Assignment 1 PPI – s2400316 – Alexander Mulkidzhanyan

## Task

The goal of the assignment was to implement an algorithm which would perform an LU-Matrix factorization using Gaussian elimination on a sparse matrix. Only arrays (no pointers) could be used and the program was to be implemented to run sequentially.

The LU-factorization consists of multiple phases:

1. Check if any pivot-variables are zero, and if yes switch columns so that there are no zero-value pivot-variables
2. Calculate “A”-matrix using Gaussian elimination
3. Break “A”-matrix into L (lower) and U(upper) triangular matrices (in sparse format).
4. Perform matrix multiplication operations
5. Perform forward/backward substitution to determine and test the correctness of the computation
6. Perform benchmark testing on multiple sparse matrices

## Results

The LU-factorization algorithm was implemented and runs without throwing errors. However, the correctness of the results cannot be tested because step 5 has not been implemented. Also, no benchmark testing has been performed. While no formal testing has been done, executing LU factorization on a 765\*765 matrix with over 24000 values takes less than 5 seconds.