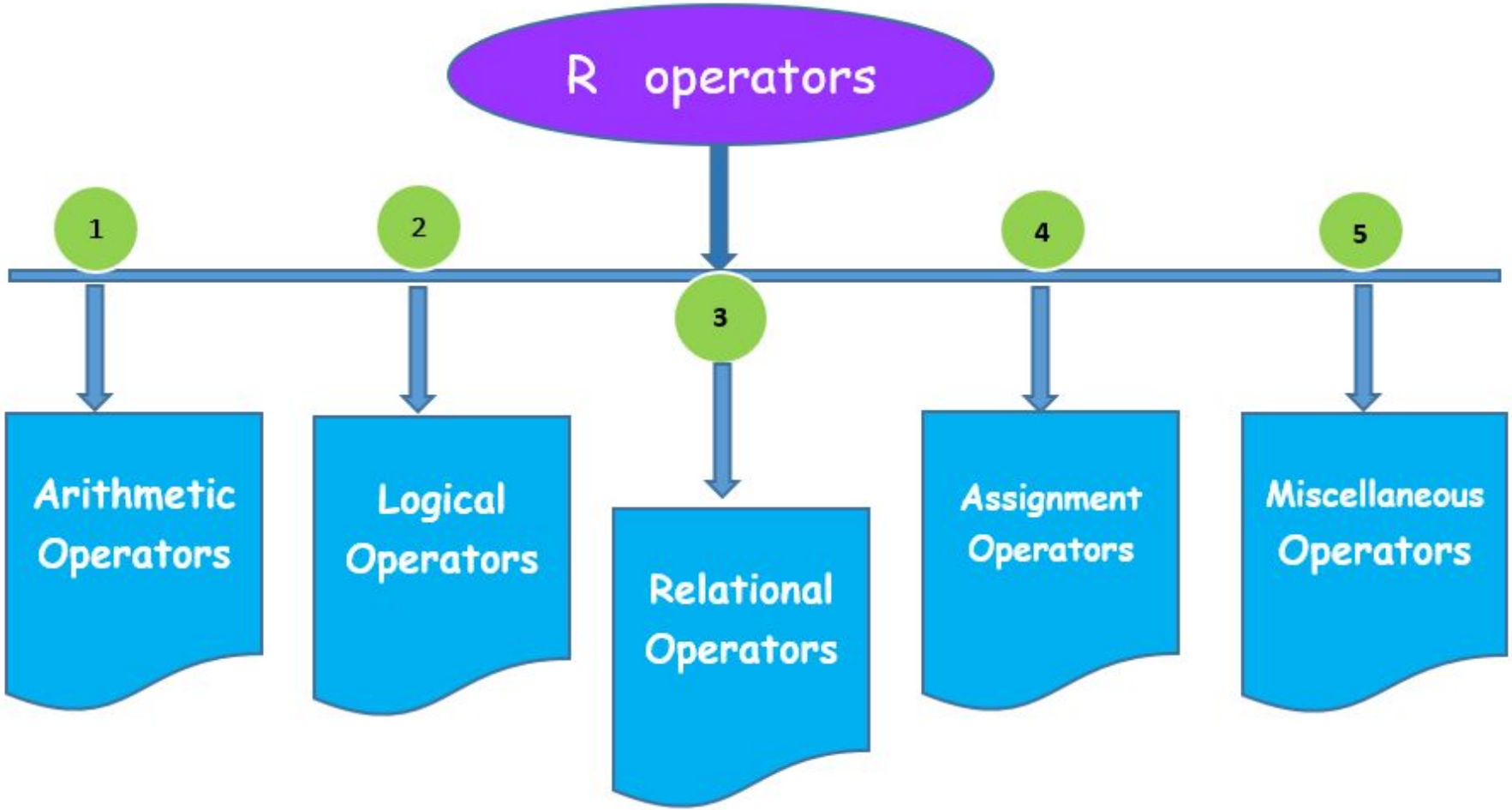
Module 1

R Operators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Arithmetic operators

Operator	Description	Usage
+	Addition of two operands	a + b
–	Subtraction of second operand from first	a – b
*	Multiplication of two operands	a * b
/	Division of first operand with second	a / b
%%	Remainder from division of first operand with second	a %% b
%/%	Quotient from division of first operand with second	a %/% b
^	First operand raised to the power of second operand	a^b

```r
var1 = as.integer(readline("Enter 1st number : "));
var2 = as.integer(readline("Enter 2nd number : "));

#########Arithmetic operator#########
print(paste("Sum =",var1+var2))
print(paste("Sub =",var1-var2))
print(paste("Mult =",var1*var2))
print(paste("Divison =",var1/var2))
print(paste("Integer divison =",var1%/%var2))
print(paste("Rem =",var1%%var2))
print(paste("Expo =",var1^var2))
```

```
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Enter 1st number : 30
Enter 2nd number : 3
[1] "Sum = 33"
[1] "Sub = 27"
[1] "Mult = 90"
[1] "Divison = 10"
[1] "Integer divison = 10"
[1] "Rem = 0"
[1] "Expo = 27000"
[1] 1 2 3 4 5
[1] FALSE
[1] TRUE
```

