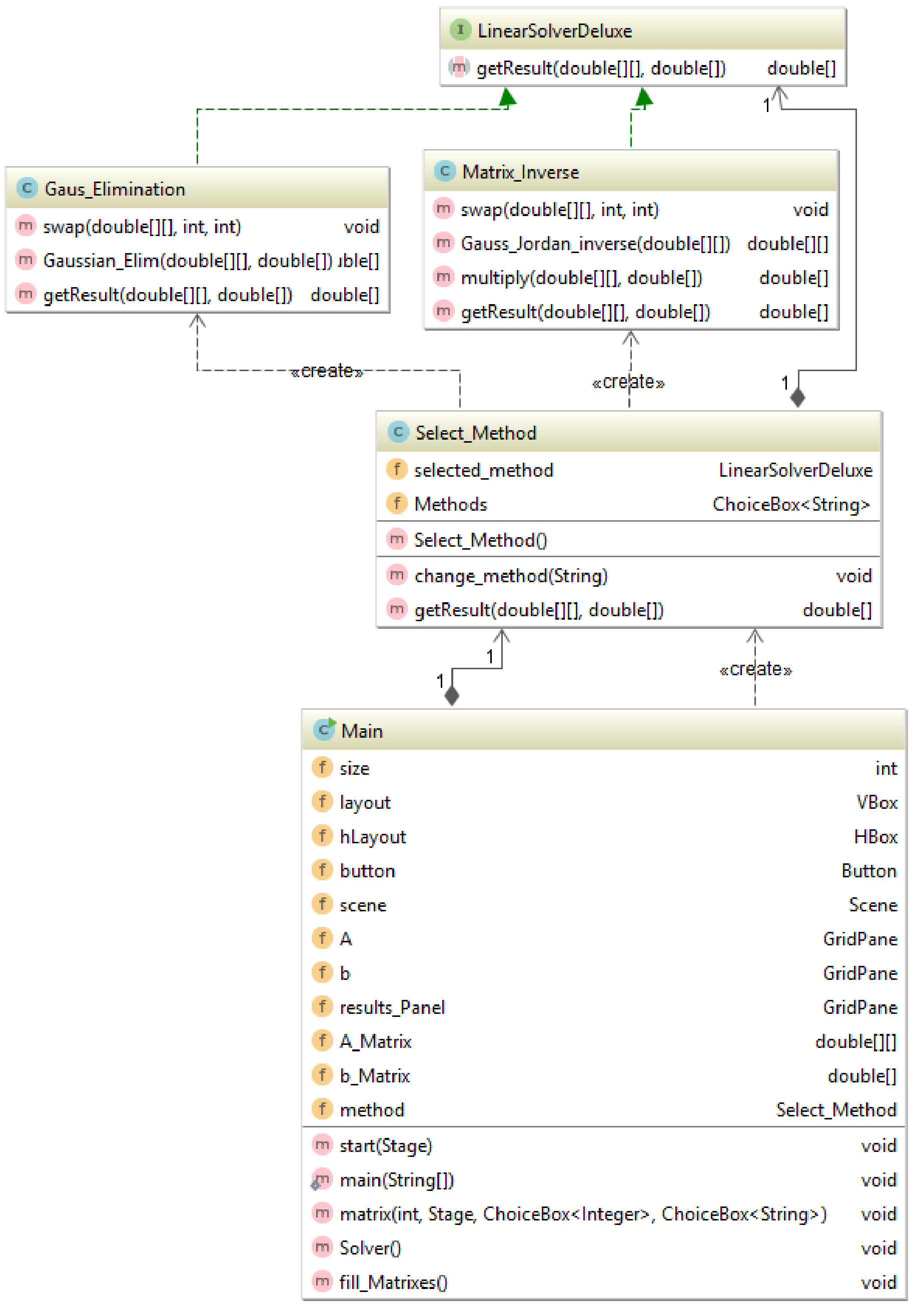
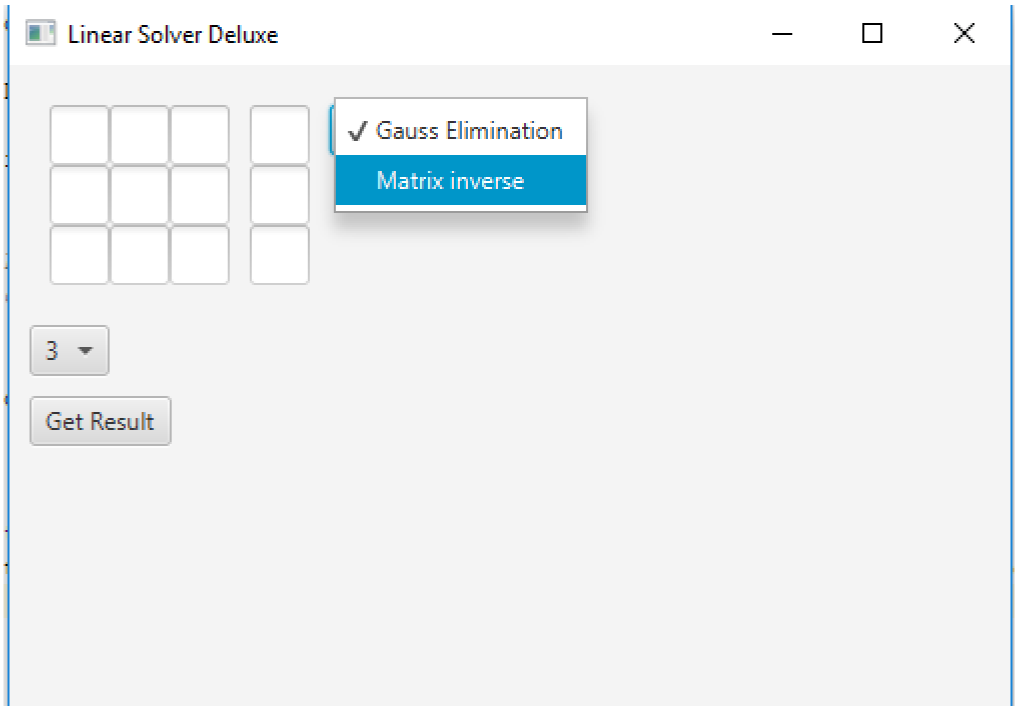
1- UML Diagram


