

More on Recursion in C Language

Assignment-13

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

Ans:-

```
#include<stdio.h>
int sumN(int);
int main()
{
    int n;
    printf("Enter a number\n");
    scanf("%d",&n);
    printf("Sum of first %d number is =%d",n,sumN(n));
    return 0;
}
int sumN(int x)
{
    if(x==1)
        return 1;
    return x+sumN(x-1);
}
```

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

Ans:-

```
#include<stdio.h>
int sum_oddN(int);
int main()
{
    int n;
    printf("Enter a number\n");
    scanf("%d",&n);
    printf("Sum of first %d odd number is =%d",n,sum_oddN(2*n-1));
    return 0;
}
int sum_oddN(int x)
{
    if(x==1)
        return 1;
    return x+sum_oddN(x-2);
}
```

3. Write a recursive function to calculate sum of first N odd natural numbers.

Ans:-

```
#include<stdio.h>
int sum_oddN(int);
int main()
{
    int n;
    printf("Enter a number\n");
```

```

scanf("%d",&n);
printf("Sum of first %d odd number is =%d",n,sum_oddN(2*n-1));
return 0;
}
int sum_oddN(int x)
{
    if(x==1)
        return 1;
    return x+sum_oddN(x-2);
}

```

4. Write a recursive function to calculate sum of squares of first n natural numbers.

Ans:-

```

#include<stdio.h>
int sum_sqN(int);
int main()
{
    int n;
    printf("Enter a number\n");
    scanf("%d",&n);
    printf("Sum of first %d number is =%d",n,sum_sqN(n));
    return 0;
}
int sum_sqN(int x)
{
    if(x==1)
        return 1;
    return x*x+sum_sqN(x-1);
}

```

5. Write a recursive function to calculate sum of digits of a given number.

Ans:-

```

#include<stdio.h>
int sum_ofdigits(int);
int main()
{
    int n;
    printf("Enter a number\n");
    scanf("%d",&n);
    printf("Sum of digits of %d is =%d",n,sum_ofdigits(n));
    return 0;
}
int sum_ofdigits(int x)
{
    if(x<10)
        return x;
    return x%10+sum_ofdigits(x/10);
}

```

6. Write a recursive function to calculate factorial of a given number.

Ans:-

```

#include<stdio.h>
int fact(int);
int main()

```

```

{
    int n;
    printf("Enter a number\n");
    scanf("%d",&n);
    printf("Factorial of %d is =%d",n,fact(n));
    return 0;
}
int fact(int x)
{
    if(x==0 || x==1)
        return 1;
    return x*fact(x-1);
}

```

7. Write a recursive function to calculate HCF of two numbers.

Ans:-

1st way:-

```

#include<stdio.h>
int hcf(int,int);
int main()
{
    int a,b;
    printf("Enter two number\n");
    scanf("%d%d",&a,&b);
    printf("HCF of %d and %d is =%d",a,b,hcf(a,b));
    return 0;
}
int hcf(int x,int y)
{
    if(x>y)
    {
        if(x%y==0)
            return y;
        hcf(x%y,y);
    }
    else
    {
        if(y%x==0)
            return x;
        hcf(x,y%x);
    }
}

```

2nd way:-

```

#include<stdio.h>
int hcf(int,int,int);
int main()
{
    int a,b,c;
    printf("Enter two number\n");
    scanf("%d%d",&a,&b);
    c=a<b?a:b;
    printf("HCF of %d and %d is =%d",a,b,hcf(a,b,c));
}

```

```

    return 0;
}
int hcf(int x,int y,int z)
{
    if(z==1)
        return 1;
    if((x%z==0) && (y%z==0) )
        return z;
    hcf(x,y,z-1);
}

```

8. Write a recursive function to print first N terms of Fibonacci series.

Ans:-

```

#include<stdio.h>
int fib(int);
int main()
{
    int n,i;
    printf("Enter a number:-");
    scanf("%d",&n);
    for(i=0;i<n;i++)
        printf("%d ",fib(i));
    return 0;
}
int fib(int n)
{
    if(n==1 || n==0)
        return n;
    return fib(n-1)+fib(n-2);
}

```

9. Write a program in C to count the digits of a given number using recursion.

Ans:-

```

#include<stdio.h>
int countd(int,int);
int main()
{
    int a;
    printf("Enter a number ");
    scanf("%d",&a);
    printf("number of digit in %d is =%d",a,countd(a,0));
    return 0;
}
int countd(int x,int y)
{
    if(x==0)
        return y;
    countd(x/10,y+1);
}

```

10. Write a program in C to calculate the power of any number using recursion.

Ans:-

```

#include<stdio.h>
int power(int,int);

```

```
int main()
{
    int x,y;
    printf("Enter the value of x and y(x to the power y) ");
    scanf("%d%d",&x,&y);
    printf("%d to the power %d is =%d",x,y,power(x,y));
    return 0;
}
int power(int a,int b)
{
    if(b==1)
        return a;
    return a*power(a,b-1);
}
```