**PROJECT Java Programming with Cramer’s Rule 50 Points \_\_\_\_ *your score***

**Objective** To write a program that uses Cramer's Rule to solve a 2 × 2 system of equations.

***PROJECT DESCRIPTION***

Write, compile and execute a computer program which will solve any 2 × 2 system of linear equations of the following form.

A *x* + B *y* = C

D *x* + E *y* = F

Your program should allow for the fact that division by zero is undefined. Meaning if the denominator of the Cramer's Rule solution, A × E − B × D , is equal to zero, then your program should print a statement indicating that the solution to the given system is inconsistent, i.e. either has no solution or has an infinite number of solutions.

***Information About This Project***

A 2 × 2 system of linear equations has the form:

A *x* + B *y* = C

D *x* + E *y* = F

Where A , B , C , D , E and F are constant values and *x* and *y* are the variables.

According to Cramer's Rule, the solution to the above 2 × 2 system of linear equations is dependant solely upon the constant values A , B , C , D , E and F , namely:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *x* = | C × E − B × F | and | *y* = | A × F − C × D |
| A × E − B × D | A × E − B × D |

***Steps To Complete This Project***

**STEP 1**  **Open a Java Editor and Write the Program Code**

Open a suitable text editor on your computer and write the program code which will allow the user to enter the necessary input items A , B , C , D , E , and F and then use these items to compute both the values of *x* and *y* .

Include your name, course title and date in the header comment ( remarks ) section of your program code.

Save your file as: Cramer.java

Use a method called SolveSystem() that will be used to receive the A , B , C , D , E and F coefficients and compute the value of the variables x and y .

Use looping techniques to allow the user to run the program repeatedly until it is desired to terminate the program.

**STEP 2**  **Compile and Run your Program**

Compile and run your program.

Once you have tested your program code, run your program using the information shown in the exercises below. Submit the individual outputs for each of the following.

**PROJECT Java Programming with Cramer’s Rule**

**Exercises** ( Cramer’s Rule )

(a) − 2 *x* − 5 *y* = − 08

− 3 *x* + 8 *y* = − 50

solution: *x* = \_\_\_\_\_\_\_\_\_\_ *y* = \_\_\_\_\_\_\_\_\_\_

(b) − 4 *x* + 5 *y* = − 30.5

− 2 *x* + 5 *y* = − 31.5

solution: *x* = \_\_\_\_\_\_\_\_\_\_ *y* = \_\_\_\_\_\_\_\_\_\_

(c) − 0.05 *x* − 0.20 *y* = − 0.405

− 0.10 *x* + 0.14 *y* = − 0.355

solution: *x* = \_\_\_\_\_\_\_\_\_\_ *y* = \_\_\_\_\_\_\_\_\_\_

**STEP 3**  **Submit Your Program Code and your Run Time Output**

When completed, submit your program source code as well as the program outputs showing the results of each of the above exercises. Attach the hardcopies to your lab cover sheet for credit.