

- 1. C program of a recursive function to find the sum of n natural numbers. For example: the number 5 will give an output of 15 since $5+4+3+2+1 = 15$.**

```
#include <stdio.h>
int sum(int n);
void main()
{
    int num, add;
    printf("Enter a positive integer:\n");
    scanf("%d", &num);
    add=sum(num);
    printf("sum=%d", add);
}
int sum(int n){
    if(n==0)
        return 0;
    else
        return n+sum(n-1); /*self call to function sum() */
}
```

- 2. Code that computes the factorial of a number using recursive function.**

```
#include<stdio.h>
int factorial(int x)
{
    if (n==1)
        return 1;
    else
        return n*factorial(n-1);
}
```

```
void main()
{
    int N,i,result;
    printf("Enter N: \n");
    scanf("%d",&N);
    result = factorial(N);
    printf("%d! = %d",N,result);
}
```

- 3. Code that computes the n-th Fibonacci number using recursive function.**

```
#include <stdio.h>

int fibonacci(int i) {

    if(i == 0) {
        return 0;
    }

    if(i == 1) {
        return 1;
    }
    return fibonacci(i-1) + fibonacci(i-2);
}

void main()
{
```

```

    int n;
    scanf("%d", &n);
    printf("%d\n", fibonacci(n));
}

```

4. C program to print all natural numbers from 1 to n using recursion.

```

#include <stdio.h>
// Recursively prints all natural number between the given range.
void printNaturalNumber(int lowerLimit, int upperLimit)
{
    if(lowerLimit > upperLimit)
        return;

    printf("%d, ", lowerLimit);

    //Recursively calls the function to print next number
    printNaturalNumber(lowerLimit+1, upperLimit);
}

void main()
{
    int limit;

    printf("Print all natural numbers from 1 to : ");
    scanf("%d", &limit);

    printf("All natural numbers from 1 to %d are: ", limit);
    printNaturalNumber(1, limit);
}

```

Exercise:

1. Write a C code to find the sum of the following series using RECURSIVE FUNCTIONS:

$$1^2 + 2^2 + 3^2 + \dots + N^2$$

- Write a C program using recursive function to find the inverse product of 1st n natural numbers. E.g. for n= 5, the function should return $(1/5) * (1/4) * (1/3) * (1/2) * (1/1) = 1/120 = 0.00833$
- Compute the value of a^b using recursion, where a and b are integers.
- Write a C program to print all natural numbers from n to 1 (i.e., from upper to lower) using recursion.

Assignment:

- Compute the sum of the following geometric progression without recursion:
 $1 + r + r^2 + \dots + r^n$ (read the values of r and n from user)
- Compute the sum of the above geometric progression using recursion.
- Write a C code to find the sum of the following series using recursion:
 $1/1! + 2/2! + 3/3! + \dots + 1/N!$
- Write a C program to compute sum of digits of a given number using recursion.

Sample input/output:

Enter an integer: **5431**

Sum of digits = 13

5. **Write a C program to print the digits of a given number in words using recursion.**

Sample input/output:

Enter an integer: **5431**

Number in words: Five Four Three One