

# Mandatory exercise: External memory II

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- 1 Matrix transposition.** In this exercise you want to compute the transpose  $A^T$  of a matrix  $A$ .
  - 1.1** Give a cache oblivious algorithm for transposing an  $n \times m$  matrix and analyse its I/O. Your algorithm can be *out-of-place*, i.e., you may write the result of the transposition to an additional  $m \times n$  matrix.
  - 1.2** Do you have to make any assumptions about the cache size for your algorithm to work?
  - 1.3** Suppose you want your algorithm to work *in-place* on  $n \times n$  matrices, i.e., you are only allowed to use a small slice of size  $o(n^2)$  of additional disk memory for your algorithm. Give a cache oblivious algorithm for this and analyze it.