Pseudocode for Gauss Elimination

**Forward Elimination**

**Pseudocode for Iteration #1:**
1. Determine the pivot term, \( A_{11} \). It moves down the diagonal of the matrix from one pivot row to the next as the iterations go on.
2. Elimination Process begins, compute the factor = \( A_{21} / \text{pivot} \)
3. Eliminate the first term in row 2, then move to the next column and Gauss it.
   \[ \text{New Row 2} = \text{Row 2} + (\text{pivot row 1}) \times (-\text{factor}) \]
4. Modify the Right hand side of the equations in row 2.
   \[ \text{New RHS} = \text{RHS} + (\text{pivot row 1}) \times (-\text{factor}) \]
5. Compute the factor for row 3.
6. Eliminate the first term in row 3, then move to the next column and Gauss it.
7. Modify the Right hand side of the equations in row 3.

**Pseudocode for Iteration #2:**
1. Determine the pivot term, \( A_{22} \). It moves down the diagonal of the matrix from one pivot row to the next as the iterations go on.
2. Elimination Process begins, compute the factor = \( A_{32} / \text{pivot} \)
3. Eliminate the second term in row 3, then move to the next column and Gauss it.
   \[ \text{New Row 3} = \text{Row 3} + (\text{pivot row 2}) \times (-\text{factor}) \]
4. Modify the Right hand side of the equations in row 3.
   \[ \text{New RHS} = \text{RHS} + (\text{pivot row 2}) \times (-\text{factor}) \]

**Pseudocode for GENERAL FORWARD ELIMINATION:**
1. Determine the pivot term, \( A_{xx} \). It moves down the diagonal of the matrix from one pivot row to the next as the iterations go on.
2. Elimination Process begins, compute the factor = \( A_{ij} / \text{pivot} \)
3. Eliminate the first term in row 3, then move to the next column and the next.
   \[ \text{New Row i} = \text{Row i} + (\text{pivot row x}) \times (-\text{factor}) \]
4. Modify the Right hand side of the equations in row 3.
   \[ \text{New RHS} = \text{RHS} + (\text{pivot row x}) \times (-\text{factor}) \]
5. Repeat 1&2 for subsequent rows.

**Back Substitution**

**Pseudocode for Iteration #1:**
1. Solve for the unknown in the last row.
2. Back substitute \( x_3 \) into row #2. Use i to count iterations of back substitution.
3. Use a temporary variable "sum" to store the contents of the dot product for each iteration.

**Pseudocode for Iteration #2:**
1. solve for the unknown \( x_1 \), in the first row.
2. Back substitute \( x_3 \) and \( x_2 \) into row#1.
3. use the dotproduct.
4. Use a temporary variable "sum" to store the contents of the dot product for the iteration.

**Pseudocode for GENERAL BACK SUBSTITUTION:**
1. solve for the unknown \( x \) in the last row, one equation, one unknown.
2. then back substitute into the second to last row.
3. use for loop to move up the matrix.
4. Use a temporary variable "sum" to store the contents of the dot product for the iteration.