R_lists_factors

2023-03-06

List Operations

Create a list

```
x <- list(1, "a", TRUE, 1+4i)
x
```

```
## [[1]]
## [1] 1
##
## [[2]]
## [1] "a"
##
## [[3]]
## [1] TRUE
##
## [[4]]
## [1] 1+4i
```

Create empty list

```
x <- vector("list", length = 5)
x
```

```
## [[1]]
## NULL
##
## [[2]]
## NULL
##
## [[3]]
## NULL
##
## [[4]]
## NULL
##
## [[5]]
## NULL
```

```
length(x)
```

```
## [1] 5
```

```
class(x)
```

```
## [1] "list"
```

Access element of list and element within element

```
x <- list(1, "a", c(1,2,3), 1+4i)
x
```

```
## [[1]]
## [1] 1
##
## [[2]]
## [1] "a"
##
## [[3]]
## [1] 1 2 3
##
## [[4]]
## [1] 1+4i
```

```
# Complete second element from list
x[2]
```

```
## [[1]]
## [1] "a"
```

```
# Value of the second element
x[[2]]
```

```
## [1] "a"
```

```
x <- list(1, "a", c(1,2,3), 1+4i)
x
```

```
## [[1]]
## [1] 1
##
## [[2]]
## [1] "a"
##
## [[3]]
## [1] 1 2 3
##
## [[4]]
## [1] 1+4i
```

```
x[[3]][3] # within 3rd element access 3rd sub element
```

```
## [1] 3
```

```
x[[3]][-2] # within 3rd element access all elements except 2nd element(-2)
```

```
## [1] 1 3
```

Modify element in list

```
x <- list(1, "a", c(1,2,3), 1+4i)
x[1] = 3
x[[3]] = "name" #c(1,3,5)
x
```

```
## [[1]]
## [1] 3
##
## [[2]]
## [1] "a"
##
## [[3]]
## [1] "name"
##
## [[4]]
## [1] 1+4i
```

Create array of lists

```
x= list(1,"kk")
y = list(c(1,2,3),list(78,78),2+67i,3,"lll")
a = array(c(x,y))
class(a)
```

```
## [1] "array"
```

```
a
```

```
## [[1]]
## [1] 1
##
## [[2]]
## [1] "kk"
##
## [[3]]
## [1] 1 2 3
##
## [[4]]
## [[4]][[1]]
## [1] 78
##
## [[4]][[2]]
## [1] 78
##
##
## [[5]]
## [1] 2+67i
##
## [[6]]
## [1] 3
##
## [[7]]
## [1] "lll"
```

Convert vector to list using as.list()

```
x <- 1:10 # range operator special behavior as dtypes integer
class(x)
```

```
## [1] "integer"
```

```
x <- as.list(x)
class(x)
```

```
## [1] "list"
```

List as key value pair

```
# list is just like key value pair
xlist <- list(a = "Shantanu Pathak", b = 1:10)#, data = head(iris))
xlist
```

```
## $a
## [1] "Shantanu Pathak"
##
## $b
##  [1]  1  2  3  4  5  6  7  8  9 10
```

Factors

factor- type vector contains a set of numeric codes with character-valued levels.

Regardless of the levels/labels of the factor, the numeric storage is an integer with 1 corresponding to the first level (in alph-order)

```
students = factor(c(100,0,100,0,0,0), levels = c(0, 100), labels = c("boy", "girl"))
students
```

```
## [1] girl boy  girl boy  boy  boy
## Levels: boy girl
```

```
grades = factor(c("A","B","A+","A","B","B","A","A+"))
grades
```

```
## [1] A  B  A+ A  B  B  A  A+
## Levels: A A+ B
```

```
nlevels(grades)
```

```
## [1] 3
```

Convert factor to numeric

```
as.numeric(students)
```

```
## [1] 2 1 2 1 1 1
```

```
 1 + as.numeric(students)
```

```
## [1] 3 2 3 2 2 2
```

Ordered Factor (Ordinal Variables)

Alphabetical Order

```
designation <- factor(c("Manager", "Team Lead","SME"), ordered =TRUE)
designation
```

```
## [1] Manager   Team Lead SME
## Levels: Manager < SME < Team Lead
```

User given Order

User can provide the order of values using levels option.

In levels, first value is lowest level and then in increasing way other values are there.

In following example levels = c(“SME”, “Team Lead”,“Manager”). So, SME is lowest then Team lead and then top level is manager.

Same order can be seen when we convert the factor to numeric, manager is assigned highest numeric value 3 then team lead 2 and then SME is 1 smallest value.

```
designation <- factor(c("Manager", "Team Lead","SME"), ordered =TRUE, levels = c("SME", "Team
Lead","Manager"))
designation
```

```
## [1] Manager   Team Lead SME
## Levels: SME < Team Lead < Manager
```

```
as.numeric(designation)
```

```
## [1] 3 2 1
```

```
val<-factor(c("r1","r2","r1","r2","r2","r3","r1"),ordered = TRUE,levels = c("r3", "r2","r1"))
val
```

```
## [1] r1 r2 r1 r2 r2 r3 r1
## Levels: r3 < r2 < r1
```

```
as.numeric(val)
```

```
## [1] 3 2 3 2 2 1 3
```