

DIRECTED WORK SERIES NO. 3

Module: Algorithmic and data structures 1

Academic year: 2023/2024

Exercise 1

Consider the following algorithm:

```
Algorithm Exercisel
a, b,c: integer;
Begin
  a ← 5 ;
  b ← 30;
  c ← a + b ;
  b ← a - b ;
  a ← c ;
END .
```

- 1) Describe the declaration part?
- 2) Describe the body part?
- 3) What will be the values of variables **a**, **b**, and **c** after execution of each instruction (Trace execution)?

Exercise 2

Let the function be: $F(X) = 7 X^3 + 2 X^2 + 1$.

Write an algorithm that reads any value **X** and displays the value of $F(x)$ for that value.

Exercise 3

- 1) Write an algorithm that fills two variables **A** and **B** with two values, then swaps and displays the values of these two variables.
- 2) Do the execution trace of the proposed solution (we assume that the values of **A** and **B** after reading are successively 5 and 9).

Exercise 4

A worker wants to withdraw some money from the post office, he goes to the ATM (Automated Teller Machine) and asks for a sum of money **S**.

- Write an algorithm that allows the ATM to calculate and display the Banknote's number of 2000 Dinar, and the 1000 Dinar, 500 Dinar, and the coin's number of 200 Dinar, 100 Dinar, 50 Dinar that it must deliver to the worker.

- do the execution trace of this algorithm assuming that the sum of money requested by the worker is 5750 Dinars.

Exercise 5

Write an algorithm that reads an integer **N** consisting of three digits and reverse it.

Example : If $N = 123$, after execution of the algorithm **N** becomes 321

