Frobenius Norm

Preparation:

1. Import the required packages, MRJob, MRStep, and sqrt from math.
2. To be able to use MRJob to calculate Frobenius norm, the index of each row should be added to the "A.txt" file. To do so, the python file called "add_rowIndex_inA.py" is created which adds a column of row index to the matrix and produces a new matrix with row indexes into "A_with_rowIndex.txt".

MapReduce Job:

1. The mapper produces 50 pairs for each row which consist of (row index, the number^2).
2. The reducer "reducer_sum_row" produces sum of squared numbers of each row, i.e., $\text{sum}_i = \sum_{j=1}^{n} |a_{ij}|^2$.
3. The reducer "reducer_Fnorm" produces Frobenius norm of the matrix by adding squared sum of each row from the previous step and then calculating the squared root of the overall sum.

Commands to be executed in terminal:

1. To get Frobenius norm of the matrix, the command below should be executed in terminal and the result is returned to "FrobeniusNorm.txt" file.

   python matrix/map_reduce_matrix.py matrix/A_with_rowIndex.txt > matrix/FrobeniusNorm.txt