Introduction to R Software

Basics of Calculations

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Truth Table and Conditional Executions

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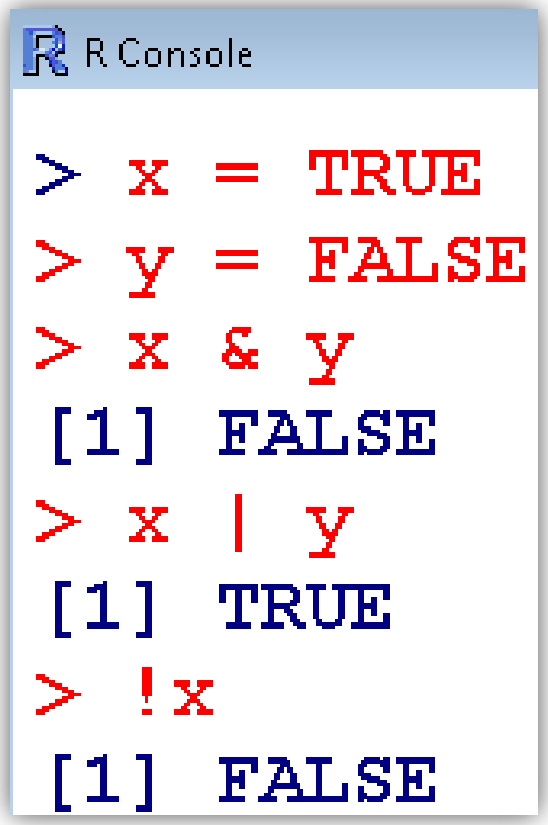
Example of Standard logical operations

Truth table

Statement 1 :: (x)	Statement 2 :: (y)	Outcome :: x and y	Outcome :: x or y
True	True	True	True
True	False	False	True
False	True	False	True
False	False	False	False

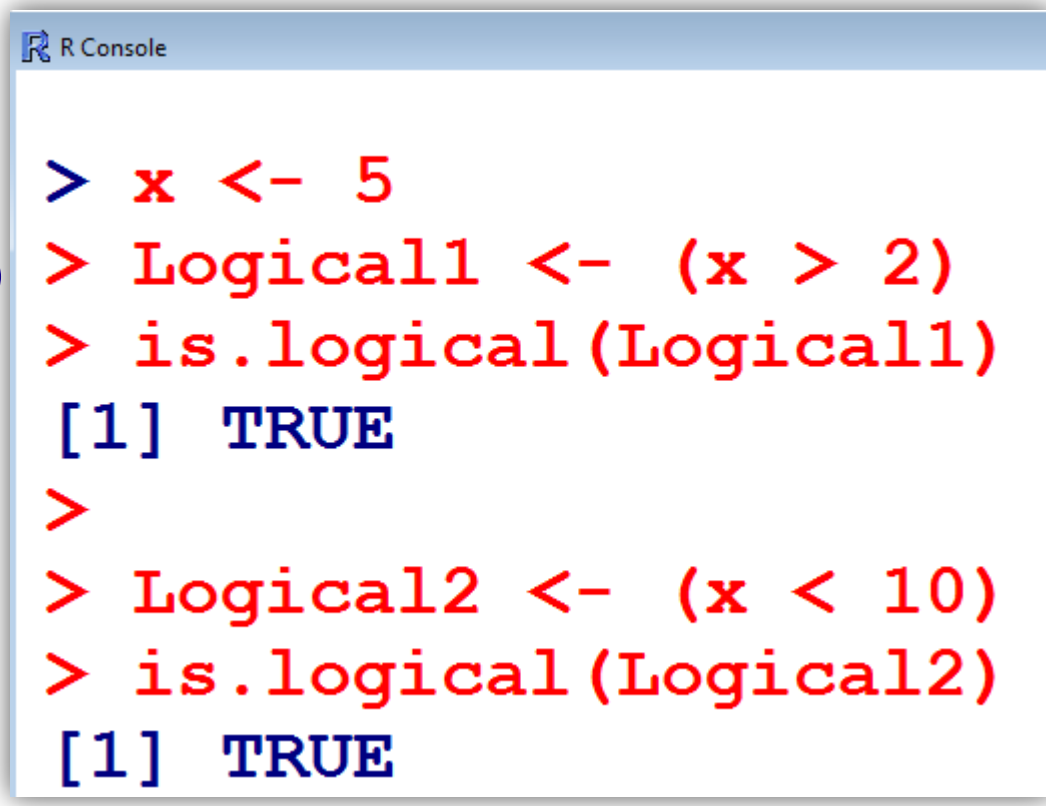
Example of Standard logical operations

```
> x = TRUE

> y = FALSE


> x & y          # x AND y
[1] FALSE

> x | y          # x OR y
[1] TRUE

> !x             # negation of x
[1] FALSE
```



