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CSE443

HW1

PART 1

What is LinearSolverDeluxe?

It's really hard to solve complex mathematical equations. Here the good solution is LinearSolverDeluxe. LinearSolverDeluxe is a Java based program that helps people to solve their mathematical equations. It’s easy to use. You just need to enter your equations.

How to Use?

1. Open the terminal. Run the program with java -jar LinearSolverDeluxe.jar.
2. Choose the solving method you want.
3. Program asks you how many equations you have and write it all elements in equation.
4. For example: (2a + 7b = -11) and (-4a - 3b = 18).
    - Choose method.
    - Write how many equations you have: 2
    - Write your first equation in descending order: 2 7 -11
    - Write your second equation in descending order: -4 -3 18
    - That’s all! Program give you the solution.

Important Notes For New Developers

Abstract factory design pattern is used in this program. Two of solving methods are extended from an abstract method that is SolvingMethodsAbstract class. In this class, matrix getter and matrix printer methods implemented correctly and they are defined as `final`.

If you need to add a new solving method, you just need to implement `solve` method. Because, in this current version has getter and printer methods that are properly works.

All other details are shown in the UML diagram.

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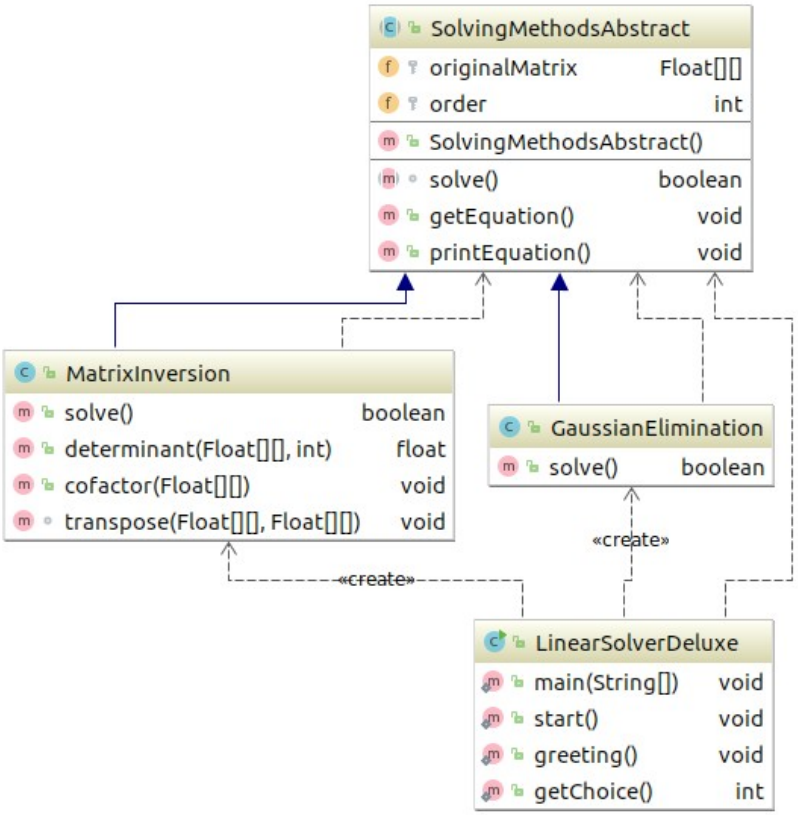
UML Diagram



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Using Example

1. 2a + b = 11

   a - b = 28

```
################################
#      LinearSolverDeluxe      #
################################
# 1-Gaussian Elimination       #
# 2-Matrix Inversion           #
# 3-Exit                       #
################################
1
Enter quantity of coefficients
2
You need to enter 2 equations
Please enter coefficients of #1 equation by descending order and result
2
1
11
Please enter coefficients of #2 equation by descending order and result
1
-1
28

Your equation:
(2.0a) + (1.0b) = 11.0
(1.0a) + (-1.0b) = 28.0

Result
(1.0a) + (0.0b) = 13.0
(-0.0a) + (1.0b) = -15.0

Good bye!
```

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2. $a - b + c = 1$

$2a - b = 1$

$3a + 3b - 4z = 2$

```
################################
#      LinearSolverDeluxe      #
################################
# 1-Gaussian Elimination       #
# 2-Matrix Inversion           #
# 3-Exit                       #
################################
1
Enter quantity of coefficients
3
You need to enter 3 equations
Please enter coefficients of #1 equation by descending order and result
1
-1
1
1
Please enter coefficients of #2 equation by descending order and result
2
-1
0
1
Please enter coefficients of #3 equation by descending order and result
3
3
-4
2

Your equation:
(1.0a) + (-1.0b) + (1.0c) = 1.0
(2.0a) + (-1.0b) + (0.0c) = 1.0
(3.0a) + (3.0b) + (-4.0c) = 2.0

Result
(1.0a) + (0.0b) + (0.0c) = 1.0
(0.0a) + (1.0b) + (0.0c) = 1.0
(0.0a) + (0.0b) + (1.0c) = 1.0

Good bye!
```