MATLAB’s backslash command to solve $Ax = b$

$\star \ x = A \backslash b$ for dense $A$ performs these steps (stopping when successful):

1. If $A$ is upper or lower triangular, solve by back/forward substitution
2. If $A$ is permutation of triangular matrix, solve by permuted back substitution
   (useful for $[L,U]=lu(A)$ since $L$ is permuted)
3. If $A$ is symmetric/hermitian
   - Check if all diagonal elements are positive
   - Try Cholesky, if successful solve by back substitutions
4. If $A$ is Hessenberg (upper triangular plus one subdiagonal), reduce to upper triangular then solve by back substitution
5. If $A$ is square, factorize $PA = LU$ and solve by back substitutions
6. If $A$ is not square, run Householder QR, solve least squares problem

Mathworks documentation:
http://www.mathworks.com/access/helpdesk/help/techdoc/ref/mldivide.html#1002049