Northeastern University

CS6020: Collecting, Storing, and Retrieving Information

Programming in R

Programming in R

FLOW CONTROL

Lesson Objectives

- After completing this lesson, you are able to:
  - control processing with conditional and iterative execution

Conditional Execution

- In conditional execution, code statements are only executed if certain conditions are TRUE.
- R supports these operators:

Operator	Semantics
<	less than
>	greater than
==	equal
&	AND
|	OR
!	NOT

The `if()` Statement

- The `if()` statement is used to construct conditional execution paths.
- The conditional code statements are enclosed in curly braces `{` and `}`.

```
> a<-10
> b<-5
> if(a < b) {
+ print("a is less than b")
+ }
```

`if()` with Nested Functions

```
> if (sum(1:10) >= sqrt(75)) {
+ print("true")
+ } else {
+ print("false")
+ }
[1] "true"
```

The `ifelse()` Function

- The `ifelse()` function provides a more compact syntax for if-else constructs.

```
> ifelse(sum(1:5) >= 10, "it's greater", "it's
smaller")
[1] "it's greater"
```

Iteration

- R supports two common forms of iteration (looping):
  - restricted iteration which executes commands a fixed number of times: **for** loop
  - unrestricted iteration in which the loop runs until some condition is no longer true: **while** loop

The `for` Loop

- The `for` loop runs a fixed number of times based on the values assigned to an index or looping variable.

```
> for (i in 1:3) {
+ print(paste("i =",i))
+ }
[1] "i = 1"
[1] "i = 2"
[1] "i = 3"

> i
[1] 3
```

Iterating Over Sets

- Instead of looping a fixed number of times, a `for` loop can also iterate over a set.
- The loop variable takes on each value in the set one at a time.

```
> cities <- c("Boston","New York","San Francisco")
> for (city in cities) {
+ print(city)
+ }
[1] "Boston"
[1] "New York"
[1] "San Francisco"
```

Unrestricted Iteration

- In this form of iteration, the loop executes the loop statements until a condition is no longer true.

```
> x <- 0
> while (x < 10) {
+ print (x)
+ x <- x + 1
+ }
[1] 0
[1] 1
[1] 2
…
```

You can break out of an “infinite loop” by pressing ESC

Summary

- In this lesson, you learned that:
  - the execution of statements can be controlled with an `if` statement
  - R supports several types of loops, including the common `for` and `while` loop constructs
  - `for` can be used to loop a fixed number of times or over a data set
  - `while` loops until some condition is no longer true

Summary, Review, & Questions…