You will write functions

- \( B = \text{nullbasis}(A, \text{tol}); \)
- \( B = \text{rangebasis}(A, \text{tol}); \)

The function \texttt{nullbasis} takes a matrix \( A \) as input, and outputs a basis for the null space of \( A \), obtained via Gaussian elimination (and finding the general solution to \( Ax = 0 \)). \( B \) should be written as columns.

The function \texttt{rangebasis} takes a matrix \( A \) as input, and outputs a basis (again written as columns) for the range space of \( A \). For this function, again use Gaussian elimination along with (4.2.8) on pg 172 in MAALA (the definition of basic columns is in the blue box on page 45). Note for both of these functions, you will need to modify Gaussian elimination for the rectangular case; see pg 43 in MAALA.

For both these functions, you will also need to input a tolerance parameter \( \text{tol} \) so that “\( s = 0 \)” if \( |s| < \text{tol} \) in order to decide when a row is to be considered 0.