Lists

- List can contain different data types
- List is ordered and changeable

Lists are created with the ***list function*** where each argument to the function becomes an element of the list.

1. **Create a simple list with number, string and Logical True**

data<-list(35,”Hello”,TRUE,45.5)

Print(data)

Output

[[1]]
[1] 35

[[2]]
[1] "Hello"

[[3]]
[1] TRUE

[[4]]
[1] 45.5

[[1]] indicates index/position of elements in the list.

[1] indicates row .

2. **Accessing list elements**

   print(data[[1]])

3. **Length of the list**

   length(list3)

4. **Change list item**

data[1]<-“Hai”

5. **Add list item**

```
data<-append("Python",data)
cat("\n after append")
print(data)
```

at specified position

```
data<-append(data,"java",after=1)
cat("\n at specified position")
print(data)
```

6. **Remove list item**

```
cat("\n after remove ")
data<-data[-2]
print(data)
```

7. **Join two lists**

```
List1<-list(1,2,3)
List2<-list(“hai”,”hello”)
List3<-c(list1,list2)
print(list3)
```

Complete the following task

1. Create a list with your roll no, name, branch and CGPA
2. Update branch to CSE
3. Add SGPA after CGPA
4. Remove Branch from the list

Matrix

- A Matrix is a two-dimensional data with rows and columns
- column is a vertical representation of data
- row is a horizontal representation of data.
- A matrix can be created with the ***matrix()*** function.
- Specify the ***nrow and ncol*** parameters.
- By default elements are arranged vertically , **to avoid specify byrow=TRUE**

Example

```
A<-matrix(c(1,2,3,4),nrow=2,ncol=2)
Print(A)
```

Output

```
     [,1] [,2]
[1,]    1    3
[2,]    2    4
```

Example

```
B<-matrix(c("c","c++","java","python"),nrow=2,ncol=2,brow=TRUE)
print(B)
```

```
      [,1]  [,2]
[1,] "c"   "c++”
[2,] "java" "python"
```

Defining row and col names

```
rname=c(“row1”,”row2”)
cname=c(“col1”,”col2”)
C<-matrix(c(3:6),nrow=2,ncol=2,byrow=TRUE,dimnames=list(rname, cname)
```

Access Matrix

Specify row and col

print(B[1,2])

Output

[1] "c++"

- The whole row or col can be accessed by specifying a comma **after** the number in the bracket

Example

A<-matrix(c(1,2,1,1),nrow=2,byrow=TRUE)

B<-matrix(c(2,2,1,1),nrow=2,byrow=TRUE)

cat("\n rows only")

print(A[2,])

cat("\n cols only")

print(B[,2])

cat("\n dimension of A")

print(dim(A))

cat("\n length of B")

print(length(B))

Matrix operations

print(A+B)

print(A*B)