# Foundations in R

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## Always First Command

```
> library(NCStats)
```

## Basic Vectors

```
> ( profs <- c("Derek","Young","Jodi") )
```

```
[1] "Derek" "Young" "Jodi"
```

```
> ( nums <- c(4,2,6,4,3) )
```

```
[1] 4 2 6 4 3
```

```
> ( heads <- c(TRUE, TRUE, FALSE, FALSE) )
```

```
[1]  TRUE  TRUE FALSE FALSE
```

```
> ls()
```

```
 [1] "f"           "fnm"        "gt5"       "heads"      "iris"       "need2render"
 [7] "nums"        "profs"      "set"       "setver"     "setver1"    "ver_and_gt5"
[13] "ver_or_gt5"
```

```
> nums[3]
```

```
[1] 6
```

```
> profs[2]
```

```
[1] "Young"
```

```
> heads[1]
```

```
[1] TRUE
```

## Basic Data Frames

```
> setwd("C:/aaaWork/Web/GitHub/NCMTH107/lecture/HOs")
> iris <- read.csv("Iris.csv")
> str(iris)
```

```
'data.frame':   150 obs. of  5 variables:
 $ seplen : int  50 46 46 51 55 48 52 49 44 50 ...
 $ sepwid : int  33 34 36 33 35 31 34 36 32 35 ...
 $ petlen : int  14 14 10 17 13 16 14 14 13 16 ...
 $ petwid : int  2 3 2 5 2 2 2 1 2 6 ...
 $ species: Factor w/ 3 levels "setosa","versicolor",..: 1 1 1 1 1 1 1 1 1 1 ...
```

```
> headtail(iris)      # NOT the entire data.frame
```

```
    seplen sepwid petlen petwid   species
1       50     33     14      2    setosa
2       46     34     14      3    setosa
3       46     36     10      2    setosa
148     57     25     50     20 virginica
149     58     28     51     24 virginica
150     63     33     60     25 virginica
```

```
> ls()
```

```
 [1] "f"           "fnm"         "gt5"         "heads"       "iris"        "need2render"
 [7] "nums"        "profs"       "set"         "setver"      "setver1"     "ver_and_gt5"
[13] "ver_or_gt5"
```

## Working With Data Frames

```
> iris[2,]
```

```
  seplen sepwid petlen petwid species
2     46     34     14      3 setosa
```

```
> iris$seplen
```

```
  [1] 50 46 46 51 55 48 52 49 44 50 44 47 48 51 48 50 50 43 58 51 49 51 50 46 57 50 54 52
 [29] 55 49 54 50 44 47 46 51 50 49 54 54 51 48 48 45 57 51 54 51 52 53 65 62 59 61 60 56
 [57] 57 63 70 64 61 55 54 58 55 50 67 56 58 60 57 57 49 56 57 66 52 60 50 55 58 62 59 60
 [85] 67 63 56 63 61 64 51 57 61 56 69 55 55 66 68 67 64 67 63 69 65 65 58 68 62 77 67 76
[113] 49 67 59 63 64 79 67 77 63 72 61 61 64 62 77 63 58 72 71 64 60 63 77 60 69 74 56 73
[141] 67 65 69 72 65 64 68 57 58 63
```

```
> iris$seplen[3]
```

```
[1] 46
```

```
> iris[3,2]
```

```
[1] 36
```

```
> iris[c(1,3,5),]
```

```
  seplen sepwid petlen petwid species
1     50     33     14      2  setosa
3     46     36     10      2  setosa
5     55     35     13      2  setosa
```

## Filtering Data Frames

```
> set <- filterD(iris,species=="setosa")
> str(set)
```

```
'data.frame':   50 obs. of  5 variables:
 $ seplen : int  50 46 46 51 55 48 52 49 44 50 ...
 $ sepwid : int  33 34 36 33 35 31 34 36 32 35 ...
 $ petlen : int  14 14 10 17 13 16 14 14 13 16 ...
 $ petwid : int  2 3 2 5 2 2 2 1 2 6 ...
 $ species: Factor w/ 1 level "setosa": 1 1 1 1 1 1 1 1 1 1 ...
```

```
> gt5 <- filterD(iris,seplen>5)
> headtail(gt5)
```

```
    seplen sepwid petlen petwid   species
1       50     33     14      2    setosa
2       46     34     14      3    setosa
3       46     36     10      2    setosa
148     57     25     50     20 virginica
149     58     28     51     24 virginica
150     63     33     60     25 virginica
```

```
> setver1 <- filterD(iris,species!="virginica")
> str(setver1)
```

```
'data.frame':   100 obs. of  5 variables:
 $ seplen : int  50 46 46 51 55 48 52 49 44 50 ...
 $ sepwid : int  33 34 36 33 35 31 34 36 32 35 ...
 $ petlen : int  14 14 10 17 13 16 14 14 13 16 ...
 $ petwid : int  2 3 2 5 2 2 2 1 2 6 ...
 $ species: Factor w/ 2 levels "setosa","versicolor": 1 1 1 1 1 1 1 1 1 1 ...
```

```
> setver <- filterD(iris,species %in% c("setosa","versicolor"))
> str(setver)
```

```
'data.frame':    100 obs. of  5 variables:
 $ seplen : int   50 46 46 51 55 48 52 49 44 50 ...
 $ sepwid : int   33 34 36 33 35 31 34 36 32 35 ...
 $ petlen : int   14 14 10 17 13 16 14 14 13 16 ...
 $ petwid : int   2 3 2 5 2 2 2 2 1 2 6 ...
 $ species: Factor w/ 2 levels "setosa","versicolor": 1 1 1 1 1 1 1 1 1 1 ...


> ver_and_gt5 <- filterD(iris,species=="versicolor",seplen>5)
> headtail(ver_and_gt5)


   seplen sepwid petlen petwid      species
1      65     28     46     15 versicolor
2      62     22     45     15 versicolor
3      59     32     48     18 versicolor
48     66     30     44     14 versicolor
49     68     28     48     14 versicolor
50     67     30     50     17 versicolor


> ver_or_gt5 <- filterD(iris,species=="versicolor" | seplen>5)
> headtail(ver_or_gt5)


   seplen sepwid petlen petwid      species
1      50     33     14      2    setosa
2      46     34     14      3    setosa
3      46     36     10      2    setosa
148    57     25     50     20 virginica
149    58     28     51     24 virginica
150    63     33     60     25 virginica


> ls()


 [1] "f"           "fnm"         "gt5"         "heads"       "iris"        "need2render"
 [7] "nums"        "profs"       "set"         "setver"      "setver1"     "ver_and_gt5"
[13] "ver_or_gt5"
```