

# Bhuyan\_Assignment2\_PS2

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Matrix factorization is a very important problem. There are supercomputers built just to do matrix factorizations. Every second you are on an airplane, matrices are being factorized. Radars that track flights use a technique called Kalman filtering. At the heart of Kalman Filtering is a Matrix Factorization operation. Kalman Filters are solving linear systems of equations when they track your flight using radars. Write an R function to factorize a square matrix A into LU or LDU, whichever you prefer R Markdown document using our class naming convention, E.g. GIyengar Assignment2 PS2.Rmd. You don't have to worry about permuting rows of A and you can assume that A is less than 5x5, if you need to hard-code any variables in your code.

```
require(Matrix)
```

```
## Loading required package: Matrix
```

```
## Warning: package 'Matrix' was built under R version 3.1.2
```

```
A <- matrix(1:9,3,3)
factor_sq_mat <- function(sq_mat){
  expand(lu(sq_mat))
}
factor_sq_mat(A)
```

```
## $L
## 3 x 3 Matrix of class "dtrMatrix" (unittriangular)
##      [,1] [,2] [,3]
## [1,] 1.0000 .      .
## [2,] 0.3333 1.0000 .
## [3,] 0.6667 0.5000 1.0000
##
## $U
## 3 x 3 Matrix of class "dtrMatrix"
##      [,1] [,2] [,3]
## [1,] 3    6    9
## [2,] .    2    4
## [3,] .    .    0
##
## $P
## 3 x 3 sparse Matrix of class "pMatrix"
##
## [1,] . | .
## [2,] . . |
## [3,] | . .
```