LinearSolverDeluxe
getResult(double[][], double[]) double[]
Gaus_Elimination
swap(double[][], int, int) void
Gaussian_Elim(double[][], double[]) ıble[]
getResult(double[][], double[]) double[]
Matrix_Inverse
swap(double[][], int, int) void
Gauss_Jordan_inverse(double[][]) double[][]
multiply(double[][], double[]) double[]
getResult(double[][], double[]) double[]
«create»
«create»
1
1
Select_Method
selected_method LinearSolverDeluxe
Methods ChoiceBox<String>
Select_Method()
change_method(String) void
getResult(double[][], double[]) double[]
1
1
«create»
Main
size int
layout VBox
hLayout HBox
button Button
scene Scene
A GridPane
b GridPane
results_Panel GridPane
A_Matrix double[][]
b_Matrix double[]
method Select_Method
start(Stage) void
main(String[]) void
matrix(int, Stage, ChoiceBox<Integer>, ChoiceBox<String>) void
Solver() void
fill_Matrixes() void

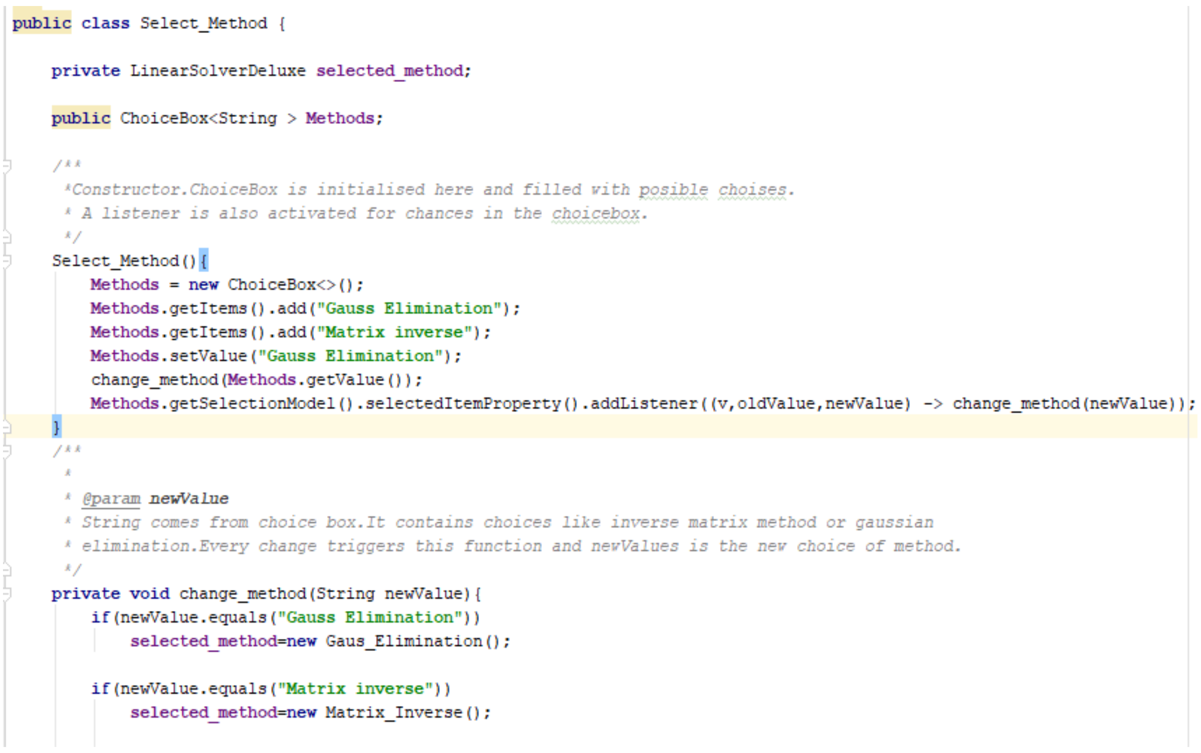
Select_Method class is the only class we have maintain.

