**Assignment - 13 A Job Ready Bootcamp in C++, DSA and IOT MySirG**

**More on Recursion in C Language**

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

#include<stdio.h>

int sum(int n)

{

if(n==1)

return 1;

return n+sum(n-1);

}

int main()

{

int n, Sum=0;

printf("Enter a number: ");

scanf("%d",&n);

Sum=sum(n);

printf("Sum of %d natural number is %d",n,Sum);

return 0;

}

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

#include <stdio.h>

int sumOfOdd(int n) {

if(n == 1) {

return 1;

} else {

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

}

}

int main() {

int n;

printf("Enter the value of N: ");

scanf("%d", &n);

printf("Sum of first %d odd natural numbers is %d",n,sumOfOdd(n));

return 0;

}

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

#include <stdio.h>

int sumOfEven(int n) {

if(n == 0) {

return 0;

} else {

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

}

}

int main() {

int n;

printf("Enter the value of N: ");

scanf("%d", &n);

printf("Sum of first %d even natural numbers is %d",n,sumOfEven(n));

return 0;

}

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

#include <stdio.h>

int sumOfSquare(int n) {

if(n == 1) {

return 1;

} else {

return (n \* n) + sumOfSquare(n - 1);

}

}

int main() {

int n;

printf("Enter the value of N: ");

scanf("%d", &n);

printf("Sum of square %d natural numbers is %d",n,sumOfSquare(n));

return 0;

}

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

#include <stdio.h>

int sumOfDigit(int n) {

if(n == 1) {

return 1;

} else {

return (n % 10) + sumOfDigit(n / 10);

}

}

int main() {

int n;

printf("Enter the value of N: ");

scanf("%d", &n);

printf("Sum of first %d numbers is %d",n,sumOfDigit(n));

return 0;

}

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

#include <stdio.h>

int fact(int n) {

if(n == 1) {

return 1;

} else {

return n\* fact(n - 1);

}

}

int main() {

int n;

printf("Enter the value of N: ");

scanf("%d", &n);

printf("Factorial of first %d numbers is %d",n,fact(n));

return 0;

}

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

#include <stdio.h>

int hcf(int a, int b) {

if(b == 0) {

return a;

} else {

return hcf(b, a % b);

}

}

int main() {

int a, b;

printf("Enter two numbers: ");

scanf("%d %d", &a, &b);

printf("HCF of %d and %d is %d", a, b, hcf(a, b));

return 0;

}

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

#include <stdio.h>

int fibonacci(int n);

int fibonacci(int n) {

if(n == 0 || n == 1) {

return n;

} else {

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

}

}

int main() {

int N, i;

printf("Enter the number of terms: ");

scanf("%d", &N);

for(i=0; i<N; i++) {

printf("%d ", fibonacci(i));

}

return 0;

}

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

#include <stdio.h>

int countdigits(int n)

{

if(n==0) return 0;

return 1+countdigits(n/10);

}

int main()

{

int a;

printf("Enter number: ");

scanf("%d",&a);

printf("Number of digits = %d", countdigits(a));

}

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

#include <stdio.h>

int power(int base, int a)

{

if (a != 0)

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

else

return 1;

}

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;

}