Lab 2_2: STRUCTURES ITÉRATIVES Instructions: Loops

Objective of the lab:

To comprehend and master the functionality of loops: for, while, and do while.

Task1

- **Loop for**

```c
#include <stdio.h>
#include <stdlib.h>

int main()
{int somme, n, i;
somme = 0;
printf("Introduire n ");
scanf("%d",&n);
for(i=0;i<n;i++)
somme = somme + i*i;
printf("somme = %d \n",somme);
return 0;
}
```

1.1 Display the value of 'i' outside of the loop.
1.2 Execute the code for n=0. What do you notice?

- **Loop while**

```c
#include <stdio.h>
#include <stdlib.h>
int main()
{
int n,i,somme;
printf("Introduire n");
scanf("%d",&n);
i=0;somme=0;
while(i<n)
{
somme=somme+i*i;
i++;
}
printf("la somme = %d\n",somme);

//system("pause");
return 0;
}
```

Perform the same procedure with the above code.

- **Loop do while**

```c
#include <stdio.h>
#include <stdlib.h>
int main()
{
int n,i,somme;
printf("Introduire n");
scanf("%d",&n);
i=0;somme=0;
do
{
somme=somme+i*i;
i++;
} while(i<n);
printf("la somme = %d\n",somme);
printf("i= %d\n",i);


//system("pause");
return 0;
}
```

Redo the same task with this program. What do you observe?

Task 2 : Loop while

```c
#include <stdio.h>
#include <stdlib.h>
int main()
{
int k=0, nbr=23;
while (nbr!=0)
{
nbr = nbr/2;
k = k+1;
}
printf(" k = %d \n",k);
int __odecl printf (const char * __restrict__ _For
}
```

1.1 Execute this program and indicate when it stops.
1.2 Can we replace the while loop with a for loop? Explain.

Task 2: Loop for

```c
#include <stdio.h>
#include <stdlib.h>

int main()
{
int N=6;
int i;
for (i=0 ; i<N ; i++ )
{
printf("%d ",i*i);
}
return 0;
}
```

2.1 Execute this program.
2.2 What is the value of 'i' at the end of the loop? Display it.

Task 3 : Loop do while

```c
#include<stdio.h>
int main()
{
int N,NB, NP ;
//Saisie d'un entier qui doit être pair)
do
{
printf("Donner un entier pair\n") ;
scanf("%d",&N);
} while (N%2 != 0);  //(condition pour que N soit pair)
//Détermination du nombre de division par 2
NB= 0;  NP= N;
do
{NP= NP / 2;
 NB= NB +1;
} while ( NP%2 == 0); //On s'arrête lorsque NP n'est plus divisible par 2
printf("%d est divisible par 2 %d fois", N,NB) ;
return 0;
}
```

1.2 Can we replace the do-while loop with a while or for loop? Explain.

• Nested loops

```c
#include<stdio.h>
int main()
{ int i,j;
for(i=0; i<=2; i++)
{
 printf("i= %d\n", i);
 for(j=1; j<=2; j++)
 printf("j= %d ", j) ;
}
return 0;
}
```

• What does the above program display?
• Can we replace the for loop with a while or do-while loop? Explain.