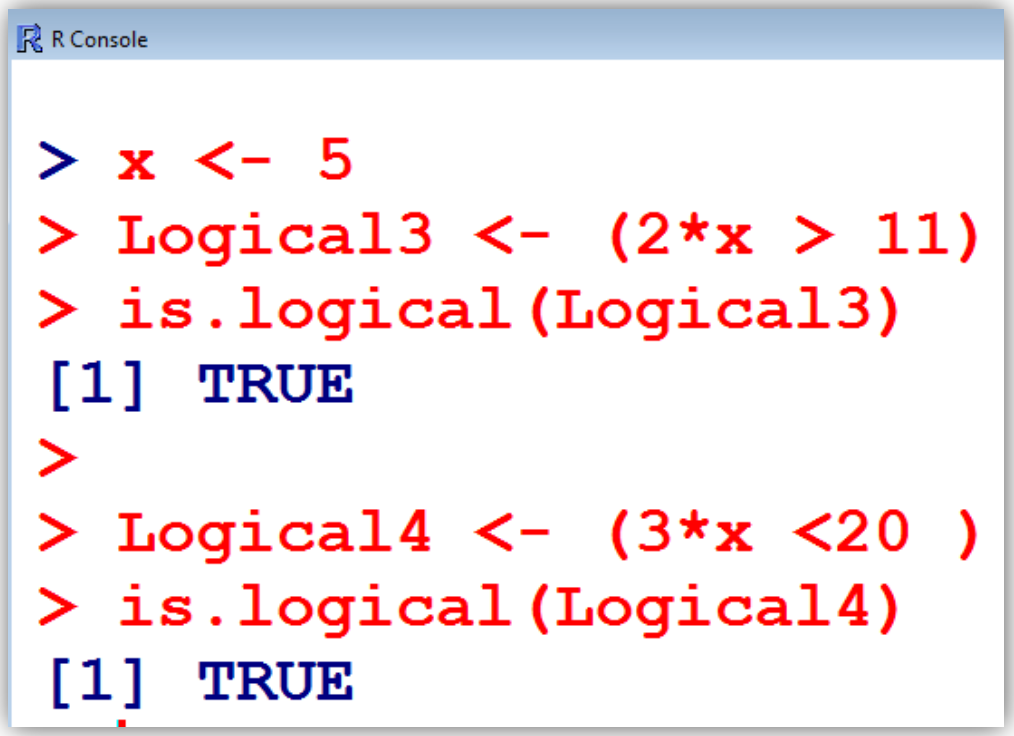
Example

```
> x <- 5
> Logical1 <- (x > 2)
> is.logical(Logical1)
[1] TRUE
> Logical2 <- (x < 10)
> is.logical(Logical2)
[1] TRUE
```



Example

```
> x <- 5

> Logical3 <- (2*x > 11)

> is.logical(Logical3)

[1] TRUE
```




```
> Logical4 <- (3*x <20)

> is.logical(Logical4)

[1] TRUE
```

Control structures in R :

