# **Lecture 1.8 – Lists and Data Frames**

#### **Specific Learning Objectives:**

- 1.1.9 Create vectors, arrays, matrices, lists, and data frames.
- 1.1.10 Understand vectors and vectorized calculations.
- 1.1.11 Understand the data classes of R.
- 1.1.12 Learn how to index vectors, arrays, matrices, lists, and data frames.

### **Logical Record Subsets**

- Information can also be pulled based on a logical test for most data structures (lists and data frames included!)
  - This is really useful if you don't care what the element position is, you care more about the value of the elements.

You run the following line to create a matrix:

```
my.matrix2 <- matrix(seq(1,21), nrow=7, byrow=TRUE)</pre>
```

Which line of code will subset only two-digit numbers (those greater than 9)?

```
- one option: my.matrix2[4:7, ]
```

- another option: my.matrix2[my.matrix>9]

```
> my.matrix2>9
                 [,3]
[1,] FALSE FALSE FALSE
                                     my.matrix2[my.matrix2>9]
[2,] FALSE FALSE FALSE
                                        10 13 16 19 11 14 17 20 12 15 18 21
[3,] FALSE FALSE FALSE
     TRUE
           TRUE
                 TRUE
[5,]
     TRUE
          TRUE
                 TRUE
[6,]
     TRUE
           TRUE
                 TRUE
     TRUE
           TRUE
                 TRUE
```

### **Logical Record Subsets**

- In data frames, be a little careful to specify whether you are looking for the record in a column or a row.
  - The easiest way to do this is to come up with the test first and then where it is searching second.

**Example:** In the **ToothGrowth** data set, find all the data associated with animals given orange juice as their supplement.

 We want to first create the test. How can we restrict data to only orange juice (OJ)?

Now use this logical vector to retrieve the records:

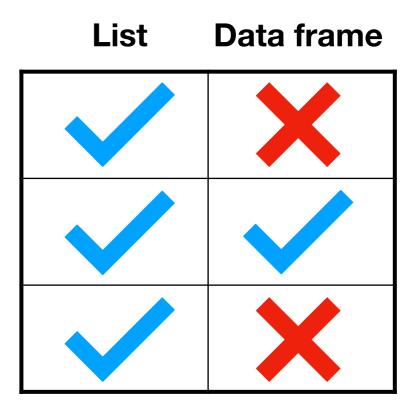
ToothGrowth [ToothGrowth\$supp == "OJ", ]

Get all the rows And get ALL where this statement columns for those is true rows!

## **Check Your Understanding**

Which class of object would you use if you needed:

- a) Members of different sizes
- b) Members of different classes
- c) Both a and b



# **Check Your Understanding**

Create a list in which each member contains one of each data types you've learned so far in the course!

## **Check Your Understanding**

In the ToothGrowth data set, how can you print out all the measured tooth lengths from their study?

How can you find the mean and standard deviation of these lengths?

#### **In-class Exercises**

- 1. Catchup with assignments. Any questions on these?
- 2. Exercise 5.1 a (except ii)
- 3. Exercise 5.2 a and b
- 4. Assignments 1.10 and 1.11

#### **Action Items**

1. Complete Assignments 1.10 and 1.11.

2. Read Davies Ch. 6 for next time.