

Introduction to Scientific Computing for Biologists

ISCB20.09 - Introduction to R

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Section-4: Operators

Operators in R

- ▶ R has many operators to carry out different mathematical and logical operations.
- ▶ Operators in R can mainly be classified into the following categories.
 1. Arithmetic Operators
 2. Relational Operators
 3. Logical Operators
 4. Assignment Operators

Arithmetic Operators

These operators are used to carry out mathematical operations like addition and multiplication. The arithmetic operators are addition(+), subtraction(-), multiplication(*), division(/), exponent(^), modulus(%%) and integer division(%/%).

Operators	Description
+	Addition
-	Subtraction
*	Multiplication
/	Division
%%	Modulus
%/%	Integer Division

```
x <- 10
```

```
y <- 2
```

```
# Addition
```

Arithmetic Operators(Cont...)

```
# Multiplication
```

```
2 * 5
```

```
[1] 10
```

```
# Division
```

```
2 / 5
```

```
[1] 0.4
```

```
# Exponent
```

```
2 ^ 5
```

```
[1] 32
```

Arithmetic Operators(Cont...)

```
# Modulus(Remainder from division)  
2 %% 5
```

```
[1] 2
```

```
# Integer Division  
2 %/% 5
```

```
[1] 0
```

Boolean Operators

```
x <- TRUE  
y <- TRUE  
a <- T  
b <- T
```

Relational Operators

```
x <- 10  
y <- 5  
# Equality  
x == y
```

[1] FALSE

```
# Inequality  
x != y
```

[1] TRUE

```
# Less Than  
x < y
```

[1] FALSE

Logical Operators

```
# Logical NOT(!)
```

```
! TRUE
```

```
[1] FALSE
```

```
! FALSE
```

```
[1] TRUE
```

Logical Operators(Cont...)

```
# Logical AND(&&)
```

```
TRUE && TRUE
```

```
[1] TRUE
```

```
TRUE && FALSE
```

```
[1] FALSE
```

```
FALSE && FALSE
```

```
[1] FALSE
```

Logical Operators(Cont...)

```
# Logical OR(|)
```

```
TRUE | TRUE
```

```
[1] TRUE
```

```
TRUE | FALSE
```

```
[1] TRUE
```

```
FALSE | FALSE
```

```
[1] FALSE
```

Relational Operators(Cont...)

```
# Greater Than
```

```
x > y
```

```
[1] TRUE
```

```
# Less or Equal
```

```
x <= y
```

```
[1] FALSE
```

```
# Greater or Equal
```

```
x >= y
```

```
[1] TRUE
```