Homework Assignment

Suppose a 96x96 array $S$ is distributed by blocks across four processors, so that each contains a 48x48 subarray. At each position $S[i,j]$ is updated by the sum of its 8 nearest neighbors:

$$S'[i,j] = \frac{(S[i-1,j-1]+S[i-1,j]+S[i-1,j+1]+S[i,j+1]+S[i+1,j+1] +S[i+1,j]+S[i+1,j-1]+S[i,j-1])}{8};$$

If each processor updates its own elements, how many messages must are produced to maintain concurrency for a directory based CC-NUMA?

HINT: Assume that an extra row and column, initialized to zero, surrounds $A$, $A$ is allocated in rmo, and storage for $S$ alternates with $S'$