Control statements,

loops,

functions

Conditional execution

1. Conditional execution

Syntax

```
if (condition) {executes commands if condition is TRUE}
if (condition) {executes commands if condition is TRUE}
else { executes commands if condition is FALSE }
```

Please note:

- **The condition in this control statement may not be vector valued and if so, only the first element of the vector is used.**

- **The condition may be a complex expression where the logical operators "and" (`&&`) and "or" (`||`) can be used.**

1. Conditional execution

Example

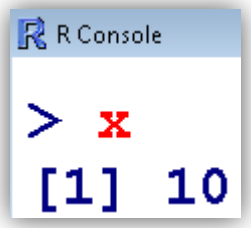
```
> x <- 5
> if ( x==3 ) { x <- x-1 } else { x <- 2*x }
```

Interpretation:

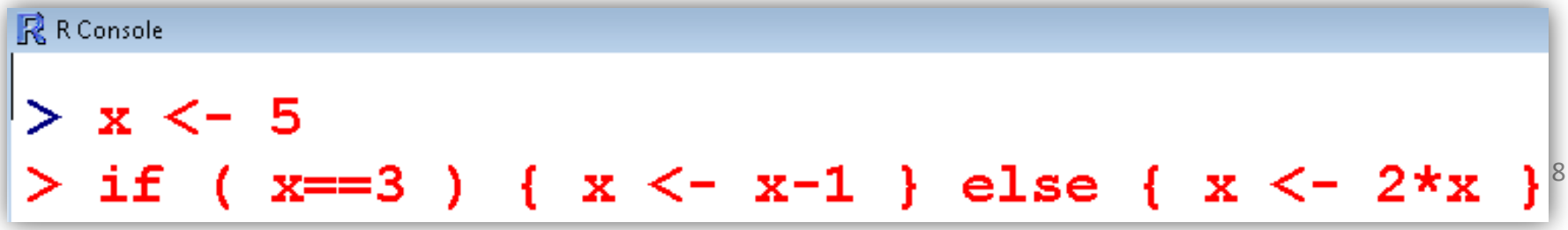
- If x = 3, then execute x = x – 1.
- If x ≠ 3, then execute x = 2*x.

In this case, x = 5, so x ≠ 3. Thus x = 2*5

```
> x
 [1] 10
```



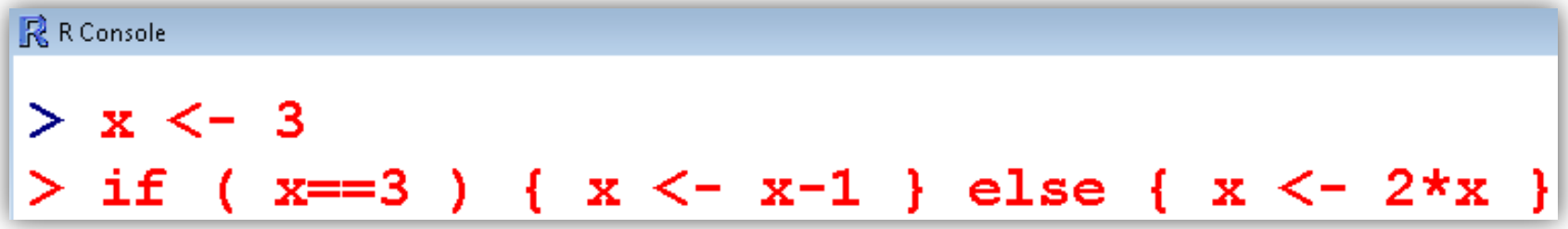
Now choose x = 3 and repeat this example



1. Conditional execution

Example

```
> x <- 3
> if ( x==3 ) { x <- x-1 } else { x <- 2*x }
```



Interpretation:

- If x = 3, then execute x = x – 1.
- If x ≠ 3, then execute x = 2*x.

In this case, x = 3, so x = 3 - 1

```
> x
 [1] 2
```