Lab Objectives:
To program a method or computation that we have not covered in the course.

Description of Lab:
Your program will be specific to the method chosen. It should ask the user for input, completely perform the method for all circumstances (as possible) and output the results in a readable format.

Requirements: The program can be chosen from…
1. Given an augmented matrix (at most 10x10) row reduce and provide the user with the exact solution to the system. This includes indicating infinite solutions and their form, no solution, or an exact solution.
2. Augment a square matrix (at most 10x10) with the identity and determine the inverse. If it does not exist the program must indicate so.
3. Determine if a set of vectors (at most 10x1) are linearly independent or dependent.
4. Find the parametric equation of a line through two points in 3-space.
5. Find a point where a line (given in parametric form) intersects a given plane in 3-space.
6. Find the equation of a plane through two points in 3-space.
7. Use the Gram-Schmidt method for creating orthogonal bases. This should also test to make sure the given vectors are linearly independent.
8. Find the determinant of a matrix (at most 10x10).
9. Determine if a matrix (at most 10x10) is an orthogonal matrix (invertible and $Q^{-1} = Q^T$).
10. Modify your row reducing code to keep track of the changes in the determinant, and when it is upper-triangular, use this information to find the determinant.
11. There may be something I missed, let me know if you have another idea!

What to Turn In:
1. A printout of your original code
2. A printout of the results with at least two sample data inputs:
3. Please be sure to label your pages at the top (i.e. “Original Code page 1 of 2” and “Run page 1 of 1”, etc).
4. Include a cover sheet, with “Program Assignment 9”, your name, and date.
5. You will present your code to the class, along with a sample run.