Biometry. Lecture 6

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Outline

> 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)

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Commands to look around

```
> ls() # lists all objects
> str() # shows the structure of object
> head() # shows first rows of table object (data frame)
```

Basics of R
Overgrown calculator

Vectorizarion and brackets

```
> log(((sqrt(sum(c(2,2))))^2)*2.5)
```

Calculation order: from inside to outside. If you want decimal logarithm, use log10() command.

The order of calculations

```
> 2+3*5
is probably what you do not want, but
> 2+(3*5)
is!
> 100/0
Inf
```

TRUE, FALSE, T, F, NA, NaN, Inf and NULL are **reserved words**

Distributions

```
> rnorm(15)
```

`rnorm()` is one of almost 20 embedded distributions. By default, mean is 0 and sd is 1. You may change it, e.g., `rnorm(15, mean=10)` will give numbers around 10. If you want whole numbers, round them with `round()` command.

Normal distribution is a result of the influence of *multiple independent random factors*, dart game is a good example.

Basics of R
The basics of R graphics

Simple plot

```
> plot(1:20)
```

Title and legend

```
> plot(1:20, main="My very important title")
> legend("topleft", pch=1, legend="My precious dots")
```

Two types of graphical commands: *updating* and *overlaying*.
legend() needs to "understand" what (color, points etc.) to describe;
pch is a type of points. You may use plot(1:20, pch=2) to have
triangles as dots.

Two types of graphical commands: plotting and adding

```
> plot(cars)
> title(main="Cars of 1920s")
```

cars is and embedded data, run ?cars for explanation

plot() is a smart (generic) command

```
> plot(cars)
> plot(trees)
> plot(uspop)
> plot(HairEyeColor)
```

Types of `plot()`

```
> plot(uspop, type="p")
> plot(uspop, type="l")
> plot(uspop, type="c")
> plot(uspop, type="s")
> plot(uspop, type="h")
> plot(uspop, type="b")
```

Empty plot with added points and grid

```
> plot(1:20, type="n")
> points(1:20, 1:20, pch=2, col=2)
> grid(5,5)
```

Empty plot() will make a coordinate grid. This is frequently used if you want to construct a complex graphs. points() and grid() are both overlaying commands.

Graphical devices

```
> plot(1:20)
> dev.off()
```

`dev.off()` will close the current device

PDF graphical device

```
> pdf(file="1.pdf")
> plot(1:20)
> dev.off()
```

PDF format is appropriate for the inclusion in reports, especially if you need to scale images

PNG graphical device

```
> png(file="1.png")
> plot(1:20)
> dev.off()
```

PNG format is more appropriate for the Web pages, it will not scale well.
Avoid jpg()!

How to save current plot into the file

```
> plot(1:20)
> dev.copy(png, "2.png")
> dev.off()
```

The file will not be written on dist until you run dev.off(). On
Windows, you may use a menu from graphical window.

Graphical options

```
> oldpar <- par(mfrow=c(2,1))
> hist(cars$speed)
> hist(cars$dist)
> par(oldpar)
```

mfrow by default is c(1,1)
par() should be kept in the object and then restored

Interactive graphics

```
> plot(1:20)
> text(locator(), "My beloved point", pos=4)
```

Click left mouse button, then right mouse button

Finishing...

Save your commands!

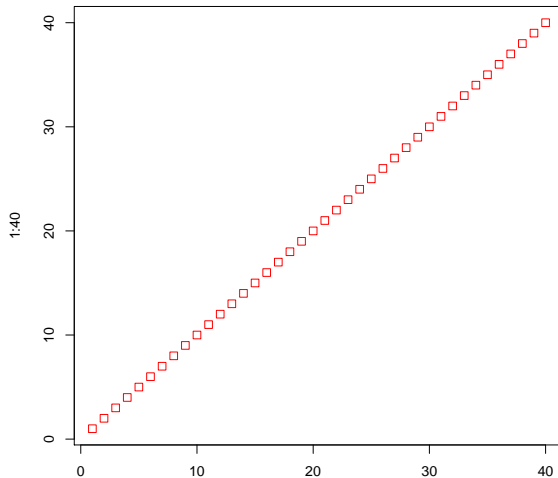(savehostory(<todaysdate>.r) or File -> Save as... on
Mac)

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Final question (3 points)

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Which command will produce this plot?

Summary: most important commands

- `plot()` draws plots
- `par()` regulates plots parameters
- `str()` shows the structure of R object

For Further Reading

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

A. Shipunov, and others.
Visual statistics. Use R!
Ongoing translation from Russian.