Gauss-Jordan Elimination

Start with a matrix (a rectangular array of numbers).

(1) Search from left to right for a column that is not marked as a pivot column and that also has a nonzero entry in a row not marked as an echelon row.
  - If you find a column as above, mark it as a new **pivot column** and proceed to step 2.
  - If you do not find a column as above, skip to step 5.

(2) Choose a nonzero entry of the new pivot column that is not already in an echelon row; it is the new **pivot**. Mark the new pivot's row as a new **echelon row**.

(3) Add multiples of the new echelon row to other rows until the new pivot is the only nonzero entry in its column. (Optional: multiply rows by nonzero constants so as to avoid fractions.)

(4) Go back to step 1.

(5) Multiply each echelon row by a nonzero constant so as to make its pivot 1.

(6) Swap rows until echelon rows are always above non-echelon rows and higher pivots are always to the left of lower pivots. Your matrix is now in **reduced row echelon form.**

Some properties of reduced row echelon form.

- The number of echelon rows equals the number of pivot columns equals the number of pivots. This number is called the **rank** of the original matrix.
- A row never has two pivots.
- A column never has two pivots.
- The non-echelon rows have only zero entries.
- A pivot is the leftmost nonzero entry in its row.