Load Packages

```
require(mosaic)
require(mosaicData)
```

Essential R Syntax

Function & arguments: `rflip(10)`

Optional arguments: `rflip(10, prob=0.3)`

Assignment: `x <- rflip(10, prob=0.3)`

Formula Interface

Used for graphics, statistics, inference, and modeling operations.

goal (y ~ x , data = mydata)

Read as: Calculate goal for how y "depends on" by x, or "is modeled by" x using variables in mydata

Examples:

```
favstats(homeless~sex, data=HELPrct)
|   .group min Q1 median   Q3 max     mean ...
| 1 female  21 31     35 40.5  58 36.25234 ...
| 2   male  19 30     35 40.0  60 35.46821 ...
```

```
quantile(age~sex,data=HELPrct,p=c(.2,.8))
|    .group 20%  80%
|  1 female  30 42.8
|  2   male  29 41.0
```

Only one variable? It goes to right of ~

```
mean( ~ age, data=HELPrct)

|  [1] 35.65342
```

Data Frames

Number of rows: `nrow(CPS85)`

Names of variables. `names(CPS85)`

Add a new variable to a data frame

```
res <- mutate(CPS85, yearly=wage*2000)
```

Drop a variable from a data frame

```
res <- select(CPS85, -married)
```

Extract cases meeting a criterion

```
res <- filter(CPS85, sector=="manag")
```

Random sample of 50 cases

```
mysamp <- sample(CPS85, size=50)
```

File reading and writing

```
myData <- read.file( "URL or filename" )
write.csv(myData, "filename.csv" )
```

Graphics interactively (in RStudio)

```
mplot(CPS85, format="scatter")
```

Other types: `"boxplot"` `"violin"` `"frequency"` `"density"` `"frequency polygon"`