

Subsetting

- `[]` always returns object of the same class
- `[[` is used to extract elements of a list or a data frame; it can only be used to extract a single element and the class of the returned object will not necessarily be a list or data frame
- `$` is used to extract elements of a list or data frame by name; semantics are similar to that of `[[`.

```
x<-c("a","b","c","d","a")
x[1]
```

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

```
x[2]
```

```
## [1] "b"
```

```
x[1:4]
```

```
## [1] "a" "b" "c" "d"
```

```
x[x>"a"]      #elements in x > "a"
```

```
## [1] "b" "c" "d"
```

```
u <- x>"a"      #logical operation showing elements > "a"
u
```

```
## [1] FALSE  TRUE  TRUE  TRUE FALSE
```

```
x[u]           #logical index
```

```
## [1] "b" "c" "d"
```

Subsetting Lists

```
x <- list(foo = 1:4, bar = 0.6)
x[1]
```

```
## $foo
## [1] 1 2 3 4
```

```
x[[1]]
```

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

```
x$bar
```

```
## [1] 0.6
```

```
x[["bar"]]
```

```
## [1] 0.6
```

```
x["bar"]
```

```
## $bar
```

```
## [1] 0.6
```

```
x <- list(foo = 1:4, bar = 0.6, baz = "hello")  
x[c(1,2)]
```

```
## $foo
```

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

```
##
```

```
## $bar
```

```
## [1] 0.6
```

```
name <- "foo"
```

```
x[[name]]
```

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

```
x$name
```

```
## NULL
```

```
x$foo
```

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

```
x<-list(a=list(10,12,14),b=c(3.14, 2.81))  
x[[c(1,3)]]
```

```
## [1] 14
```

```
x[[1]][[3]]
```

```
## [1] 14
```

```
x[[c(2,1)]]
```

```
## [1] 3.14
```

Subsetting a Matrix

```
x<-matrix(1:6,2,3)
x
```

```
##      [,1] [,2] [,3]
## [1,]    1    3    5
## [2,]    2    4    6
```

```
x[1,2]
```

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

```
x[2,1]
```

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

```
x[1,]
```

```
## [1] 1 3 5
```

```
x[,2]
```

```
## [1] 3 4
```

`x[1,2]` gives element rather than a matrix. So, to preserve the matrix we use `drop = FALSE`

```
x<-matrix(1:6,2,3)
x
```

```
##      [,1] [,2] [,3]
## [1,]    1    3    5
## [2,]    2    4    6
```

```
x[1,2, drop = FALSE]
```

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

```
x<-matrix(1:6,2,3)
x
```

```
##      [,1] [,2] [,3]
## [1,]    1    3    5
## [2,]    2    4    6
```

```
x[1, , drop = FALSE]
```

```
##      [,1] [,2] [,3]  
## [1,]    1    3    5
```