Data Structures- Lab 5- Recursion

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Fibonacci Series:

Code:

```
#include <stdio.h>
int fibonacci(int n) {
   if (n <= 1) {
      return n;
   }
   return fibonacci(n - 1) + fibonacci(n - 2);
}
void main() {
   int n, i;
   printf("Enter Number of Terms in Fibonacci series: ");
   scanf("%d", &n);

   printf("Fibonacci Series: ");
   for (i = 0; i < n; i++) {
      printf("%d ", fibonacci(i));
   }
}
```

Output:

```
Enter Number of Terms in Fibonacci series: 10
Fibonacci Series: 0 1 1 2 3 5 8 13 21 34
Process returned 10 (0xA)   execution time : 2.000 s
Press any key to continue.
```

Factorial:

Code:

```
#include <stdio.h>
int factorial(int n)
{
   if (n<=1)
   {
      return 1;
   }
   return n * factorial(n - 1);
}
void main()
{
   int num;
   printf("Enter Number to Calculate Factorial: ");
   scanf("%d", &num);
   if (num < 0)
   {
      printf("Factorial Not Possible\n");
   }
   else
   {
      printf("Factorial of %d is %d\n", num, factorial(num));
   }
}
```

Output:

```
Enter Number to Calculate Factorial: 6
Factorial of 6 is 720
```

Tower of Hanoi:

Code:

```
#include <stdio.h>
void TOH(int n, char s, char t, char d)
{
   if (n == 1)
   {
      printf("Move Disk %d from %c to %c\n", n, s, d);
      return;
   }
   TOH(n - 1, s, d, t);
   printf("Move disk %d from %c to %c\n", n, s, d);
   TOH(n - 1, t, s, d);
}

void main()
{
   int n = 3;
   TOH(n, 'S', 'T', 'D');
}
```

Output:

```
Move Disk 1 from S to D
Move disk 2 from S to T
Move Disk 1 from D to T
Move disk 3 from S to D
Move Disk 1 from T to S
Move disk 2 from T to D
Move Disk 1 from S to D
```