

Specifications of the Matrix Operator

I. Explanations of our project

The Matrix Operator is a program that allows the user to create matrices of dimensions $n \times m$. The user will be able to perform several operations on them, and also to determine the solutions (if they exist) of a system of equations of dimensions $n \times m$ with at most n unknowns. Depending on the operations they choose, there will be conditions on the dimensions of the matrices.

II. Features of our program

II.1. Basic operations and their conditions:

- Sum of 2 matrices : the matrices must have the same dimensions.
- Subtraction of 2 matrices : the matrices must have the same dimensions.
- Multiplication of a matrix by a real scalar : there is no specific conditions.
- Multiplication of 2 matrices : the number of columns of the first matrix has to be equal to the number of rows of the second one.
- Raise of a matrix to a given power: the matrix has to be a square matrix.
- Transposition of a matrix : there is no specific conditions.
- Computation of the determinant of a matrix : the matrix has to be a square matrix.

II.2. Advanced operations and their conditions:

- Resolution of a system of equations by using the Gaussian elimination : the number of equations of the system has to be at most equal to the number of unknowns.
- Matrix inversion : The matrix has to be a square matrix and the determinant has to be a non-null value.

III. - Group organization:

First of all, we wrote the methods for the first four basic operations : each member worked on one of them.

Then, we worked together on the last three basic operations.

Next, we made 2 subgroups to work on the two advanced operations.

Eventually, we realized all together the main program and the UML diagram.