Relational Operators

Operator	Description	Usage
<	Is first operand **less than** second operand	a < b
>	Is first operand **greater than** second operand	a > b
==	Is first operand **equal to** second operand	a == b
<=	Is first operand **less than** or equal to second operand	a <= b
>=	Is first operand **greater than** or equal to second operand	a > = b
!=	Is first operand **not equal** to second operand	a!=b

```r
#########Relational operator#########
x <- 5
y <- 16
x < y
x > y
x <= 5
y >= 20
y == 16
x != 5
```

```
> x <- 5
> y <- 16
> x < y
[1] TRUE
> x > y
[1] FALSE
> x <= 5
[1] TRUE
> y >= 20
[1] FALSE
> y == 16
[1] TRUE
> x != 5
[1] FALSE
```

Logical Operators

Operator	Description	Usage
&	Element wise logical AND operation.	a & b
|	Element wise logical OR operation.	a | b
!	Element wise logical NOT operation.	!a
&&	Operand wise logical AND operation.	a && b
||	Operand wise logical OR operation.	a || b

Note:

- && and || are intended for use solely with scalars, they return a single logical value.
- & and | work with multivalued vectors, they return a vector whose length matches their input arguments.

```r
#########Logical operator#########
#
# & Element-wise Logical AND operator. It returns TRUE if both elements are TRUE
# &&  Logical AND operator - Returns TRUE if both statements are TRUE
# | Elementwise- Logical OR operator. It returns TRUE if one of the statement is TRUE
# ||  Logical OR operator. It returns TRUE if one of the statement is TRUE.
# ! Logical NOT - returns FALSE if statement is TRUE

v1 <- c(0, 1, 0, 23)
v2 <- c(1, 2, 3, 4)

!v1
v1 & v2
v1 | v2

n1 <- 23
n2 <- 89
n1 && n2
n1 || n2
```

```
>
> v1 <- c(0, 1, 0, 23)
> v2 <- c(1, 2, 3, 4)
>
> !v1
[1]  TRUE FALSE  TRUE FALSE
> v1 & v2
[1] FALSE  TRUE FALSE  TRUE
> v1 | v2
[1] TRUE TRUE TRUE TRUE
>
> n1 <- 23
> n2 <- 89
> n1 && n2
[1] TRUE
> n1 || n2
[1] TRUE
```

Assignment Operators

Operator	Description
<-, <<-, =	Left assignment
->, ->>	Right assignment

```r
#########Assignment operator########

a <- 3
b = 4
y <<- 5

13 -> d
14 ->> f

a
b
y
d
f
```

```
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>
> a <- 3
> b = 4
> y <<- 5
>
> 13 -> d
> 14 ->> f
>
> a
[1] 3
> b
[1] 4
> y
[1] 5
> d
[1] 13
> f
[1] 14
```

Miscellaneous Operators

Operator	Description
:	Colon operator. It creates a sequence of numbers.
%in%	This operator is used to identify if an element belongs to a vector or not.
%*%	This operator is used for matrix multiplication. Normal * do elementwise multiplication.

```r
#########Miscellaneous Operators#########
# generate sequence from 1 to 5 (Sequence Operator (:))
x <- 1:5
print(x)

x1 <- 10
x2 <- 2
print(x1 %in% x)
print(x2 %in% x)

A <- matrix(c(1, 2, 3, 4), nrow = 2)
A %*% A # Matrix Multiplication
A*A
```

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```
> # generate sequence from 1 to 5 (Sequence Operator (:))
> x <- 1:5
> print(x)
[1] 1 2 3 4 5
>
> x1 <- 10
> x2 <- 2
> print(x1 %in% x)
[1] FALSE
> print(x2 %in% x)
[1] TRUE
>
> A <- matrix(c(1, 2, 3, 4), nrow = 2)
> A %*% A # Matrix Multiplication
     [,1] [,2]
[1,]    7   15
[2,]   10   22
> A*A
     [,1] [,2]
[1,]    1    9
[2,]    4   16
>
```

Summary

Arithmetic Operators	+	-	*	/	%%	%/%	^
Relational Operators	<	>	==	<=	>=	!=	
Logical Operators	&	|	!	&&	||		
Assignment Operators	=	<-	->	<<-	->>		
Misc. Operators	:	%in%	%*%				