Recursion

1. **Program to Find factorial of a number using Recursion.**

```c
#include<stdio.h>
 long factorial(int n)
{
 if (n == 0)
   return 1;
 else
   return(n * factorial(n-1));
}

int main()
{
 int number;
 long fact;
 printf("Enter a number: ");
 scanf("%d", &number);
 printf("Factorial of %d is %ld\n", number, factorial(number));
 return 0;
}
```

2. **Program to Find the Sum of N natural numbers using Recursion:**

```c
#include <stdio.h>
int sum (int n)
{
        if (n == 1)
                return 1;
        else
                return (n + sum (n-1));
}
int main()
{
        int n;
        printf("\nEnter the number: ");
        scanf ("%d", &n);
        printf("\nSum of %d Natural Numbers is %d\n ", n, sum(n));
        return 0;
}
```

3. **Program to Find/print N Fibonacci Series using Recursion:**

$$
fib(n) = \begin{cases} 0 & \text{if } n=1 \\ 1 & \text{if } n=2 \\ fib(n-1)+fib(n-2) & \text{if } n>0 \end{cases}
$$

Base case (for n=1 and n=2)
General case (for n>0)

```c
#include <stdio.h>
int fib(int n);
int main()
{
    int f1=0,f2=1,n,i;
    printf("Enter the number n \n");
    scanf("%d",&n);
    printf("Fibonacci sereis are\n");
    if (n==1)
    {
        printf("%d\t",f1);
    }
    else if (n==2)
    {
        printf("%d\t%d\t",f1,f2);
    }
    else
    {
        printf("%d\t%d\t",f1,f2);
        for(i=3;i<=n;i++)
        {
            printf("%d\t",fib(i));
        }
    }
        return 0;
}

int fib(int n)
{
    if(n==1)
        return 0;
    if(n==2)
        return 1;
    else
        return (fib(n-1) +fib(n-2));

}
```

4. **Program to Find GCD of two numbers using Recursion:**

```c
#include <stdio.h>
int gcd(int n1, int n2);
int main() {
    int n1, n2;
    printf("Enter two positive integers:\n");
    scanf("%d %d", &n1, &n2);
    printf("G.C.D of %d and %d is %d.", n1, n2, gcd(n1, n2));
    return 0;
}

int gcd(int n1, int n2)
{
    if(n2 == 0)
        return n1;
    else
        return gcd(n2, n1 % n2);
}
```