Determinant calculator (of a 2\*2 matrix)

Objective:

Using the input of the user (each element of matrix- from 1,1 to 1,2 to 2,1 to 2,2), calculate the determinant.

Complexity level:

* Medium

Scenario:

* John Doe is a student in a differential equations class.
* The student wants to be able to determine the determinant of a 2x2 matrix easily.

Problem statement

1. Write an algorithm to take the input of the elements and calculate the determinant.
2. Write an algorithm that then deduces whether or not the inverse of the matrix exists, and then calculates it (if such inverse exists).

Expectation outcomes:

Practice a vital part of differential equations and create a useful tool which fortifies understanding of matrices.

Reference URL:

1. [Serge Lang](https://en.wikipedia.org/wiki/Serge_Lang), Linear Algebra, 2nd Edition, Addison-Wesley, 1971, pp 173, 191.
2. [WildLinAlg episode 4](http://www.youtube.com/watch?v=6XghF70fqkY), Norman J Wildberger, Univ. of New South Wales, 2010, lecture via youtube.
3. In a non-commutative setting left-linearity (compatibility with left-multiplication by scalars) should be distinguished from right-linearity. Assuming linearity in the columns is taken to be left-linearity, one would have, for non-commuting scalars *a*, *b*:

det.png

a contradiction. There is no useful notion of multi-linear functions over a non-commutative ring.