Assignment – 13

A Job Ready Bootcamp in C++, DSA and IOT

More on Recursion in C Language

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

Priogram:

#include<stdio.h>

int sum\_natural(int );

int sum\_natural(int n)

{

int sum;

if(n>0)

{

sum=n+sum\_natural(n-1);

}

return sum;

}

int main()

{

int n;

printf("enter value of N for sum of fisrt N natural number: ");

scanf("%d",&n);

printf("The sum %d natural number is %d ",n,sum\_natural(n));

printf("\n");

return 0;

}

OUTPUT:

enter value of N for sum of fisrt N natural number: 10

The sum 10 natural number is 55

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Process exited after 2.983 seconds with return value 0

Press any key to continue . . .

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

PROGRAM:

#include<stdio.h>

int sum\_odd(int );

int sum\_odd(int n)

{

int sum;

if(n>0)

{

sum=(2\*n-1)+sum\_odd(n-1);

}

return sum;

}

int main()

{

int n;

printf("enter value of N for sum of fisrt N odd number: ");

scanf("%d",&n);

printf("The sum %d odd number is %d ",n,sum\_odd(n));

printf("\n");

return 0;

}

OUTPUT:

enter value of N for sum of fisrt N odd number: 9

The sum 9 odd number is 81

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Process exited after 2.535 seconds with return value 0

Press any key to continue . . .

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

#include<stdio.h>

int sum\_even(int );

int sum\_even(int n)

{

int sum;

if(n>0)

{

sum=(2\*n)+sum\_even(n-1);

}

return sum;

}

int main()

{

int n;

printf("enter value of N for sum of fisrt N even number: ");

scanf("%d",&n);

printf("The sum %d odd number is %d ",n,sum\_even(n));

printf("\n");

return 0;

}

OUTPUT;

enter value of N for sum of fisrt N even number: 10

The sum 10 odd number is 110

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Process exited after 1.233 seconds with return value 0

Press any key to continue . . .

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

PROGRAM

#include<stdio.h>

int sum\_square(int );

int sum\_square(int n)

{

int sum=0;

if(n>0)

{

sum=(n\*n)+sum\_square(n-1);

}

return sum;

}

int main()

{

int n;

printf("enter value of N for sum of fisrt N even number: ");

scanf("%d",&n);

printf("The sum %d odd number is %d ",n,sum\_square(n));

printf("\n");

return 0;

}

Output:

enter value of N for sum of fisrt N even number: 10

The sum 10 odd number is 385

--------------------------------

Process exited after 2.487 seconds with return value 0

Press any key to continue . . .

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

PROGRAM:

#include<stdio.h>

int sum\_digits(int );

int sum\_digits(int n)

{

int sum=0;

if(n>0)

{

sum=(n%10)+sum\_digits(n/10);

}

return sum;

}

int main()

{

int n;

printf("enter a number: ");

scanf("%d",&n);

printf("The sum of the digit is %d ",sum\_digits(n));

printf("\n");

return 0;

}

Output:

enter a number: 147

The sum of the digit is 12

--------------------------------

Process exited after 2.125 seconds with return value 0

Press any key to continue . . .

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

PORGRAM:

#include<stdio.h>

int factorial(int );

int factorial(int n)

{

int fact;

if(n>=1)

{

return n\*factorial(n-1);

}

else

return 1;

}

int main()

{

int n;

printf("enter a number: ");

scanf("%d",&n);

printf("The factorial is %d ",factorial(n));

printf("\n");

return 0;

}

OUTPUT:

enter a number: 5

The factorial is 120

--------------------------------

Process exited after 1.763 seconds with return value 0

Press any key to continue . . .

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

PROGRAM:

#include<stdio.h>

int hcf(int );

int hcf(int x,int y)

{

if(x>y)

hcf(y,x);

if(y%x!=0)

{

hcf(y%x,x);

}

else

return x;

}

int main()

{

int x,y;

printf("enter a number: ");

scanf("%d%d",&x,&y);

printf("The HCF is %d ",hcf(x,y));

printf("\n");

return 0;

}

OUTPUT

enter a number: 45 120

The HCF is 15

--------------------------------

Process exited after 4.289 seconds with return value 0

Press any key to continue . . .

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

PROGRAM:

#include<stdio.h>

int fibo(int);

int fibo(int n)

{

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

return n;

else

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

}

int main()

{

int n;

printf("enter the value of n: ");

scanf("%d",&n);

for(int i=1;i<=n;i++)

{

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

}

printf("\n");

return 0;

}

Output:

enter the value of n: 5

1 1 2 3 5

--------------------------------

Process exited after 2.664 seconds with return value 0

Press any key to continue . . .

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

#include<stdio.h>

int digits(int);

int count =0;

int digits(int n)

{

if(n>0)

{

count++;

digits(n/10);

}

return count;

}

int main()

{

int n;

printf("enter the value of n: ");

scanf("%d",&n);

printf("Number of digits are %d. ",digits(n));

printf("\n");

return 0;

}

OUPUT:

enter the value of n: 14785

Number of digits are 5.

--------------------------------

Process exited after 2.948 seconds with return value 0

Press any key to continue . . .

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

PROGRAM:

#include<stdio.h>

int power(int ,int );

int power(int n,int a)

{

if(a!=0)

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

else

return 1;

}

int main()

{

int n,a;

printf("enter the number and power: ");

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

printf("%d^%d = %d ", n,a,power(n,a));

printf("\n");

return 0;

}

Output:

enter the number and power: 4 3

4^3 = 64

--------------------------------

Process exited after 5.453 seconds with return value 0

Press any key to continue . . .