

1. How the integer multiplication can be improved using Divide & Conquer Strategy. Write an algorithm for the same.
2. Write the Algorithm for the Optimal Merge Patterns using the Greedy Programming Design Technique. Give its Time Complexity. Solve the example if you are given four files with no. of records 20,30,40,50 respectively.
3. Consider the problem of searching in a sorted matrix. That is, you are given an  $n \times n$  matrix A, where each entry is an integer. Each row of the matrix is sorted in ascending order, and each column is also sorted in ascending order. Given a value x, the problem is to decide whether x is stored somewhere in the array (i.e., whether there is some i and j such that  $A[i][j] = x$ ). Give a divide-and-conquer algorithm for this problem. (Hint: Your algorithm needs to call itself recursively, so think carefully about the parameters required. First compare x with the element in the "middle" of your array)

4 . Using Kruskal's method of MST find the five edges.

	A	B	C	D	E	F
A		7	6	1	3	12
B			4	5	8	10
C				9	11	15
D					2	14
E						13
F						

5 . You have 32 movable pieces that are initially placed on a board as shown. A piece can move by jumping over its immediate neighbor horizontally or vertically into an empty square opposite. The jump removes the jumped over neighbor from the board. The goal is to remove 31 pieces to finish with a single piece at the center of the board. Write a suitable efficient algorithm for this.

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