ITM 613 Algorithm

[B-1] Maximum Submatrix

We are going to expand the maximum subarray problem into another dimension. We will find a *maximum submatrix*, where given an N x N matrix (a two dimensional array) of positive and negative integers whose submatrix has the largest sum.

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EXAMPLE
Input : A two-dimensional array (matrix)
[[ 9, -8,  1,  3, -2],
 [-3,  7,  6, -2,  4],
 [ 6, -4, -4,  8, -7],
 [12, -5,  3,  9, -5]]
Output: 38 // (start (1, 1), end (4,4))
```

Write pseudocode to find the sum of submatrix with the largest possible sum.

1) Provide a pseudocode using a brute-force approach and its running time.

2) Transform the problem into a divide-and-conquer algorithm, and analyze its running time.

3) Write pseudocode using dynamic programming, answering together the range of submatrix.