## 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.

$$\boxed{\text{goal}} \left( \left( \boxed{\text{y}} \sim \boxed{\text{x}} \right, \text{data} = \boxed{\text{mydata}} \right)$$

Read as: Calculate goal using mydata for y "depends on" by x, or "modeled by" x. Examples:

```
          tally(homeless~sex, data=HELPrct)
|            sex
|  homeless   female  male
|    homeless  0.374 0.488
|    housed    0.626 0.512

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.table( "URL or filename" )
          write.csv(myData, "filename.csv" )
```

## GRAPHICS INTERACTIVELY (IN RSTUDIO)

```
                    mplot(CPS85, "scatter")
            Other types: "boxplot" "violin"
  "frequency" "density" "frequency polygon"
```