Class Prep 6: 3.1.1 to 3.1.2

Chapter 3: Linear Algebra

Section 3.1.1: Matrix and Vector Operations

```
library(cmna)
library(pracma)

##
## Attaching package: 'pracma'

## The following objects are masked from 'package:cmna':
##
##     cubicspline, horner, newton, nthroot, romberg, secant, wilkinson

u <- c(1, 2, 3); v <- c(8, 4, 2); x <- 7
u + x

## [1]  8  9 10

u + v

## [1] 9 6 5

u + c(1,9)

## Warning in u + c(1, 9): longer object length is not a multiple of shorter
object
## length

## [1]  2 11  4

A <- matrix(1:9, 3)
A + 1

##      [,1] [,2] [,3]
## [1,]    2    5    8
## [2,]    3    6    9
## [3,]    4    7   10

A + c(1, 2, 3)

##      [,1] [,2] [,3]
## [1,]    2    5    8
## [2,]    4    7   10
## [3,]    6    9   12
```

```r
A + 1
```

```
##      [,1] [,2] [,3]
## [1,]    2    5    8
## [2,]    3    6    9
## [3,]    4    7   10
```

```r
A + c(1, 2) - A
```

```
## Warning in A + c(1, 2): longer object length is not a multiple of shorter
object
## length
```

```
##      [,1] [,2] [,3]
## [1,]    1    2    1
## [2,]    2    1    2
## [3,]    1    2    1
```

```r
A + c(1, 2, 3) - A
```

```
##      [,1] [,2] [,3]
## [1,]    1    1    1
## [2,]    2    2    2
## [3,]    3    3    3
```

```r
B <- matrix(1:6, 3)
status <- try(A + B)
```

```
## Error in A + B : non-conformable arrays
```

```r
print(status[1])
```

```
## [1] "Error in A + B : non-conformable arrays\n"
```

```r
A %*% B
```

```
##      [,1] [,2]
## [1,]   30   66
## [2,]   36   81
## [3,]   42   96
```

```r
u %*% v
```

```
##      [,1]
## [1,]   22
```

```r
diag(A)
```

```
## [1] 1 5 9
```

```r
diag(B)
```

```
## [1] 1 5
```

```
diag(u)
```

```
##      [,1] [,2] [,3]
## [1,]    1    0    0
## [2,]    0    2    0
## [3,]    0    0    3
```

```
diag(1, 4)
```

```
##      [,1] [,2] [,3] [,4]
## [1,]    1    0    0    0
## [2,]    0    1    0    0
## [3,]    0    0    1    0
## [4,]    0    0    0    1
```

```
nrow(B)
```

```
## [1] 3
```

```
ncol(B)
```

```
## [1] 2
```

```
nrow(u)
```

```
## NULL
```

```
ncol(u)
```

```
## NULL
```

```
length(u)
```

```
## [1] 3
```

```
length(B)
```

```
## [1] 6
```

```
dim(B)
```

```
## [1] 3 2
```

Section 3.1.2: Elementary Row Operations

```
A <- matrix(1:15, 5)
scalerow(A, 2, 10)
```

```
##      [,1] [,2] [,3]
## [1,]    1    6   11
## [2,]   20   70  120
## [3,]    3    8   13
## [4,]    4    9   14
## [5,]    5   10   15
```

```
swaprows(A, 1, 4)
```

```
##      [,1] [,2] [,3]
## [1,]    4    9   14
## [2,]    2    7   12
## [3,]    3    8   13
## [4,]    1    6   11
## [5,]    5   10   15
```

```
replacerow(A, 1, 3, -3)
```

```
##      [,1] [,2] [,3]
## [1,]    1    6   11
## [2,]    2    7   12
## [3,]    0  -10  -20
## [4,]    4    9   14
## [5,]    5   10   15
```