Python Developer Task - 2

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# Objective

The objective of this task was to implement several Python programs focusing on fundamental concepts such as prime checking, number operations, list manipulation, string operations, and a mini project involving maze generation and solving using DFS algorithm—all without using external libraries for visualization.

# Task-wise Approach

## 1. Prime Number

Checked if a number is prime by testing for divisibility up to its square root.

## 2. Sum of Digits

Converted the number to a string and summed up its digits using a loop.

## 3. LCM and GCD

Implemented Euclidean Algorithm for GCD and used the formula LCM = abs(a\*b)//GCD.

## 4. List Reversal

Reversed a list manually by swapping elements without using built-in reverse().

## 5. Sort a List

Used Bubble Sort algorithm to sort the list in ascending order.

## 6. Remove Duplicates

Created a new list and added only unique elements from the input list.

## 7. String Length

Counted characters manually using a loop, without using len().

## 8. Count Vowels and Consonants

Iterated through the string and checked against a set of vowels.

## 9. Maze Generator and Solver

Implemented recursive DFS for both maze generation and solving. The maze was represented as a 2D grid with 1s for walls and 0s for paths. The solution path was traced using recursive backtracking.

# Challenges Faced

The primary challenge was implementing the maze generation and solving algorithm in a terminal-based format without using any external libraries. Managing recursion for both generating and solving the maze required careful handling of edge cases and path tracking.

# Learning Outcomes

This task enhanced my understanding of core Python logic, algorithm design, recursion, and graph traversal. It reinforced best practices in problem-solving and strengthened my ability to implement solutions without relying on external tools.

# Conclusion

Successfully completing Task 2 has improved my proficiency in Python and problem-solving. The maze generator project, in particular, was a rewarding experience that deepened my understanding of data structures and algorithmic thinking.