

Assignment -13

More on Recursion in C Language

Que : 1 Write a recursive function to calculate sum of first N natural numbers

```
#include <stdio.h>
int num =0;
int sum(int n){

    if(n){

        num = num+n;
        sum(n-1);
        return num;

    }
    else
        return num;
    return num;
}

int main()
{
    int n;
    printf("enter the number :");
    scanf("%d",&n);
    int result = sum(n);
    printf("sum of n numbers is %d",result);

    return 0;
}
```

Que : 2 Write a recursive function to calculate sum of first N odd natural numbers

```
#include <stdio.h>
int num =0;
int oddsum(int i ,int n){

    if(i==n){

        printf("%d",n);
        return i ;

    }
```

```

    }
    else{

        num = num + i;
        oddsum(i+2,n);

    }
    return num+n;
}

int main()
{
    int a, n;
    printf("enter range of number :");
    scanf("%d%d",&a,&n);
    int result = oddsum(a,n);
    printf("sum of n numbers is %d",result);

    return 0;
}

```

Que : 3 Write a recursive function to calculate sum of squares of first n natural numbers

```

#include <stdio.h>
#include <math.h>
int num =0;
int oddsum(int i ,int n){

    if(i==n){

        printf("%d",n);
        return i ;

    }
    else{

        num = num + pow(i,2);
        oddsum(i+1,n);

    }
    return num+pow(n,2);
}

```

```

int main()
{
    int a, n;
    printf("enter range of  number :");
    scanf("%d%d",&a,&n);
    int result = oddsum(a,n);
    printf("sum of n numbers is %d",result);

    return 0;
}

```

Que : 4 Write a recursive function to calculate sum of digits of a given number

```

#include <stdio.h>
#include <math.h>
    int sum =0;
    int rem = 0;
int sumofdigits(int n){

    if(n!=0){
        rem = n%10;
        sum = sum+rem;
        sumofdigits(n/10);

    }
    else{
        return sum;
    }
    return sum;
}

int main()
{
    int n;
    printf("enter range of  number :");
    scanf("%d",&n);
    int result = sumofdigits(n);
    printf("sum of n numbers is %d",result);
    return 0;
}

```

Que : 5 Write a recursive function to calculate factorial of a given number

```
#include <stdio.h>
#include <math.h>
    int factorial =1;

int fact(int n){

    if(n==0 || n ==1){
        return 0;
    }
    else{

        factorial = factorial*n;
        fact(n-1);

    }
    return factorial;
}

int main()
{
    int n;
    printf("enter a  number :");
    scanf("%d",&n);
    int result = fact(n);
    printf("sum of n numbers is %d",result);

    return 0;
}
```

Que : 6 Write a recursive function to calculate HCF of two numbers

```
#include <stdio.h>

/* Function declaration */
int gcd(int a, int b);

int main()
{
    int num1, num2, hcf;
```

```

    /* Input two numbers from user */
    printf("Enter any two numbers to find GCD: ");
    scanf("%d%d", &num1, &num2);

    hcf = gcd(num1, num2);

    printf("GCD of %d and %d = %d", num1, num2, hcf);

    return 0;
}

/**
 * Recursive approach of euclidean algorithm to find GCD of two numbers
 */
int gcd(int a, int b)
{
    if(b == 0)
        return a;
    else
        return gcd(b, a%b);
}

```

Que :7 Write a recursive function to print first N terms of Fibonacci series

```

#include <stdio.h>

void fibo(int n){

    static int n1 =0;
    static int n2=1;
    static int n3;

    if(n>0){
        n3 = n1+n2;
        n1 =n2;
        n2 = n3;
        printf("%d ",n3);
        fibo(n-1);
    }

}

```

```

int main()
{
    int n ;
    printf("enter a number :");
    scanf("%d",&n);
    printf("%d %d ",0 ,1 );

    fibo(n-2);
    return 0;
}

```

Que : 8 Write a program in C to count the digits of a given number using recursion.

```

#include <stdio.h>

int dcount(int n){
    static int count =0;
    if(n>0){
        count++;
        dcount(n/10);
    }
    else{
        return count;
    }
}

int main()
{
    int n ;
    printf("enter a number :");
    scanf("%d",&n);
    //printf("%d %d ",0 ,1 );

    printf("%d",dcount(n));
    return 0;
}

```

Que : 9 Write a program in C to calculate the power of any number using recursion.

```
#include <stdio.h>

int power(int b,int e)
{
    if(e==0)
        return 1;
    else
        return (b*power(b,e-1));
}

void main()
{
    int base,exponent;
    printf("Enter the base\n");
    scanf("%d",&base);
    printf("Enter the exponent\n");
    scanf("%d",&exponent);

    printf("Power(%d^%d) = %d\n",base,exponent,power(base,exponent));
}
```