A Gentle Introduction to R

EXTRAS

Jonathan Whiteley

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Matrix math

- R can do *matrix math* — which are uses in many statistical procedures
  - But the *syntax* is different from the usual math operators
- Using a regular multiplication symbol (*) results in *element*-wise multiplication
  - each *element* (item) in matrix1 is multiplied by the corresponding *element* in matrix2, etc.

```
c(1, 2, 3) * c(3, 2, 1)
```

- *Matrix multiplication* is specified by this operator: %*%

```
c(1, 2, 3) %*% c(3, 2, 1)
```

Symbolic *Variables*

- You can store values (*objects*) in symbolic variables (*names* using an *assignment operator*

`->`	assign the *value* on the **left** to the *name* on the **right**
`<-`	assign the *value* on the **right** to the *name* on the **left**
`=`	assign the *value* on the **right** to the *name* on the **left**

- '<-' is preferred, because it is unambiguous (to people *and* to R)
- '=' is not allowed in certain situations (e.g., when surrounded by other expressions)
  - '=' is also used to set *argument values* in *function calls*, which is a different meaning and its most common use.
- You can also use the `assign` *function* (advanced):

```
assign('x', 3)    # assign the value 3 to the variable 'x'
```

Variable Names

- Variable names can include:

letters	`a-z A-Z`
numbers	`0-9`
periods	`.`
underscores	`_`

- Variable names *should begin with a letter*

```
A <- 10
B = 10 * 10
log(A) -> A_log
B.seq <- 1:B
assign('x', 3)
```

Variable Names: Details

Names can start with a **letter** or a **period** *(more on this later)*

```
myvar  <- T
.myvar <- T
```

but anything else triggers an error

```
0myvar <- F
_myvar <- F
my var <- F
```

Variable Names: Hidden

- Variable names starting with a period (`.`) are special and normally hidden from users.

```
ls()
ls(all.names = TRUE)
```

- Such variables are used by packages or the system for special values that users should not interact with directly.
- Such variables may not behave as expected with common commands, such as `ls()` (above).
- Therefore, most users should avoid doing this unless they know what they are doing and have a good reason to do so.

Variable Names: Advanced

- 'Valid' names following the rules above can be referred to easily in code.
- Names with any character are actually possible, but must be quoted with backticks (“‘)
  - **This is not recommended practice**, but occasionally useful when you need to refer to an element of an object, such as lists and data frames, that have non-standard names.

```
`(my) [strange] {variable} 'name' "!@#$"` <- T
print(`(my) [strange] {variable} 'name' "!@#$"`)
```

```
## [1] TRUE
```