

Short Summary of My Project

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I have created a Java application that can load a .txt file and find its solution with any constraint given with the help of a user interface. It cannot explain the solution steps. Sometimes, it displays the negative and minus signs at the same time if the coefficient of a variable is 0 due to the nature of floating points. Here is how it works:

- First line in the .txt file should be the objective function. It first expects either “min” or “max” words. It does not check if the format is satisfied or not. afterwards, the coefficients of the objective function should be written with one space between them.
- Constraints are the rest of the lines. First, the constraint coefficients of a given line is written with the same format, then the “sense” of the constraint is indicated by:
 - “e”, which means “equal to”
 - “l” which means “lower or equal to”
 - “g” which means “greater or equal to”
- Finally, the right-hand side is written.

Here is an example that is also in the .zip file I have provided:

textInput3.txt

```
min 2 1 3
5 1 7 e 420
3 2 5 g 280
```

The output of the application when this file is loaded:

Original Problem:
minimize $Z = +2.0x_1 + 1.0x_2 + 3.0x_3$
Subject to:
 $+5.0x_1 + 1.0x_2 + 7.0x_3 = 420.0$
 $+3.0x_1 + 2.0x_2 + 5.0x_3 \geq 280.0$
 $x_1, x_2, x_3 \geq 0$

Standardized Problem:
maximize $-Z = -2.0x_1 - 1.0x_2 - 3.0x_3 + -0.0x_4 + -0.0x_5 + -0.0$
Subject to:
 $+5.0x_1 + 1.0x_2 + 7.0x_3 + 1.0x_4 + 0.0x_5 + 0.0x_6 = 420.0$
 $-3.0x_1 - 2.0x_2 - 5.0x_3 + 0.0x_4 + 1.0x_5 + 0.0x_6 = -280.0$
 $-5.0x_1 - 1.0x_2 - 7.0x_3 + 0.0x_4 + 0.0x_5 + 1.0x_6 = -420.0$
 $x_1, x_2, x_3, x_4, x_5, x_6 \geq 0$

The program displays the answer without explanation. It also recognizes if the problem is infeasible or unbounded.

