R Handout - R Foundations

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Always First Command

```
> library(NCStats)
```

Basic Vectors

```
> ( profs <- c("Derek","Young","Sharad") )
[1] "Derek"  "Young"  "Sharad"
> ( 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] "heads" "nums"  "profs"
> nums[3]
[1] 6
> profs[2]
[1] "Young"
> heads[1]
[1] TRUE
```

Basic Data Frames

You must change the working directory in R with `setwd()` (as below, but for your directory) or with the Session..Working Directory menu items before using `read.table()`.

```
> setwd("C:/aaaWork/Class Materials/MTH107/Lecture/HOs/")
> perch <- read.table("PerchGL.txt",header=TRUE)
> str(perch)
'data.frame': 100 obs. of  3 variables:
 $ fl  : int  59 60 63 63 66 69 72 74 78 78 ...
 $ w   : num  2.5 2.5 3.3 3.6 3.9 4.1 4.4 4.8 5 5.6 ...
 $ year: int  1994 1994 1994 1994 1994 1994 1994 1994 1994 1994 ...
> view(perch)     # random 6 rows, NOT the entire data.frame
    fl    w year
3   63  3.3 1994
7   72  4.4 1994
28 120 19.1 1994
71 117 14.5 2000
92  93  8.9 2000
98 110 13.5 2000
> ls()
[1] "heads" "nums"  "perch" "profs"
```

Working With Data Frames

```
> perch[2,]
  fl   w year
2 60 2.5 1994
> perch$w
  [1]  2.5  2.5  3.3  3.6  3.9  4.1  4.4  4.8  5.0  5.6  6.2  6.2  6.3  6.3  7.8  7.8
 [17]  9.1  9.5  9.8  9.8 11.0 11.5 13.2 12.9 13.2 14.5 16.2 19.1 19.5  6.3  6.0  6.5
 [33]  6.6  4.3  4.6  4.6  5.2  5.9 14.1 12.6 13.2  2.1  2.6  2.6  3.3  3.5  3.5  3.9
 [49]  3.9  4.1  4.2  4.5  4.8  5.0  5.4  5.5  6.0  6.6  7.2  7.9  8.3  9.5  9.5 10.5
 [65] 11.2 10.7 12.3 12.9 12.6 14.5 14.5 15.8 18.2 18.2 18.2 16.2 21.4 31.6 28.8 35.5
 [81] 50.1  4.3  4.3  4.4  4.9  5.1  5.5  5.9  6.8  7.8  8.1  8.9 10.0 10.0 11.0 11.7
 [97] 12.9 13.5 15.1 15.1
> perch$w[3]
[1] 3.3
> perch[3,2]
[1] 3.3
> perch[c(1,3,5),]
  fl   w year
1 59 2.5 1994
3 63 3.3 1994
5 66 3.9 1994
```

Subsetting Data Frames

The `iris.txt` file must be downloaded from the webpage first.

```
> iris <- read.table("Iris.txt",header=TRUE)
> 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 ...
> view(iris)
   seplen sepwid petlen petwid    species
14     51     38     16      2     setosa
33     44     29     14      2     setosa
36     51     34     15      2     setosa
48     51     37     15      4     setosa
77     52     27     39     14 versicolor
89     61     28     47     12 versicolor
```

```
> set <- Subset(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 <- Subset(iris,seplen>5)
> view(gt5)
```

```
    seplen sepwid petlen petwid    species
10      50     35     16      6     setosa
42      48     34     16      2     setosa
56      56     25     39     11 versicolor
76      66     29     46     13 versicolor
114     67     30     52     23  virginica
122     72     32     60     18  virginica
```

```
> setver <- Subset(iris,species=="setosa" | species=="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 1 2 6 ...
 $ species: Factor w/ 2 levels "setosa","versicolor": 1 1 1 1 1 1 1 1 1 1 ...
```

```
> setver1 <- Subset(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 ...
```

```
> vergt5 <- Subset(iris,species=="versicolor" & seplen>5)
> view(vergt5)
```

```
   seplen sepwid petlen petwid    species
19     58     27     41     10 versicolor
22     57     29     42     13 versicolor
29     50     20     35     10 versicolor
35     67     31     47     15 versicolor
44     56     29     36     13 versicolor
49     68     28     48     14 versicolor
```

```
> ls()
```

```
 [1] "gt5"     "heads"   "iris"    "nums"    "perch"   "profs"   "set"     "setver"
 [9] "setver1" "vergt5"
```