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Project 2  
Professor Raheja  
CS 3010.E01 Numerical Methods  
Due: June 25th, 2023

Important note:

I designed this program to work with presorted input. It does not have a feature to check dominance, but it will scan for diagonal zeros and handle that error.

I have included screenshots of the application running with both terminal input and file input.

With any concerns/questions, please contact me at [ajsanna@cpp.edu](mailto:ajsanna@cpp.edu)

Thanks!

## Terminal input/output example:

```
(base) alexsanna@Alexs-MacBook-Air 3010P2 % javac Driver.java
(base) alexsanna@Alexs-MacBook-Air 3010P2 % java Driver
Welcome to the Linear Equation Solver 2.0
By: Alexander Sanna
-----

How many equations would you like to enter? (Max. 10)
# of Equations: 3
Would you like to use a File for input? y/n
File input?: n

Equation: 1, Please enter the coefficients (One at a time, please)
    Coefficient 1: 6
    Coefficient 2: 2
    Coefficient 3: -1
    b value: 4
Equation: 2, Please enter the coefficients (One at a time, please)
    Coefficient 1: 1
    Coefficient 2: 5
    Coefficient 3: 1
    b value: 3
Equation: 3, Please enter the coefficients (One at a time, please)
    Coefficient 1: 2
    Coefficient 2: 1
    Coefficient 3: 4
    b value: 27

What is the desired stopping error? (ex: .1)
.01

Starting Solutions:
x1: 0
x2: 0
x3: 0
Jacobi X^1 = [0.6666666666666666 0.6000000000000001 6.75 ]
Siegel X^1 = [0.6666666666666666 0.46666666666666673 6.300000000000001 ]
Calculated Error at iteration 1 is: 0.07194008168760017
Jacobi X^2 = [1.5916666666666668 -0.8833333333333333 6.266666666666667 ]
Siegel X^2 = [1.5611111111111111 -0.9722222222222223 6.2124999999999995 ]
Calculated Error at iteration 2 is: 0.00720828073697595
Result found acceptable after 2 iterations.
(base) alexsanna@Alexs-MacBook-Air 3010P2 %
```

## File input/output example:

```
(base) alexsanna@Alexs-MacBook-Air 3010P2 % java Driver
Welcome to the Linear Equation Solver 2.0
By: Alexander Sanna
-----

How many equations would you like to enter? (Max. 10)
# of Equations: 3
Would you like to use a File for input? y/n
File input?: y

File input selected, please enter the file name.
File Name: numbers.txt

What is the desired stopping error? (ex: .1)
.01

Starting Solutions:
x1: 0
x2: 0
x3: 0
Jacobi X^1 = [-0.2 0.2222222222222222 -0.42857142857142855 ]
Siegel X^1 = [-0.2 0.15555555555555553 -0.5079365079365079 ]
Calculated Error at iteration 1 is: 0.07941213651901255
Jacobi X^2 = [0.146031746031746 0.20317460317460315 -0.5174603174603174 ]
Siegel X^2 = [0.16698412698412698 0.334320987654321 -0.42862181909800956 ]
Calculated Error at iteration 2 is: 0.01076474919113709
Jacobi X^3 = [0.1917460317460317 0.328395061728395 -0.4158730158730159 ]
Siegel X^3 = [0.19090148652053415 0.33348069762884575 -0.4216682463696825 ]
Calculated Error at iteration 3 is: 0.01220611877192459
Jacobi X^4 = [0.18088183421516754 0.33234567901234563 -0.42070042831947585 ]
Siegel X^4 = [0.1863932268733478 0.3312053252210806 -0.4226312673534835 ]
Calculated Error at iteration 4 is: 0.0044920469128581515
Result found acceptable after 4 iterations.
(base) alexsanna@Alexs-MacBook-Air 3010P2 %
```