* Ch2, 3: Data structures and subsetting
  + Data structures, what it is you are dealing with
  + Subsetting is how you cut the stuff to do things with them
* Vector
  + Simplest data structure in R
  + One dimensional
  + [3 [‘f’  
    5 ‘q’  
    9 ‘I’  
    12] ‘r’]
  + Logical (Boolean) value True stored as 1, False stored as 0
  + Different ways to represent numbers: integers (small in memory), single (float, 8 digits of precision), double (even more precise)
  + Only allow one data type to go into them, they are relatively restrictive but that can be used to our advantage
* Factor
  + Vector of integers
  + as.numeric (a) + as.numeric(a) = [2 6 4 8]
  + as.character(a) = [‘f’ ‘q’ ‘I’ ‘r’]
  + char.a <- as.charcter(a)
  + as.numeric(char.a)
    - Output == [NA NA NA NA]  
      Warning given
  + str(a)
    - str == structure
    - Know this
* Matrix
  + Bigger version of a vector, 2 dimensional
  + [x x x  
    x x x  
    x x x]
* Array
  + Any number of dimensions
  + Generally, never need to use these in R, not the same is true of other languages
* Lists
  + One dimensional
  + Every item in a list has a position
  + Multiple data types can be included in a list
  + My\_list <-
  + [[1]] [1, 2,3]  
    [[2]] [matrix]  
    [[3]] my\_list\_in\_a\_list
* VECTORS GET PERIODS TO SEPARATE WORDS WHEREAS LISTS USE UNDERSCORES TO SEPARATE WORDS
* My\_mod <- lm(y~x)
  + Means y as a function of x
  + Print(my\_mod)  
    call: y~x  
    Coefficients  
     intercept: 3 x(slope):4.5
  + Str(my\_mod)  
    “List of 12”  
    ---------  
    ---------
* data.frame
  + A list which can only contain vectors, each vector has a name
  + Station Date Salinity  
    [st1 [- [37  
    st2] -] 38]
  + “tidy” data
    - Each row is one observation and each column is a variable or identifier
* Subsetting
  + Based on: position  
     name   
     Boolean (logical) vector
  + Character vector, named: a  
    [1  
    2  
    “red”]
    - a[1] = 1
    - a[c(3, 2, 1, 3, 1)] = [red, 2, 1, red, 1]
  + Can give elements of vectors names:
  + a  
    steve [1  
    sue 2  
    sam “red”]
    - a[c(“steve”, “sam”)] = [1, red]
  + Names are really just examples of attributes
    - attr(a, “units”) <- “mg per L”
  + With a numerical vector:  
    [7  
    19  
    5]
    - A[c(True, false, true)] = [7, 5]
    - a[a < 10} = [7, 5]