

ASSIGNMENT

Write an function *grams.m* to perform the Gram-Schmidt process on the columns of a matrix A (the input) and return a structure variable Q , with the structures $Q.not_normal$ and $Q.normal$. $Q.not_normal$ should be a matrix containing the result of Gram-Schmidt on the columns of A , without the normalization step. $Q.normal$ should then be the matrix resulting from the complete Gram-Schmidt procedure, where the columns have been normalized. Test your code on the following matrix:

$$A = \begin{bmatrix} 1 & -1 & 7 & 1 \\ 0 & 6 & -3 & 3 \\ -7 & -7 & -7 & 4 \\ -9 & 6 & 0 & -1 \end{bmatrix}$$

Your output should be:

$$Q.not_normal = \begin{bmatrix} 1 & -0.9542 & 6.7808 & 2.6138 \\ 0 & 6.000 & -4.3094 & 2.8515 \\ -7 & -7.3206 & -2.4100 & 1.3918 \\ -9 & 5.5878 & 2.6279 & -0.7921 \end{bmatrix}$$

and

$$Q.normal = \begin{bmatrix} 0.0874 & -0.0865 & 0.7714 & 0.6243 \\ 0 & 0.5438 & -0.4903 & 0.6811 \\ -0.6116 & -0.6635 & -0.2742 & 0.3324 \\ -0.7863 & 0.5065 & 0.2990 & -0.1892 \end{bmatrix}$$

Submit your M-file and a diary that shows how you tested the code. **Follow our work above and do not use the algorithm for Gram-Schmidt that is written in the book.**