I have implemented Gauss-Jordan method of inverse matrix for matrix inverse method.Rest is prety self explanatory.

You can see the inverse of a given matrix as printed in the terminal if Matrix inverse method is chosen.

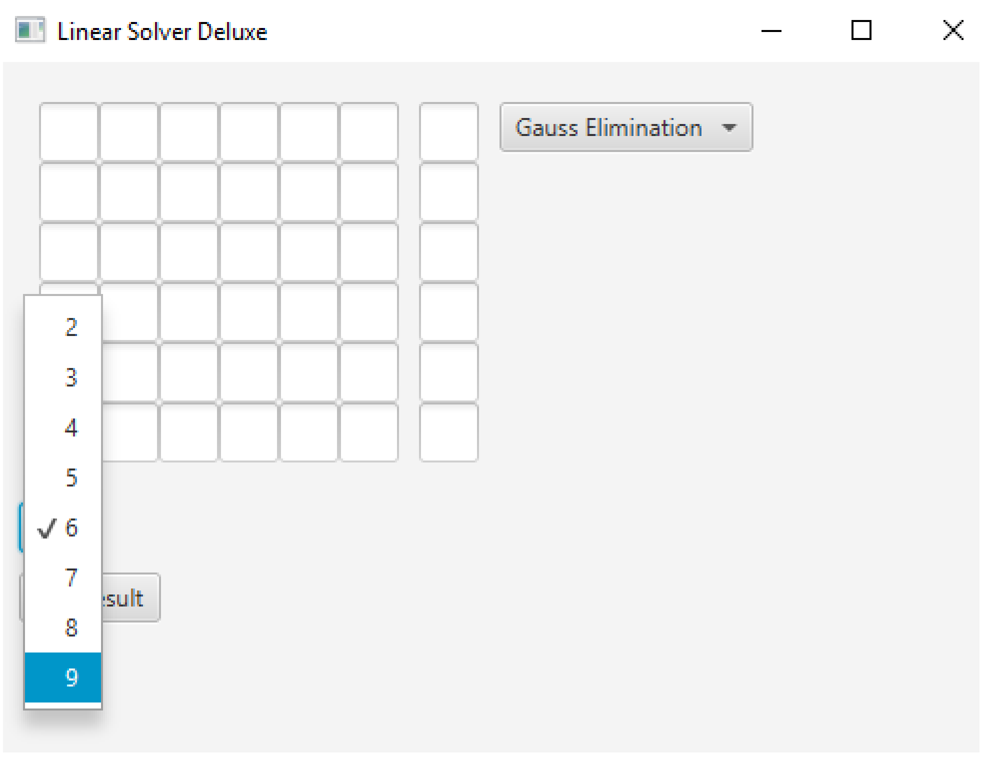


Calculation method can be dynamicaly changed by Choicebox.

