

# Indexing

## Part 1

# Last time was objects

- **Objects** are the **nouns** of programming languages
- **Objects** store something
  - value
  - character string
  - **vector** of values or characters
  - entire data frame
  - model
  - etc...

# So what?

- Making an **object** is only useful if you can use it later on
- We need to be able to access our **objects**
- And we need to be able to access bits and pieces of our **objects**
  - Example: what if you only want one or a few of the objects in a **vector**?

# Indexing

**Indexing** is how we access items within a **vector**.

To index a **vector**, we're going to use square brackets [ ]

# An example

Let's make a **vector** of *some* my favorite TV **comedies**:

```
comedies <- c("Parks and Rec", "Broad City", "I'm Sorry", "Avenue 5",  
              "Bored to Death", "The Office", "Silicon Valley", "30 Rock",  
              "Big Mouth", "Futurama")
```

If you want to look at *all* the objects contained in the vector, all you need is your vector name

```
comedies
```

```
## [1] "Parks and Rec" "Broad City"    "I'm Sorry"     "Avenue 5"  
## [5] "Bored to Death" "The Office"    "Silicon Valley" "30 Rock"  
## [9] "Big Mouth"     "Futurama"
```

But, if I only want to know the 6th TV show in this **comedies** vector I would type:

```
comedies[6]
```

```
## [1] "The Office"
```

# Indexing

An **index** is the *position* of an element in a **vector**

In **R**, indexing starts at 1. That is, the first element of a vector is located at position 1.

The basic syntax is to take the name of the **vector** and directly next to it, in square brackets, put the position you want to get.

- Something like `objectName[position number]`

# Indexing Vectors

```
comedies <- c("Parks and Rec", "Broad City", "I'm Sorry", "Avenue 5",  
             "Bored to Death", "The Office", "Silicon Valley", "30 Rock",  
             "Big Mouth", "Futurama")
```

To select objects that are sequential (in a row):

- `comedies[3:5]`
- You can think of `:` as *"through"*
  - `[3:5]` = "three *through* five"

```
comedies[3:5]
```

```
## [1] "I'm Sorry"      "Avenue 5"       "Bored to Death"
```

# Indexing Vectors

To select objects that are *not* in a row:

```
comedies[c(1,7,10)]
```

```
## [1] "Parks and Rec" "Silicon Valley" "Futurama"
```

Note that you need to wrap the position numbers inside of `c()`. What you're doing is making a mini-vector of position numbers! Vectors on vectors!



# Indexing Vectors

Since you can make these mini-vectors, you can go crazy and combine sequential and non-sequential objects.

- Example:

```
comedies[c(1:4, 9)]
```

```
## [1] "Parks and Rec" "Broad City"    "I'm Sorry"     "Avenue 5"  
## [5] "Big Mouth"
```

This reads as *"give me the elements that correspond to positions 1,2,3,4 (1 through 4), and 9"*

# A more serious example

Let's say we have a vector that contains body mass indices (BMIs) for 20 participants in your study. A healthy BMI is between 18.5-24.9, and anything above 30 is considered "obese". You inspect your vector called `bmi`.

```
## [1] 34.2 31.6 29.8 27.2 26.5 20.0 25.1 33.7 21.1 22.3 32.0 24.9 33.0 28.6  
## [16] 55.8 55.8 60.9 81.0 65.2
```

The last 5 numbers are WAY off the scale! You recently implemented a new survey tool to collect the data, and only those 5 participants used the new method. You realize there's probably something wrong with the data collection!

You'll need those `index` positions in order to remove those 5 participants.

```
bmi[16:20]
```

```
## [1] 55.8 55.8 60.9 81.0 65.2
```

(We will talk more about removing participants in the coming weeks!)