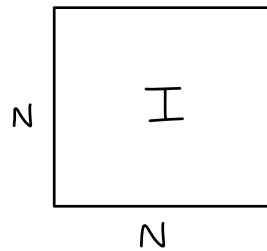
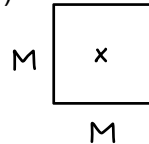


## exercise\_02d

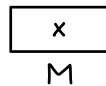
Input image:  $(N \times N)$



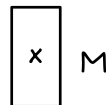
B centered structuring element:  $(M \times M)$



C centered structuring element:  $(1 \times M)$



D centered structuring element:  $(M \times 1)$



Estimate the number of 'max' operations that must be computed in order to process a  $N \times N$  sparse image using:

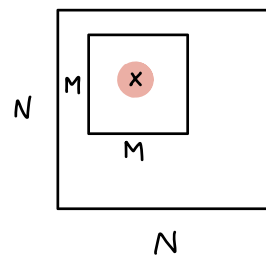
- dilate\_B (I)

For each pixel I perform (number of elements to compare in max operation - 1) so in this case:  $(M^2 - 1)$ . Doing it for all the pixels I obtain:

$$N^2 \times (M^2 - 1)$$

ex.  $N=5$   $M=3$

$$\rightarrow 5^2 \times (3^2 - 1) = 200 \quad \checkmark$$



- dilate\_C (dilate\_D(I))

For each pixel I perform in both C and D:  $(M - 1)$  and in both cases it has to be done for each pixel:  $N^2 \times (M - 1)$ . Because we have two dilations the final result is:

$$2 N^2 \times (M - 1)$$

$$\rightarrow 2 \cdot 5^2 \times (3 - 1) = 100 \quad \checkmark$$

