

**MIDDLE EAST TECHNICAL UNIVERSITY
DEPARTMENT OF MECHANICAL ENGINEERING
ME 310 NUMERICAL METHODS
FALL 2014
PROGRAMMING PROJECT 2**

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Due date : 03.12.2014

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The programming project will be submitted through METU-Class, as described in the “Programming Project Assignment Guidelines”, which is posted on METU-Class.

Write a computer program to find the rank of an m -by- n rectangular matrix **A** by Gauss elimination. Remember that the rank will be equal to the number of non-zero rows in the matrix **A** after Gauss elimination. Perform partial pivoting during your elimination process. Do not use scaling.

Your code should do the following:

- User defines matrix **A**. Write your code as a function that can accept user defined variables.
- Also find the rank of the given matrix using built-in capabilities of the software/computer language you are using. Compare the results. (If you are using a programming language such as C/C++, Fortran, etc. compare the result of your code and the result of a built-in function in a software package only in your report)
- Present the results by displaying them on the screen. Do not forget to display the original and eliminated form of matrix **A**.

Present your results in a short report (a few pages of a word document only, saved as a pdf document) which should include the following:

- A basic introduction paragraph,
- Necessary hand calculations to write your code (type it in the word document)
- Formulations used in the calculations,
- Your numerical results,
- Discussion of the results and conclusion,
- Appendix section including your code.