1 Determinant of a $3 \times 3$ matrix

Write a function myDeterminant(x), where x is a $3 \times 3$ matrix. Use the following formula:

$$
\det \begin{pmatrix}
  a & b & c \\
  d & e & f \\
  g & h & i \\
\end{pmatrix} = a \det \begin{pmatrix}
  e & f \\
  h & i \\
\end{pmatrix} - b \det \begin{pmatrix}
  d & f \\
  g & i \\
\end{pmatrix} + c \det \begin{pmatrix}
  d & e \\
  g & h \\
\end{pmatrix}
$$

You may use the built-in function det to find the determinants of $2 \times 2$ matrices. For example, det(m) returns the determinant of $2 \times 2$ matrix m. Recall that you can construct a matrix by putting two row vectors one below the other or two column vectors side by side.

2 Find a value in a matrix

Write the following function:

```matlab
function [r, c] = findInMatrix(n,M)
    % Find all occurrences of the number n in matrix M.
    % r and c are column vectors of row and column numbers such that
    % M(r(k),c(k)) is equal to n.
    % If n is not found in M, r and c are empty vectors.
    Do not use the built-in function find.
```

Note: The next two questions require that you design solutions. Instead of giving you the specifications of a function, we are asking you to design a complete solution: you decide what functions and/or scripts are necessary and implement those functions/scripts. Take some time to do the planning—don’t jump immediately to coding.

3 Random walk

A random walk that starts from the center of a $21 \times 21$ grid ends when a boundary is reached. Which “square” or grid point is visited most often?

4 Bounded random walk

In a bounded random walk, a set number of steps are taken within a bounded area. For example, when the right boundary (excluding the corners) is reached, the next step can go left, up, or down only. Similarly, when a corner is reached, the next steps can be in two directions only. For a 100-step bounded random walk in a $21 \times 21$ grid, which “square” is visited most often?