:\*\* Write a Python program to solve the given problem.

\*\*Solution:\*\*

numbers = [10, 45, 67, 89, 34]  
print("Largest number:", max(numbers))

## Case Study 17: Reverse a List

\*\*Problem:\*\* Write a Python program to solve the given problem.

\*\*Solution:\*\*

numbers = [1, 2, 3, 4, 5]  
print("Reversed List:", numbers[::-1])

## Case Study 18: Find Common Elements in Two Lists

\*\*Problem:\*\* Write a Python program to solve the given problem.

\*\*Solution:\*\*

list1 = [1, 2, 3, 4, 5]  
list2 = [3, 4, 5, 6, 7]  
common\_elements = list(set(list1) & set(list2))  
print("Common elements:", common\_elements)

## Case Study 19: Merge Two Dictionaries

\*\*Problem:\*\* Write a Python program to solve the given problem.

\*\*Solution:\*\*

dict1 = {"a": 1, "b": 2}  
dict2 = {"c": 3, "d": 4}  
merged\_dict = {\*\*dict1, \*\*dict2}  
print("Merged Dictionary:", merged\_dict)

## Case Study 20: Count Word Frequency in a Sentence

\*\*Problem:\*\* Write a Python program to solve the given problem.

\*\*Solution:\*\*

sentence = input("Enter a sentence: ")  
word\_counts = {word: sentence.split().count(word) for word in set(sentence.split())}  
print("Word Frequencies:", word\_counts)