Ministry of Higher Education and Scientific Research
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1st year IT 2025-2026
Module: Algorithmics and data structure 1

Tutorial Sheet N° 01: Initiation to Algorithms

Exercise 01:

1. What is an algorithm?
2. Give the general structure of an algorithm.
3. What are a variable and a constant in an algorithm?
4. What are the characteristics of a variable and those of a constant?
5. What is an identifier in algorithm?
6. Indicate whether the following identifiers are syntactically correct:

Value _lenght 1sum note 2 -average_3 name@ a_n5689How

7. do input/output devices enable interaction between the user and the computer? Give real-life examples.
8. What is the **Von Neumann architecture**? Why is it considered a fundamental model of computers?
9. Compare **Von Neumann architecture** and **Harvard architecture** in simple terms.
10. Explain the relationship between **hardware**, **software**, and **programs** in performing a computer task.

Exercise 02: What is the type and value of the following expressions (N.-B: some may be incorrect):

1	8*9	1 > 2	6 < 7 and 8 < 5
1,5	11/10	3 ≤ 4	6 < 7 or 8 < 5
2,0	12 div 13	2*2≠3+1	"1+2"
"hello"	14 mod 5	6=5	2 and 2
"3"	15+16.0	"12" > "2"	"true"
" "	17.86.5	" "=""	4+5
""	19/1.9	2=2.0	67
FALSE	not TRUE	3=3.1	4/5=4 div 5
"2"+"3"	Not (6>7)	x≤0 or x>0	"hello"+"everybody"
true and false	true or true	"true and false"	"hello" ≤ "every one"
"20060901"	> "20060831"		

Exercise 03 : Convert the following four formulas into expressions: with

The expression 1 is defined in the set of real numbers, Expressions 2, 3 and 4 are defined in the set of integers.

$$\frac{2+\frac{2.5\times 1.5}{1.2-10.3}}{2} \qquad \frac{4}{5}-\frac{1}{1+\frac{1}{2}} \qquad 1+\frac{\frac{1}{2}}{2} \qquad 1+\frac{1}{\frac{1}{2}}$$

Exercise 04: Give the type and result of the following expressions, or say if they are not well formed.

Example: round (2.6 + 1) > 4 / 3
real integer integer integer
real 3.6 real 1.33
integer 4
Booleen (true)

2 - 5 * 3 + 4	2 - (5 * 3 + 4)
(2 - 5) * (3 + 4)	2.12 / 3
12 div 3	11 mod 3 + 5.2
11 div 3 div 2	12 > 3 > 4
1.0 * 2 + 3 – 4	3.5 + 7 > 4 > False
(50 < 3 * 8)	(12 > 24) + (2 + 4 = 12)
False OR Not False AND True.	(37 - 3 >= 14) - 'a' + 3

Exercise 05: Put the steps in the correct order

The following steps describe how to calculate the sum of two numbers, but they are given in the wrong order. Put them in the correct order.

1. Display the result of the sum
2. Read two numbers (a and b)
3. Start the algorithm
4. Calculate the sum of a and b
5. End the algorithm
6. Allocate a memory space for three variables: a, b, and the sum