

1 Determinant of a 3×3 matrix

Write a function `myDeterminant(x)`, where `x` is a 3×3 matrix. Use the following formula:

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

You may use the built-in function `det` to find the determinants of 2×2 matrices. For example, `det(m)` returns the determinant of 2×2 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:

```
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 21×21 grid ends when a boundary is reached. Which “square” or grid point is visited most often?

4 Bounded random walk (do this at home)

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 21×21 grid, which “square” is visited most often?

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