UNIT-I: Introduction to Data Science

Operations: Arithmetic, Logical and Vector Operations in R,

Advanced Programming in R : Functions, Data Visualization in R Basic Graphics.

Recap...!!

- Operations in R Programming.
- Vectors in R.
- Operations of Vector in R.

Operations in R Programming

- There are several operators in R, such that arithmetic operators for math calculations, logical, relational, assignment operators, miscellaneous operators(EDS) or even the popular pipe operator.
- An Operator is a symbol that tells to perform different operations between operands. R programming is very rich in built-in operators.
- R Programming has the following operators,
  1. Arithmetic Operators
  2. Assignment Operators
  3. Logical Operators
  4. Relational Operators
  5. Miscellaneous Operators

Arithmetic Operator in R

- These operators perform basic arithmetic operations like addition, subtraction, multiplication, division, exponent, modulus, etc.
- **Example: (x = 10, y = 4)**

Operator	Operation	Output
x+y	Addition of two operands	14
x – y	Subtraction of second operand from first	06
x * y	Multiplication of two operands	40
x / y	Division of first operand with second	2.5
x ^ y	First operand raised to the power of second operand	10000
x %% y	Remainder from division of first operand with second	2

Assignment Operators in R

- These operators are used to assign values to variables.
- **Example: (x = 10, 10 ->y)**

Operator	Operation	Action
<-	Assigns right side value to left side operand	a <- 5
=	Assigns right side value to left side operand	a = 3
->	Assigns left side value to right side operand	4 -> a
<<-	Assigns right side value to left side operand	a <<- 3.4
->>	Assigns left side value to right side operand	5->> a

Relational Operators in R

- Relational Operators are those that find out relation between the two operands provided to them. Following are the six relational operations R programming language supports.

Operator	Operation	Action
<	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

Logical Operators in R

- Logical Operators in R programming language work only for the basic data types logical, numeric and complex and vectors of these basic data types.

Operator	Operation	Action
&	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

Miscellaneous Operators in R

- These operators does not fall into any of the categories mentioned above, but are significantly important during R programming for manipulating data.

Operator	Operation	Action
:	Creates series of numbers from left operand to right operand	a:b
%in%	Identifies if an element(a) belongs to a vector(b)	a %in% b
%*%	Performs multiplication of a vector with its transpose	A %*% t(A)

Vector in R

- Vector is a basic data structure in R. It contains element of the same type. The data types can be logical, integer, double, character, complex or raw.
- A vector's type can be checked with the **typeof()** function.
- Another important property of a vector is its length. This is the number of elements in the vector and can be checked with the function **length().**