

# Exercise Sessions

*Session 1: introduction to R, basic data structures, basic control flow*

Get the best from your sequences

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## Simple Calculations

Using the R console perform the following tasks:

1. Calculate the following expressions in R:

$2 \cdot 7 + 16 : (9 - 6 + 1) - 10 =$	[8]
$(2 + 5 + 3) : 2 + [(8 + 2) - (4 + 1)] : 5 - 1 =$	[5]
$7 - 16 : 4 - [3 + (3 + 17) : 2 + 2] : 5 =$	[0]
$(7 + 4 - 10) \cdot 4 + [8 + 6 - (15-2)] \cdot 6 =$	[10]
$26 : 2 + 1350 : 9 + 84 : 2 - 5000 : 2500 =$	[203]
$8 + 2 \cdot 3 - 5 \cdot 2 + (82 + 4 + 4) : (12 + 6 + 12) + 3 =$	[10]
$[(12 : 4 + 9 : 1 + 15 : 5) \cdot 2 - (1 + 1 + 8 + 16 + 1)] : 3 =$	[1]
$12 : 6 + 137 : 137 - [15 + (8 : 4 - 2 \cdot 0) : 2 - 5 \cdot 3] =$	[2]
$[26 : (2 + 11 \cdot 2 - 2 + 4)] \cdot \{ [10 + (16 : 4)] : (8 + 6 - 7) + 2 \} =$	[4]
$(7 + 4 - 10) \cdot 4 + [8 + 6 - (15-2)] \cdot 6 =$	[10]
$26 : 2 + 1350 : 9 + 84 : 2 - 5000 : 2500 =$	[203]
$8 + 2 \cdot 3 - 5 \cdot 2 + (82 + 4 + 4) : (12 + 6 + 12) + 3 =$	[10]
$[(12 : 4 + 9 : 1 + 15 : 5) \cdot 2 - (1 + 1 + 8 + 16 + 1)] : 3 =$	[1]
$12 : 6 + 137 : 137 - [15 + (8 : 4 - 2 \cdot 0) : 2 - 5 \cdot 3] =$	[2]
$[26 : (2 + 11 \cdot 2 - 2 + 4)] \cdot \{ [10 + (16 : 4)] : (8 + 6 - 7) + 2 \} =$	[4]

2. Assign the value of 39 to x
3. Assign the value of 22 to y
4. Make z the value of x-y (assign to the variable z)
5. Display the value of z in the console
6. Calculate the square root of 2345 and 336, perform a log2 transformation on the results, and multiply them together (use variables to store temporary data).

## Variables and data types

Using the R console perform the following tasks:

1. Use variables (with appropriate name) to store the following information:
  - (a) your complete registered name;
  - (b) your birth date;
  - (c) your birth place.

Discuss which type of data each variable is.

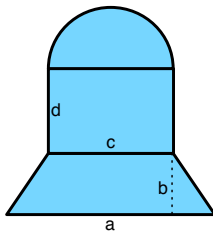
2. Use variables (with appropriate name) to store the names the players of your favorite football team

## Use of functions

1. Search for a function that “concatenates strings” in the base package and learn its usage.
2. Adopt the function found previously to build a string salutation message:  
“Hi <your name> how are you?”  
where <your name> comes from a previously stored variable containing your name

## Basic program structure

1. Write a program that reads your name from the keyboard and prints a string salutation message:  
“Hi <your name> how are you?”
2. Write a program that read four inputs from the keyboard and computes the area of the following figure:



3. Write a program that reads a temperature in Celsius and prints the corresponding temperature in Fahrenheit (Search the web for the conversion formula)

## Basic control flow

1. Write a program that simulates a simple calculator that performs the four operations '+', '-', '\*', and '/'. The program should read two numbers and a string operator and then prints out the corresponding result by performing the operation chosen by the user
2. Write a program that reads three integers and prints them in increasing order
3. Write a program that reads three integers and prints the one more nearer to their mean
4. Write a program that reads a Birth date from the keyboard and determines the corresponding Astrological sign (search the web for the zodiac date ranges)
5. Write a program that reads the height, the weight, and the gender (as a string 'F' or 'M') and determines whether the weight is within the 5% of the ideal weight determined by the Loretz's formula:

$$IdealWeight_{male} = height_{cm} - 100 - (height_{cm} - 150)/4$$

$$IdealWeight_{female} = height_{cm} - 100 - (height_{cm} - 150)/2$$