# Biometry. Lecture 10

Alexey Shipunov

Minot State University

February 29, 2016

> setwd("<working folder>")

or

"Change dir"

in menu!

On Mac, be sure that startup option is working: getwd()

(getwd() checks if R is in working folder, dir() checks the folder content)

# Inside R: Matrices, lists and data frames
## Lists

# List is a collection of everything

- List may contain any type of objects
- Moreover, list can contain other lists, and so on

# List examples

```
> fred <- list(name="Fred", wife.name="Mary", no.children=3,
+ child.ages=c(1,5,9))
> fred
```

# Indexing of vectors, matrices and lists

```
> m[3] # third element of vector m
> ma[2, 1] # second row, first column
> fred[3] # lists may be indexed like vectors
> str(fred[3]) # it's a list!
> fred[[3]] # not the same as fred[1]!
> str(fred[[3]]) # it's a vector!
```

# Names

In R, elements of vectors and lists, columns and rows of matrices may have *names*:

```
> names(fred)
> fred$wife.name # this is a selection by name
> w <- c(69, 68, 93, 87, 59, 82, 72)
> names(w) <- c("Rick", "Amanda", "Peter", "Alex",
+ "Kathy", "Ben", "George")
> w
> w["Rick"]
> rownames(ma) <- c("a1", "a2")
> colnames(ma) <- c("b1", "b2")
> ma
```

M

# Inside R: Matrices, lists and data frames
## Data frames (data tables)

# More important than any other object

- This is a most important type of object; most of data are represented by data frames
- *Date frame is a list of vectors of same length*

## How to create a data frame

```
> x <- c(174, 162, 188, 192, 165, 168, 172)
> sex <-c("male","female","male","male","female","male","male")
> m <- c("L","XL","S","M","S","M","XL")
> d <- data.frame(weight=w, height=x, size=m, sex=sex)
> d
> str(d)
```

M

# Selection from data frames

```
> d$weight # by name
> d[[1]] # by number, as list
> d[,1] # by number of column, as matrix
> d[,"weight"] # by name of column
> d[,2:4] # columns 2, 3, 4
> d[,-1] # all columns except first
> d[-c(1,2),] # all rows except two first
```

M

## Conversions

```
> b <- 1:8 # vector
> dim(b) <- c(4,2) # two columns, four rows
> b <- data.frame(b) # convert to data frame
```

# Selection by condition

```
> d[d$sex=="female",] # will select only women
> d[d$sex!="female",] # will select all other genders ;)
```

== is "equal?", & "and", | "or" and ! is "not"

## Finishing...

Save your commands!

(`savehistory(<todaysdate>.r)` or `File -> Save as...` on Mac)

# Summary: most important commands

- `[`—selects an element, row or column
- `$`—selects by name from list or data frame

# For Further Reading

📕

A. Shipunov.
*Biometry* [Electronic resource].
2012—onwards.
Mode of access:
http://ashipunov.info/shipunov/school/biol_240

📕

A. Shipunov, and many others.
*Visual statistics. Use R!*
2016—onwards.
Mode of access: http://ashipunov.info/shipunov/
school/biol_240/en/visual_statistics.pdf