Variables

CSC121
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Last time

- We saw how the R Console works and wrote some expressions
- Learned about some binary and unary operators
- Saw some different numeric data types
  - ‘double’ and ‘integer’
- Introduced variables
Today

- Go a little deeper into variables
- See some ways we can work with variables in the console
- Introduce Functions
  - What they are
  - How to use them
Review: Why we need variables

- We need a way to easily store and access the data we work with.
- We want to be able to label data
  - Make it human readable (a theme of programming languages)
- We want to keep track of how data changes
Variable Assignment Statement

- We need a way to create a variable, name it, and assign some data to it.

- We do that with an assignment statement:

```r
variableName <- expression
```

We say:

“`variableName` is assigned the value `expression`”
variableName <- expression

“variableName is assigned the value of expression”

- On the left side, you have the name of the variable you want to assign
- On the right side, you have the expression (the value) you want to assign to that variable

  <- is the assignment operator

- It looks like an arrow, and you can think of it like that:
  - The expression is put into the variable in the direction of the arrow
Two steps to assign a variable

variableName <- expression

**Step 1:** Evaluate the expression on the right-hand side of the statement to produce a value

**Step 2:** Assign the value of that expression to the variable name on the left-hand side of the statement
variableName <- expression

p <- 5

Step 1: Evaluate expression on right-hand side to get a value
5
Step 2: Assign that value to variable name on left-hand side
p is assigned the value 5

R Console:
> p <- 5
> p
[1] 5
variableName <- expression

q <- 6 * 3

Step 1: Evaluate expression on right-hand side to get a value
6 * 3 = 18

Step 2: Assign that value to variable name on left-hand side
q is assigned the value 18

R Console:
> q <- 6 * 3
> q
[1] 18
p <- 5
t <- p + 3

We saw how we assigned p before, so let's focus on t

Assignment steps for variable t

Step 1: Evaluate expression on right-hand side to get a value
p + 3 = 5 + 3 = 8

Step 2: Assign that value to variable name on left-hand side
t is assigned the value 8

R Console:
> p <- 5
> t <- p + 3
> t
[1] 8
b <- as.integer(7.76)

Assignment steps for variable b

Step 1: Evaluate expression on right-hand side to get a value
as.integer(7.76) = 7

Step 2: Assign that value to variable name on left-hand side
b is assigned the value 7

R Console:
> b <- as.integer(7.76)
> b
[1] 7
Variable data type

- The data type of the variable is the data type of its value
- Remember that we can use the `typeof()` command to find the type

```r
> p <- 5
> typeof(p)
[1] "double"

> b <- as.integer(7.76)
> typeof(b)
[1] "integer"
```
Let’s look at how this all works in the R Console