Analysing Social Data Using R

Matrices and arrays

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Creating matrices

- Matrix is a "rectangular" object containing elements of the same type:

```
matrix(1:6, nrow = 2, ncol = 3)  # Numeric matrix
```

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

```
matrix(c("a", "b", "c", "d", "e", "f"), nrow = 2,
    ncol = 3)  # Character matrix
```

```
##      [,1] [,2] [,3]
## [1,] "a"  "c"  "e"
## [2,] "b"  "d"  "f"
```

Creating matrices 2

- Elements in a matrix can by arranged in two ways:

```
matrix(1:6, nrow = 2, ncol = 3, byrow = TRUE)  #
by row
```

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

```
matrix(1:6, nrow = 2, ncol = 3)  # by column
```

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

Adding names

- We can give names to row and columns of a matrix:

```
m <- matrix(1:6, nrow = 2, ncol = 3)
rownames(m) <- c("r1", "r2")
colnames(m) <- c("c1", "c2", "c3")
m
```

```
##    c1 c2 c3
## r1  1  3  5
## r2  2  4  6
```

Subsetting matrices

- As usually, we use square brackets to extract subsets from matrices:

```
m[1, 1]  # the entry in the first row and first column
```

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

```
m[1, ]  # the elements of the first row
```

```
## c1 c2 c3
##  1  3  5
```

```
m[, 2]  # the entries in the 2nd column
```

```
## r1 r2
##  3  4
```

Subsetting matrices 2

- Negative indices are used to indicate which elements we don't want to extract:

```
m[-1, ]

## c1 c2 c3
##  2  4  6

m[, -2]

##    c1 c3
## r1  1  5
## r2  2  6
```

```
m[-1, -2]

## c1 c3
##  2  6
```

Subsetting matrices 3

- Row and columns names can also be used to subset a matrix:

```
m["r1", "c1"]  # the entry in the first row and
first column
```

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

```
m["r1", ]  # the elements of the first row
```

```
## c1 c2 c3
##  1  3  5
```

```
m[, "c2"]  # the entries in the 2nd column
```

```
## r1 r2
##  3  4
```

Creating matrices

- Array is a multi-dimensional matrix:

```
array(1:8, dim = c(2, 2, 2))
```

```
## , , 1
##
##      [,1] [,2]
## [1,]    1    3
## [2,]    2    4
##
## , , 2
##
##      [,1] [,2]
## [1,]    5    7
## [2,]    6    8
##
```

Adding names

- We can add names to elements of an array using function `dimnames()` as follows:

```
a <- array(1:8, dim = c(2, 2, 2))
dimnames(a) <- list(row = c("r1", "r2"), column =
c("c1",
    "c2"), layer = c("l1", "l2"))
```

Subsetting arrays

- Again, the square brackets:

```
a[1, , 1]
```

```
## c1 c2
##  1  3
```

```
a[, 2, 2]
```

```
## r1 r2
##  7  8
```

```
a[, , 1]
```

```
##     column
## row  c1 c2
##   r1  1  3
##   r2  2  4
```