ZOJ 1074

daseinpwt

1. We number the elements as below:

$$A = \begin{bmatrix} a_{1,1} & \dots & a_{1,N} \\ \vdots & \ddots & \vdots \\ a_{N,1} & \dots & a_{N,N} \end{bmatrix}$$

2. Let $sum_{i,j}$ denote the sum of the elements in the sub-matrix b with

$$b = \begin{bmatrix} a_{1,1} & \dots & a_{1,j} \\ \vdots & \ddots & \vdots \\ a_{i,1} & \dots & a_{i,j} \end{bmatrix}$$

3. We have

$$sum_{i,j} = sum_{i-1,j} + sum_{i,j-1} - sum_{i-1,j-1} + a_{i,j}$$

   We can pre-calculate all the $sum_{i,j}$. $\mathcal{O}(N^2)$

4. Enumerate all sub-matrices and calculate the maximum sum. $\mathcal{O}(N^4)$