UNIVERSITY MOHAMED BOUDIAF OF M'SILA
FACULTY OF TECHNOLOGY
COMMON BASE ST

Computer science II : (Practical Work) **Academic year 2023 /2024**

The third serie (N°03)

Solution

Exercice 05 :

This a Pascal program that that calculates the Exponential Series according to taylor's development (using functions):

$$e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \frac{x^4}{4!} \ldots$$

Where the user enters the variable x and the number of terms n.

See the solution on the next page...

```
Program s_Taylor;
Var
  x, sum: Real;
  n, i: Integer;

Function puissance(x: Real; n: Integer): Real;
Var
  p: Real;
  i: Integer;
Begin
  p := 1;
  For i := 1 To n Do
    p := p * x;
  puissance := p;
End;

Function factorial(n: Integer): Real;
Var
  f: Real;
  i: Integer;
Begin
  f := 1;
  For i := 1 To n Do
    f := f * i;
  factorial := f;
End;

Begin
  Writeln('Enter the value of x:');
  Readln(x);
  Writeln('Enter the value of n:');
  Readln(n);

  sum := 1;
  For i := 1 To n-1 Do
    sum := sum + puissance(x, i) / factorial(i);
  Writeln('The sum of the Taylor series e^', x:0:2, ' is ', sum:0:2);
  Readln;
End.
```

After running the program, here is the display: