Larbi Ben M'hidi -Oum El Bouaghi- University

Faculty of Exact Sciences and Natural and Life Sciences

Mathematics and Computer Science Department

Academic year: 2023-2024

Level: 1st year “Computer Science & Mathematics”

Module: Algorithmic and Data Structures 2

TP n°3

Pedagogic objective

→ Handle recursive procedures & functions in C;

Exercise n°1

```
#include <stdio.h>
int factorial (int);
int power(int,int);
main()
{
    int x, n;
    printf ("Enter an integer: x = "); scanf ("%d",&x );
    printf ( "Enter an integer: n = "); scanf ("%d",&n );
    printf ( "%d",factorial (n));
    printf ( "\n %d ",power( x,n ));
}
int factorial(int m)
{
if (m==0)
{
return 1;
}
else
{
 return (m* factorial(m-1));
}
}
int power( int r, int k)
```

```
{
if (k==0)
{
return 1;
}
else
{
return (r*power(r,k-1));
}
}
```

<u>Exercise n°2</u>

```
#include <stdio.h>
int Ackermann(int,int);
main()
{
int x, y;
printf ( "Enter an integer: x = "); scanf ("%d",&x );
printf ( "Enter an integer: y = "); scanf ("%d",&y );
printf ( "result %d", Ackermann( x,y ));
}
int Ackermann( int M,int N) {
if( M == 0)
 return N+1;
else
if(N==0 && M>0)
     return (Ackermann(M-1,1));
else
    return (Ackermann(M-1,(Ackermann(M, N-1))));
}
```

<u>Exercise n°3</u>

```
#include <stdio.h>
int Fibonacci (int);
main()
{
 int x;
 printf ( "Enter an integer: x = ");
scanf("%d",&x);
printf("result %d", Fibonacci(x));
}
int Fibonacci ( int N) {
if( N == 0) return 0; else {
```

```
if( N == 1) return 1;
else return ( Fibonacci (N-1)+ Fibonacci (N-2));
}
}
```