Python Programming Task-3 Report

Introduction:

This task focuses on enhancing Python programming skills by solving various problems such as number operations, string manipulation, matrix calculations, and AI-based game development.

Tasks Overview

1. Table of a Number: Generate a multiplication table for a number using loops.
2. Swap Two Numbers: Swap numbers without a temporary variable using arithmetic operations.
3. Check Substring: Determine if a string is a substring of another using Python’s in operator.
4. Decimal to Binary Conversion: Convert a decimal number to binary using iterative division or Python’s bin() function.
5. Matrix Addition: Add two matrices by iterating through their elements.
6. Matrix Multiplication: Multiply two matrices using row-by-column multiplication.
7. Find Second Largest: Identify the second largest number in a list using sorting or iteration.
8. Check Anagram: Verify if two strings are anagrams by sorting or counting character frequencies.
9. AI-Based Tic-Tac-Toe: Create a game where AI uses the minimax algorithm to make optimal moves.

Challenges:

Handling edge cases (e.g., empty inputs, invalid matrices).

Ensuring efficient implementation of algorithms.

Applying advanced techniques like recursion and minimax for AI.

Learning Outcomes:

Strengthened Python programming and logical thinking skills.

Practical experience with algorithms and matrix operations.

Introduction to AI strategies through Tic-Tac-Toe.

Conclusion:

Task-3 provided diverse programming challenges, enhancing problem-solving and practical implementation skills while introducing advanced concepts like AI game development.