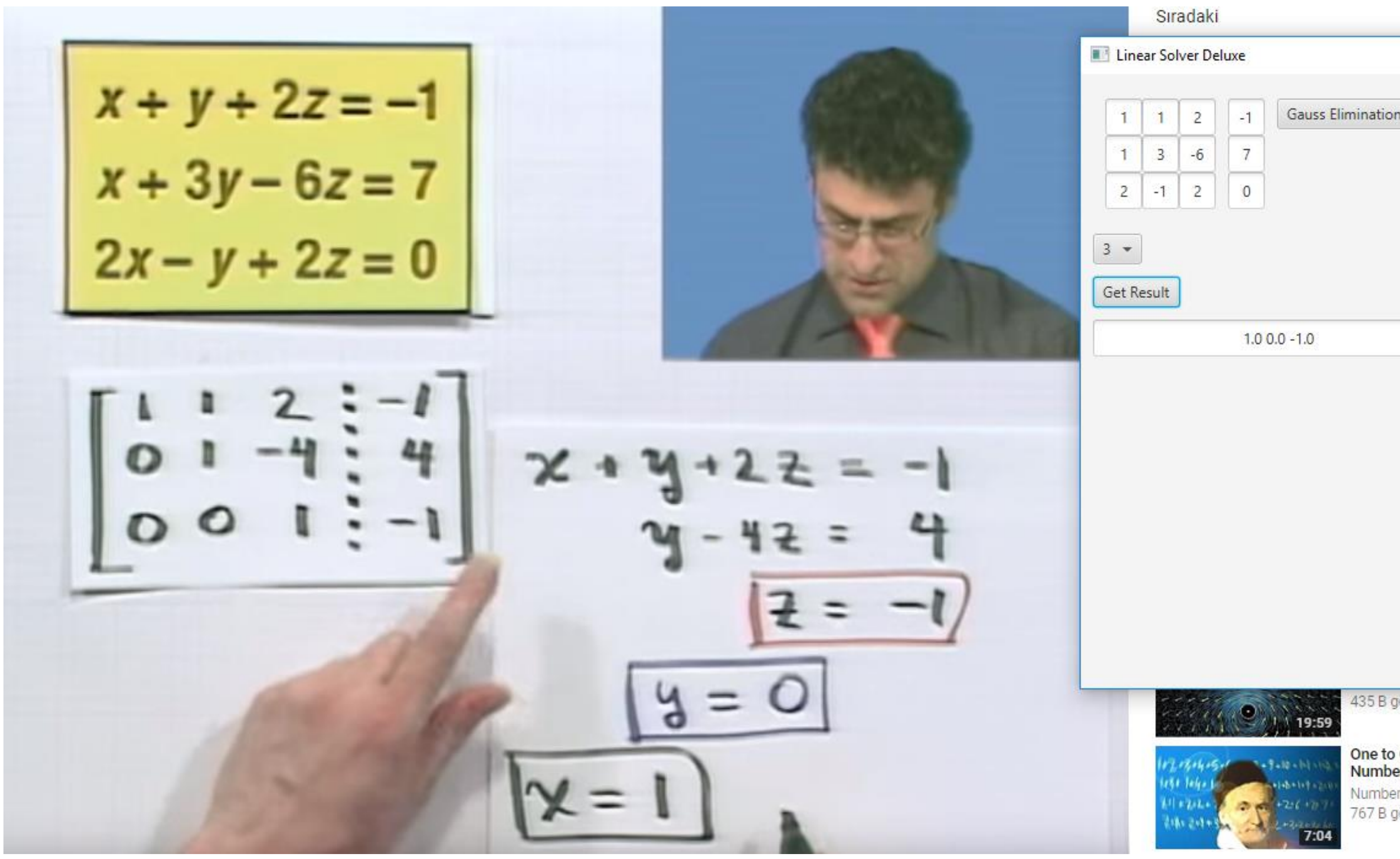


```
public class Select_Method {

    private LinearSolverDeluxe selected_method;

    public ChoiceBox<String > Methods;

    /**
     *Constructor.ChoiceBox is initialised here and filled with posible choises.
     * A listener is also activated for chances in the choicebox.
     */
    Select_Method(){
        Methods = new ChoiceBox<>();
        Methods.getItems().add("Gauss Elimination");
        Methods.getItems().add("Matrix inverse");
        Methods.setValue("Gauss Elimination");
        change_method(Methods.getValue());
        Methods.getSelectionModel().selectedItemProperty().addListener((v,oldValue,newValue) -> change_method(newValue));
    }
    /**
     *
     * @param newValue
     * String comes from choice box.It contains choices like inverse matrix method or gaussian
     * elimination.Every change triggers this function and newValues is the new choice of method.
     */
    private void change_method(String newValue){
        if(newValue.equals("Gauss Elimination"))
            selected_method=new Gaus_Elimination();

        if(newValue.equals("Matrix inverse"))
            selected_method=new Matrix_Inverse();
```

If we need to add a new method of calculation all we have to do is to update Choicebox object and change_method() function.We don’t have to touch anywhere else.Of course new method has to implement LinearSolverDeluxe interface.



