Mila University Center
Institute of Mathematics and Computer Science
Department of Mathematics
1st Year LMD

DIRECTED WORK SERIES NO. 2

Module: Algorithmic and data structures1 Academic year: 2023/2024

Exercise 1

Consider the following variable declaration:

N1, N2, N3: integer;
X1, X2: real;
C: character;
Chain1, Chain2: String;
Bool1, Bool2: boolean;

1) Give the type of the following different expressions:

a) N1+N2;
b) N1+X2;
c) N1+N2 div 4;
d) N1 mod X2 + N2;
e) N2< N1et Bool1 or Bool2;
f) N1+N3 < N1 and not Bool2;

2) Are the following assignments valid? Explain.

a) N1←X1 + 2;
b) X1←N1 * 20;
c) Channel1←"Monday";
d) N1+N2←3;
e) Channel1←"Monday" + 11.0;

Exercise 2

1) What are the truth values (**true** or **false**) of the following Boolean expressions:
   a) true and false
   b) true and not (false)
   c) (not(not(true) or not(false))) and (true and (not(false and true)))
2) Give the truth value of the following assertions:
   a) “208 is an Even number”
   b) “15 is a multiple of 7”
   c) “208 is an Even number” And “208 is divisible by 3”
3) Give the negation of the following expressions:
   a) (A div 2 = 0)
   b) (A>0) and (B<0)
   c) (A>0) or (B<=0)

Exercise 3

Let be three students Mohamed, Amine and Moustafa, who obtained averages in the computer science exam. Give the Boolean expressions corresponding to the following situations:

Noticed: To pass the exam you need an average **strictly above** 10.

a) All the students succeed in their exam,
b) At least one student passed the exam,
c) Only Amine passed the exam,
d) Only Amine and Mohamed succeeded in their exams and obtained the same average

Exercise 4

Consider the following operator priority table (in C++ language):

Priorities	Operators
1 (strongest)	**( )**
2	**Not, +, –** *(unary)*
3	**Mod div / ***
4	**- ,+** *(binary)*
5	>>= <<=
6	= ≠
7	**And**
8 (weakest)	**Or**

Consider the integer variables x,y,z and the Boolean variables a, b, c. Put parentheses to clarify the order of calculation of the following expressions:

a) x + y * z
b) x / y div z* x
c) -x / -y + z
d) -a/-(b+c)
e) not a or b and - x > 5
f) not not b or a and x div 2 * - x = x – y / 2 * 7 and - y ≠ 0