LA1 - Version 2 - Exercise 3

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```r
# initial setup
options(scipen = 999)
options(tinytex.verbose = TRUE)
library(matlib)
library(knitr)
library(rmarkdown)
library(quarto)
library(tinytex)
library(pandoc)
knitr::opts_chunk$set(echo=TRUE, message=FALSE, warning=FALSE, fig.width=6, fig.height=6)
```

System of linear equations of the form Ax=b, where:

```r
A <- matrix(
        c( 1, 1, 2,
           1, 1, 0 ), 2, 3, byrow=TRUE)

b <- c(0, 1)
```

Code the equation in R matlib:

```
showEqn(A, b, fractions = TRUE, latex = TRUE)
```

Show equation (R's Latex output):

$$
\begin{aligned}
1 \cdot x_1 &+& 1 \cdot x_2 &+& 2 \cdot x_3 &=& 0 \\
1 \cdot x_1 &+& 1 \cdot x_2 &+& 0 \cdot x_3 &=& 1
\end{aligned}
$$

Code equation solution:

```
Solve(A, b, fractions = TRUE)
```

Show the final result of the equation (not Latex, plain):

```
x1 + x2   =      1
      x3  =   -0.5
```

Show whole step by step verbose solution:

```r
Solve(A, b, verbose = TRUE, fractions = TRUE)
```

```
##
## Initial matrix:

##      [,1] [,2] [,3] [,4]
## [1,] 1    1    2    0
## [2,] 1    1    0    1
##
## row: 1
##
##   subtract row 1 from row 2
```

```
##      [,1] [,2] [,3] [,4]
## [1,]  1    1    2    0
## [2,]  0    0   -2    1
##
## row: 2
##
##  multiply row 2 by -1/2
```

```
##      [,1] [,2] [,3] [,4]
## [1,]    1    1    2    0
## [2,]    0    0    1 -1/2
##
##  multiply row 2 by 2 and subtract from row 1
```

```
##      [,1] [,2] [,3] [,4]
## [1,]    1    1    0    1
## [2,]    0    0    1 -1/2
## x1 + x2     =     1
##        x3  =  -1/2
```