PSC 253 Minimal Manual

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2020-09-24

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Preface

This book is a supplement to the book, Quantitative Social Science: An Introduction, by Kosuke Imai. It also relies heavily on the work of Jeffrey Arnold, who translated the Imai code into tidyverse code.

I aspire for this text to act as a minimal manual for the course PSC 253 Scope and Methods in Political Science taught at Morehouse College. It is intended to cover all of the main analytical tasks that the course requires.

Chapter 1

R Basics

At is most basic functionality, R is a calculator.

1.1 Use R as a Calculator

1.1.1 Problem

You want to add, subtract, multiply, divide, use exponents, and take square roots

1.1.2 Solution

Use `+` for addition, `-` for subtraction, `*` for multiplication and `/` for division.

```
# addition
43 + 5
```

```
## [1] 48
```

```
# subtraction
43 - 5
```

```
## [1] 38
```

```
# multiplication
43 * 5
```

```
## [1] 215
```

```
# division
43/5
```

```
## [1] 8.6
```

For exponents, we raise `X` to the power of `y` by using `^`. That is `X^y`.

```
# raise 43 to the power of 5
43 ^ 5
```

```
## [1] 147008443
```

Take the square root of some number `x` by using the function `sqrt()`. That is `sqrt(x)`.

```
# take the square root of 43
sqrt(43)
```

```
## [1] 6.557439
```

1.1.3 Troubleshooting

- Keep in mind that R follows the order of operations, 2 + 2 * 2 is equal to 6 and not 8.

```
# correct
2 + 2 * 2
```

```
## [1] 6
```

```
# incorrect
(2 + 2) * 2
```

```
## [1] 8
```

1.2 Creating an Object

1.2.1 Problem

You want to create an object to hold a number

1.2.2 Solution

To create an object:

1. type in a name for the object, like `newobject` then
2. use the assignment operator `<-`,
3. input a number, mathematical expression, dataset, or text on the right side of `<-` that you want assigned to the `newobject`

```
# assigning the number 4 to a new object named "myobject"
myobject <- 4
```

```
# assigning the text "hallelujah hollaback" to a new object named "second_object"
second_object <- "hallelujah hollaback"
```

Type the name of an object in order to see what it contains.

```
myobject
```

```
## [1] 4
```

```
second_object
```

```
## [1] "hallelujah hollaback"
```

1.2.3 Troubleshooting

- There cannot be any spaces in the name of an object. Instead you could use dots, dashes, underscores, or capitalization to distinguish between words: `small.data`, `big-data`, `bigger_data`, `mediumData`.
- Text needs to be in quotation marks in order to be assigned to an object.
- Object names are case sensitive `Myobject` is not the same as `myobject`

1.3 Creating a Vector

A vector is a list of numbers or characters. We will create vectors for a variety of reasons in this course.

1.3.1 Problem

You want to create a vector.

1.3.2 Solution

Use the function `c()` to create a list by separating the entries with a comma.

```
# create a vector called 'prime'
prime <- c(1, 3, 5, 7)

prime
```

```
## [1] 1 3 5 7
```

```
# create a vector called "first_name"
first_name <- c("Matthew", "Mosi", "Manu", "Ekundayo", "Kwasi")

first_name
```

```
## [1] "Matthew"  "Mosi"     "Manu"     "Ekundayo" "Kwasi"
```

1.3.3 Troubleshooting

- As the name of a function, `c()` is case sensitive. Use the lowercase `c`.
- Make sure that all elements are separated by a comma.
- Vectors are typically assigned to some object.