Lab 1

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Note: Unless specifically asked to submit a solution, just work on the exercises and keep track of your progress in your journal.

1. Come up and write down the pseudo-code to compute the product of the transpose of the $n \times n$ sparse matrix A in CSR format with a vector x:

   $$y = A' \cdot x$$

   Do not use the naive way by searching for all non-zero entries in column i. The number of operations performed in the algorithm should be $O(n)$ (assuming a constant number of entries by row.

2. Take a look at the `01_sparse_mat` source code from the class repo and implement your pseudo code in 1) in the function `mat_vec_transposed`. Submit your `main.cc` solution on Canvas.

3. Take a look at the function `print_full` in the same program: notice that the output is incorrect (see the last entry in the second row). Try to fix this bug.

4. Install deal.II version 9.2.0 on your computer. See the lecture and Canvas for more information. Make sure you can run tutorial `step-1` from deal.II.