Input matrix can also be changed dynamicaly.It can be bigger but 9 seemed big enough.



$$x + y + 2z = -1$$
$$x + 3y - 6z = 7$$
$$2x - y + 2z = 0$$

$$\left[\begin{array}{ccc:c} 1 & 1 & 2 & -1 \\ 0 & 1 & -4 & 4 \\ 0 & 0 & 1 & -1 \end{array}\right]$$

$$x + y + 2z = -1$$
$$y - 4z = 4$$
$$\boxed{z = -1}$$
$$\boxed{y = 0}$$
$$\boxed{x = 1}$$

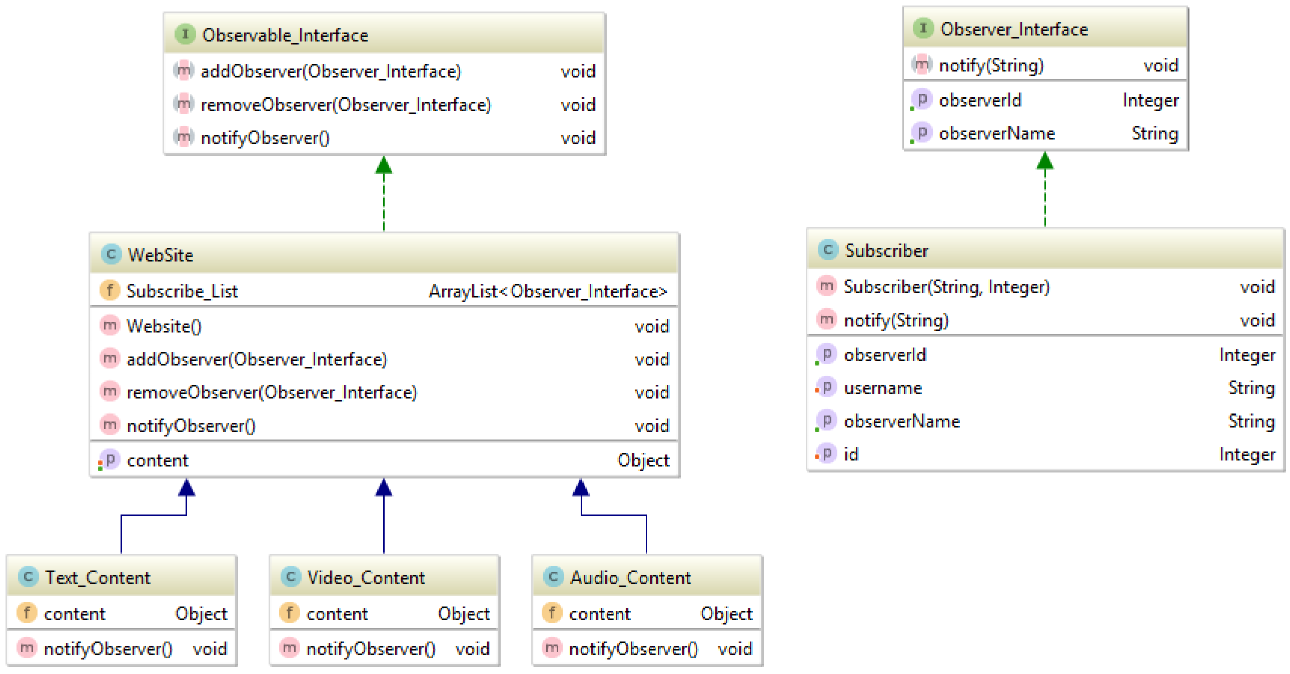
1	1	2	-1
1	3	-6	7
2	-1	2	0

```
1.0 0.0 -1.0
```

Result is left to right x,y,z.

This how an equation is applied.Click Get Result button to get the answer.

2-)



To keep subrisriber away from unwanted type of content we have inherited 3 type of class from Website class.Each is for a type of content.If we get a new type of content ,we can inheritWebSite class and implement notifyObserver() method.

I have implemented an Observer design.Website is Observed,subribers are Observers.Both have been implemented from interfaces of those names.

notifyObserver() method is there to reach the Observers notify() method and send a messege to all Observers.

Same with addObserver and removeObserver methods.Observable classes holds the Observers information. Observer classes have to have a username and id because of that reason.When there is something new ,we use these information to notify all Observers.

We could have just have subsriber objects ping the server regularly but that would be very cosly.More subsribers means more cost.But with this design ,the amount of subscribers almost means nothing. That way we don’t have to stress the servers.