

## Group FORTRAN Exam 2

Due Tuesday November 5, 2013

### The Gauss-Jordan Program

This is a group program.

Write a FORTRAN program to:

- Prompt for, test existence of, and open an input file.
- If the input file does not exist, re-prompt the user and accept another file name or 'QUIT' to quit.
- Prompt for, test existence of, and open an output file.
- If the output file exists, prompt the user to enter a new file name, overwrite the existing file, or 'QUIT'.
- If the output file does not exist, create it.
- Once the files are open, read the integer from the input file, this will be the number of rows and columns. The maximum number of rows and columns are 10. Remember N simultaneous linear equations in N unknowns. The matrix is square.
- The real data will be read row by row from the file. The row element of the solution vector will follow at the end of each row of the coefficient matrix. i.e. for 4x4 one row is: 1.3 2.4 5.1 0.5 5.4
- The program will handle read errors caused by incorrect amount of data with respect to N.
- Use the Gauss-Jordan method with the maximum pivot technique.
- If the solution is not singular, write the solution vector to the output file. If the solution is singular, write a zero solution vector and indicate the solution is singular.
- Write the Gauss-Jordan procedure as a subroutine which receives the coefficient matrix, solution vector, dimension of the problem, and a logical error flag.
- Return the solution back through the solution vector and set the error flag accordingly.
- Write a main program which will open the files, read the data, call the Gauss subroutine, and print the results to the output file.
- Do not use dynamic array allocations.
- Include the program name (not gxe2.for), program number, and group member names at the top of the program.
- Name the program GxE2.FOR where x is the group number.
- Comment your program.
- Turn the program in, as an ASCII file. Include your names, the class, and program name and number on the storage device or e-mail subject line.