System Of Linear Equations

Write a program called **SystemOfLinearEquations**. The Goal of this program is to solve a system of linear equations and display the solution if it exits. If the system is inconsistent or dependent, program should display message stating so.

Methods you need for this program:

Task 1: Receive equation from the user:

Your program should allow the user to enter two lines using any of the following four options:

1. By entering slope and y intercept (two double inputs)
2. By entering two points (4 double inputs)
3. By entering one point and slope (3 inputs)
4. By entering coefficients A, B and C for the standard equation of line. $Ax + By = C$

(More clearly each of the options from Task 1, should initialize m1, b1, m2 and b2 for the two lines)

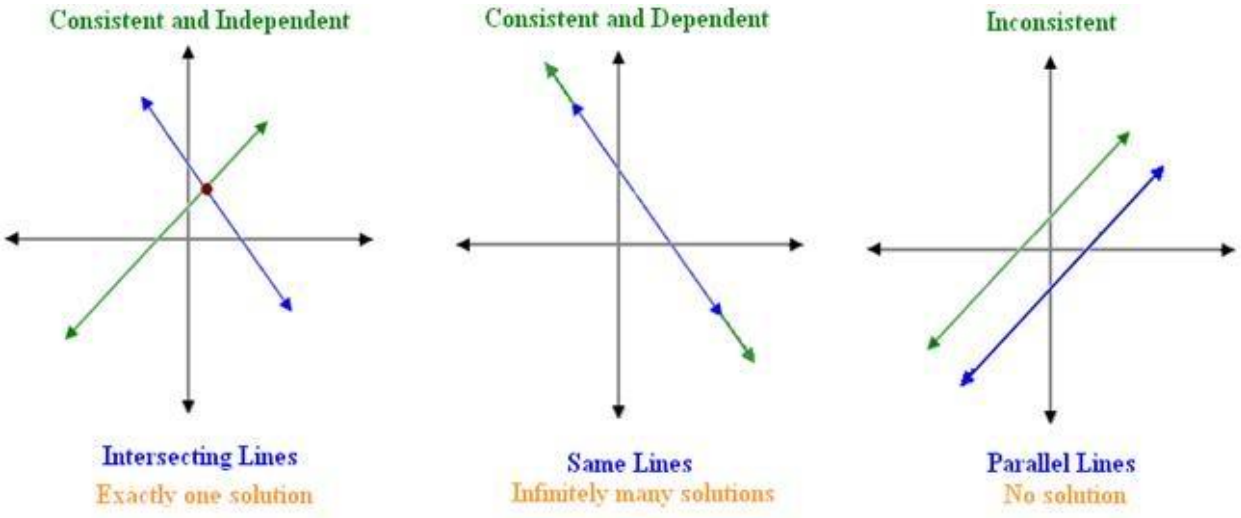
Task 2: Display the equation of the line in slope intercept form $y = mx + b$, based upon the information entered in Task 1.

Task 3: Determine whether the system of linear equations is inconsistent, dependent or independent and display the appropriate message.

Task 4: Display the solution for an independent system of equations.

Task5: Prompt user to enter another set of equations or chose a sentinel value to quit.

Hint: it will be helpful to have global variables m1, b1, m2 and b2 to represent two different lines.



Extension: (Extra Credit) – have your program work for system of three equations.

Sample Run of the program:

```
Please Enter First Line
1. Slope and Y-Intercept
2. Two Points
3. Point and Slope
4. Coefficients A, B and C, Standard Form Ax+By=C

1
Please Enter Slope: -5
Please Enter Y-Intercept: 3
Equation 1 : y = -5/1 x + 3/1

Please Enter Second Line
1. Slope and Y-Intercept
2. Two Points
3. Point and Slope
4. Coefficients A, B and C, Standard Form Ax+By=C

2
x1: 4
y1: 5
x2: -9
y2: 3
Point Created
Equation 2 : y = 2/13 x + 57/13

Solution is: ( -0.27 , 4.34 )
_____________________________________

1. Enter Another Set of Equations
0. Quit

1
Please Enter First Line
1. Slope and Y-Intercept
2. Two Points
3. Point and Slope
4. Coefficients A, B and C, Standard Form Ax+By=C

3
x1: 5
y1: 7
Slope is: 0
Equation 1 : y = 0/1 x + 7/1

Please Enter Second Line
1. Slope and Y-Intercept
2. Two Points
3. Point and Slope
4. Coefficients A, B and C, Standard Form Ax+By=C

4
A: 8
B: 0
C: 9
Equation 2 : x = 1.125

Solution is: ( 1.12 , 7 )
_____________________________________

1. Enter Another Set of Equations
0. Quit

1
Please Enter First Line
1. Slope and Y-Intercept
2. Two Points
3. Point and Slope
4. Coefficients A, B and C, Standard Form Ax+By=C

2
x1: 4
y1: 9
x2: 12
y2: 9
Point Created
Equation 1 : y = 0/8 x + 9/1

Please Enter Second Line
1. Slope and Y-Intercept
2. Two Points
3. Point and Slope
4. Coefficients A, B and C, Standard Form Ax+By=C

2
x1: 7
y1: 9
x2: 7
y2: 2
Point Created
Equation 2 : x = 7.0

Solution is: ( 7 , 9 )
_____________________________________

1. Enter Another Set of Equations
0. Quit

0
```

Incomplete code for the ***SystemOfEquations*** Class is:

```
import java.text.DecimalFormat;
import java.util.Scanner;

public class SystemOfLinearEquations_Student{
	static Scanner scn = new Scanner(System.in);
	static DecimalFormat fmt = new DecimalFormat("0.##");
	static Line l1, l2;

	public static void main(String[] args) {
		/*
		 * 1. Controls if user wants to enter another system of equations.
		 * 2. Allows user to input both of the equations one by one.
		 * 3. Calls the correct constructor of the line class based upon
		 *    the value received from the menu()
		 */
	}

	public static void solution(){
		/*
		 * This method displays the correct solution for the system of
		 * two equations. This method will handle all the conditions before
		* calling intersection() on the line class, so that it does not give
		* you null pointer or division by zero error.
		 *
		 * NOTE: Here you will check if lines are vertical, horizontal,
		* parallel, etc.
		 */
	}

	public static void standardForm(int n) {
		/*
		 * Allows user to input equation in standard form. Function
		* initializes L1 or L2 and displays this equation to the screen
		 */
	}

	public static void twoPoints(int n) {
		/*
		 * Allows user to input equation using two Points. Function
		* initializes L1 or L2 and displays this equation to the screen
		 */
	}

	public static void pointSlope(int n) {
		/*
		 * Allows user to input equation using a Points and slope. Function
		* initializes L1 or L2 and displays this equation to the screen
		 */
	}

	public static void slopeIntercept(int n) {
		/*
		 * Allows user to input equation using slope and y intercept.
		* Function also displays this equation to the screen
		 */
	}
```

```
	public static void prtSol(double x, double y) {
		prtLn("Solution is: ( " + fmt.format(x) + " , " + fmt.format(y) + " )");
	}

	public static double in() {
		return scn.nextDouble();
	}

	public static void prt(String str) {
		System.out.print(str);
	}

	public static void prtLn(String str) {
		System.out.println(str);
	}

	public static int menu() {
		prtLn("1. Slope and Y-Intercept");
		prtLn("2. Two Points");
		prtLn("3. Point and Slope");
		prtLn("4. Coefficients A, B and C, Standard Form Ax+By=C");
		return scn.nextInt();
	}
}
```