5. Vectors and Matrices

5.1 Vectors

In any program/ application we need data, without data there can hardly be an application. To store data we need variables but, what if we have hundreds or thousands even more data. It will be difficult to create that many variables. This is where data structure comes into the picture. A data structures can store multiple data with a single reference, with each element having its own index.

Vectors are one of the most important data structures in R. Vectors are one dimensional array that can store homogeneous (same data type) data.

In R vectors are created using combine function **c().**

Since vectors can store only homogeneous data, R will convert the other elements in the array to force everything to be of the same data type**.**

If a vector is created in this fashion

vector = **c**(“A”, 12, 12.5, TRUE)

Output vector will be -

|  |  |  |  |
| --- | --- | --- | --- |
| “A” | “12” | “12.5” | “TRUE” |

If you check the data type of the above vector using class() function, the output will be **character**.

Each element in the vector can be accessed with it’s index value. Unlike other programming languages, the index value starts with 1 in R.

|  |  |  |  |
| --- | --- | --- | --- |
| 1 | 2 | 3 | 4 |

|  |  |  |  |
| --- | --- | --- | --- |
| “A” | “12” | “12.5” | “TRUE” |

Hence elements are accessed in this fashion

vector[1] - “A”

vector[2] - “12”

vector[3] - “12.5”

vector[4] - “TRUE”

5.2 Matrices

Matrices are two dimensional arrays that can store homogeneous (same data type) data.

In R matrices are created using matrix function **matrix().**

mat = **matrix**(**c**(10,20,30,40,50,60),nrow=2)

The above function will convert a vector to matrix with 2 rows using **nrow** argument.

|  |  |  |
| --- | --- | --- |
| 10 | 30 | 50 |
| 20 | 40 | 60 |

In Order to access matrix elements, rows and columns are used.

mat[1,1] - 10

mat[1,2] - 30

mat[1,3] - 50

mat[2,1] - 20

mat[2,2] - 40

mat[2,3] - 60