

DAA Homework - 1

Question 1

Consider the size of the matrices given in Table 1.

- Perform matrix chain multiplication for $A_1 \cdot A_2 \cdot A_3 \cdot A_4$ to minimize the number of scalar multiplication operations.
- Explain the optimal parenthesis substructure of matrix chain.

Table 1

Matrix	No. of Rows	No. of columns
A_1	5	4
A_2	4	6
A_3	6	2
A_4	2	7

Question 2

Consider the two strings "BDCB" and "BACDB".

- Determine the longest common subsequence (LCS).
- Discuss the three optimal substructure cases of LCS using dynamic programming.

Question 3

Solve the following instance of the 0/1 Knapsack problem using branch and bound method.

Number of elements = 4, Capacity = 15, Weights = {2, 4, 6, 9},

Profit = {10, 10, 12, 18}

Question 4

Explain the greedy algorithm to determine the optimal solution in a 0/1 Knapsack's problem with a suitable example

Question 5

Derive the time complexity of the quick sort algorithm.