Assignment=13

More on Recursion Problems .

1. write a recursive program to calculate the sum of first n natural numbers.

```
#include <stdio.h>
int natural(int);
int main()
{
	int x;
	printf("\nEnter Number : ");
	scanf("%d",&x);
	printf("Sum of %d Natural number is %d",x,natural(x));
	return 0;
}
int natural(int a)
{
	int k=0;
	if(a==0)
	return 0;
	else
	{
		k= a + natural(a-1);
		return k;
}
}
```

2. write a recursive program to calculate the sum of first n odd natural numbers.

```
#include <stdio.h>
int odd(int);
int main()
{
	int x;
	printf("\nEnter Number : ");
	scanf("%d",&x);
	printf("Sum of %d odd Natural number is %d",x,odd(x));
	return 0;
}
int odd(int a)
{
	int k=0;
	if(a==0)
	return 0;
```

```
        else
        {
                k=(2*a-1) + odd(a-1);
                return k;
   }
}
```

3. write a recursive program to calculate the sum of the first n even natural number.

```
#include <stdio.h>
int even(int);
int main()
{
        int x;
        printf("\nEnter Number : ");
        scanf("%d",&x);
        printf("Sum of %d Even Natural number is %d",x,even(x));
        return 0;
}
int even(int a)
{
        int k=0;
        if(a==0)
        return 0;
        else
        {
                k=2*a + even(a-1);
                return k;
}
}
```

4. write a recursive program to calculate the sum of sqaure first n natural numbers.

```
#include <stdio.h>
int square(int);
int main()
{
        int x;
        printf("\nEnter Number : ");
        scanf("%d",&x);
        printf("Sum of square of %d Natural number is %d",x,square(x));
        return 0;
}
int square(int a)
{
```

```
        int k=0;
        if(a==0)
        return 0;
        else
        {
                k=a*a + square(a-1);
                return k;
}
}
```

5. write a recursive program to calculate the factorial of a given number.

```
#include <stdio.h>
int fact(int);
int main()
{
        int x;
        printf("\nEnter Number : ");
        scanf("%d",&x);
        printf("factorial of %d is %d",x,fact(x));
        return 0;
}
int fact(int a)
{
        int k=0;
        if(a==0)
        return 1;
        else
        {
                k= a * fact(a-1);
                return k;
}
}
```

6. Write a recursive program to find nth terms of fibonacci series.

```
 #include <stdio.h>
int fib(int);
int main()
{
        int x,i;
        printf("\nEnter Number:");
        scanf("%d",&x);
        for(i=0;i<x;i++)
        printf("%d ",fib(i));
        return 0;
}
```

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

7. write a program to calculate the sum of digit of a given Number.

```
#include <stdio.h>
int digit(int);
int main()
{
        int x;
        printf("\nEnter Number: ");
        scanf("%d",&x);
        printf("sum of digit of given Number is %d",digit(x));
        return 0;
}
int digit(int a)
{
        int k=0;static int sum;
        if(a==0)
        return 0;
        else
        {
           k=a%10;
           sum+=k;
           digit(a/10);
           return sum;
        }
}
```

8. write a recursive program to find number of digit in a given Number.

```
#include <stdio.h>
int digit(int);
int sum=0;
int main()
{
        int x;
        printf("\nEnter Number: ");
        scanf("%d",&x);
        printf("digit in given Number is %d",digit(x));
```

```
        return 0;
}
int digit(int a)
{
        if(a==0)
        return 0;
        else
        {
           k=a%10;
           sum++;
           digit(a/10);
           return sum;
        }
}
```

9. write a recursive function to find HCF of given Number .

```
#include <stdio.h>
int hcf(int,int,int);
int main()
{
        int x,y,k;
        printf("\nEnter Numbers : ");
        scanf("%d%d",&x,&y);
        k=x>y?x:y;
        printf("HCF is %d",hcf(k,x,y));
        return 0;
}
int hcf(int i,int a,int b)
{

        if(a%i==0 && b%i==0)
        return i;
        else
        {
                hcf(i-1,a,b);
   }
}
```

10. write a recursive program to calculate power of any number.

```
#include <stdio.h>
int power(int,int);
int main()
{
        int x,y;
        printf("\n Enter Number and its power : ");
```

```
        scanf("%d%d",&x,&y);
        printf("result is %d",power(x,y));
        return 0;
}
int square(int a,int b)
{
        static int k=1;
        if(b==0)
        return 0;
        else
        {
                k*=a;
                power(a,b-1);
                return k;
   }
}
```