**Assignment-13 Solution Name: Om Pant**

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

Ans-

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

#include<stdio.h>

int sumOfN(int n){

    if(n==1)

        return 1;

    return n + sumOfN(n-1);

}

int main(){

    int num,sum;

    printf("Enter a number\n");

    scanf("%d",&num);

    sum = sumOfN(num);

    printf("Sum of First %d natural numbers is: %d\n",num,sum);

}

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

Ans-

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

#include<stdio.h>

int sumOfOddN(int n){

    if(n==1)

        return 1;

    return (2\*n-1) + sumOfOddN(n-1);

}

int main(){

    int num,sum;

    printf("Enter a number\n");

    scanf("%d",&num);

    sum = sumOfOddN(num);

    printf("Sum of First %d Odd natural numbers is: %d\n",num,sum);

}

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

Ans-

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

#include<stdio.h>

int sumOfOddN(int n){

    if(n==0)

        return 0;

    return (2\*(n-1)) + sumOfOddN(n-1);

}

int main(){

    int num,sum;

    printf("Enter a number\n");

    scanf("%d",&num);

    sum = sumOfOddN(num);

    printf("Sum of First %d Even natural numbers is: %d\n",num,sum);

}

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

Ans-

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

#include<stdio.h>

int sumOfN(int n){

    if(n==1)

        return 1;

    return n\*n + sumOfN(n-1);

}

int main(){

    int num,sum;

    printf("Enter a number\n");

    scanf("%d",&num);

    sum = sumOfN(num);

    printf("Sum of Squares of First %d natural numbers is: %d\n",num,sum);

}

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

Ans-

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

#include<stdio.h>

int sumOfDigit(int n){

    if(n <10)

        return n;

    return n%10 + sumOfDigit(n/10);

}

int main(){

    int num,sum;

    printf("Enter a number\n");

    scanf("%d",&num);

    sum = sumOfDigit(num);

    printf("Sum of digits of %d is: %d\n",num,sum);

    return 0;

}

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

Ans-

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

#include<stdio.h>

int fact(int n){

    if(n==1)

        return 1;

    return n \* fact(n-1);

}

int main(){

    int num,factorial;

    printf("Enter a number\n");

    scanf("%d",&num);

    factorial = fact(num);

    printf("Sum of digits of %d is: %d\n",num,factorial);

    return 0;

}

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

Ans-

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

#include<stdio.h>

int hcf(int n, int m){

    if(m!=0)

        return hcf(m, n%m);

    else

        return n;

}

int main(){

    int num1,num2,result;

    printf("Enter two numbers\n");

    scanf("%d%d",&num1,&num2);

    result = hcf(num1,num2);

    printf("HCF of %d and %d is: %d\n",num1,num2,result);

    return 0;

}

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

Ans-

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

#include <stdio.h>

int fibonacci(int num)

{

    if (num == 0 || num == 1)

    {

        return num;

    }

    else

    {

        return fibonacci(num - 1) + fibonacci(num - 2);

    }

}

int main()

{

    int num;

    printf("Enter the number of elements to be in the series : ");

    scanf("%d", &num);

    for (int i = 0; i < num; i++)

    {

        printf("%d, ", fibonacci(i));

    }

    return 0;

}

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

Ans –

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

#include<stdio.h>

int count(int n){

    if(n<=10){

        return 1;

    }

    return 1 + count(n/10);

}

int main(){

    int num,result;

    printf("Enter a number\n");

    scanf("%d",&num);

    result = count(num);

    printf("Digits - %d\n",result);

    return 0;

}

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

Ans-

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

#include <stdio.h>

int power(int , int );

int main() {

    int base, a, result;

    printf("Enter base number: ");

    scanf("%d", &base);

    printf("Enter power number(positive integer): ");

    scanf("%d", &a);

    result = power(base, a);

    printf("%d^%d = %d", base, a, result);

    return 0;

}

int power(int base, int a) {

    if (a != 0)

        return (base \* power(base, a - 1));

    else

        return 1;

}