

The SVD compression and image formation in part 3 and 4 have been done by Sejuti Banik.

Before part 3 the SVD of original matrix was obtained in  $U$ ,  $\Sigma$  and  $V^T$  matrices in the SVD.txt file.

Part 3: In part 3, data from header and matrices  $U$ ,  $\Sigma$  and  $V^T$  are read from the SVD.txt. The magic number of the image (P2), the data from header.txt, the value of  $k$ , and the  $k$  singular values of  $\Sigma$ ,  $k$  columns of  $U$  and  $k$  rows of  $V^T$  are stored in image\_b.pgm.SVD. Before storing the values, bitwise operation is done on the matrix values and converted to short into 2 bytes with 10 bits mantissa, 5 bits exponent and 1 bit for sign.

Part 4: In part 4 data from image\_b.pgm.SVD are read and converted back to their float form by bitwise operation. Then matrix multiplication is done in the order of  $(U * (\Sigma * V^T))$ . Next the magic number of the image, the width, height, grayscale, the value of  $k$  are written to image\_k.PGM from the image\_b.pgm.SVD. Finally if the float value of the matrix elements is less than 0.1 from the integer value of the elements, then we place the matrix element value as the integer value, otherwise we use the ceiling of the matrix element. Then we write the matrix elements in the file image\_k.PGM. The final image can be observed on any pgm file viewer.

Also the graphs used by Sejuti in the report are generated by herself.