Name\_Pinaki sahani

Regd. No-2061020074

a) Functions without arguments and without return type

i. check whether the year is Leap year

program:-

#include <stdio.h>

void lp();

int main()

{

printf("cheking leap year.\n");

lp();

return 0;

}

void lp()

{

int y;

printf("enter year no: \n");

scanf("%d",&y);

if(y%4==0)

printf("your year \"%d\" is leap year.\n",y);

else

printf("your year \"%d\" is not a leap year.\n",y);

}

Output:-

cheking leap year

enter year no:

2001

your year "2001" is not a leap year.

ii. convert binary to hexadecimal

Program:-

#include <stdio.h>

void hexa();

int main()

{

printf("conversion of binary to hexadecimal.\n");

hexa();

return 0;

}

void hexa()

{

long int b, hd = 0, i = 1, rem;

printf("Enter the binary number: ");

scanf("%ld", &b);

while(b!=0)

{

rem = b % 10;

hd = hd + rem \* i;

i = i \* 2;

b = b / 10;

}

printf("Equivalent hexadecimal value: %lX", hd);

}

Output:-

conversion of binary to hexadecimal.

Enter the binary number: 1111

Equivalent hexadecimal value: F

iii. count number of digits in a number

Program:-

#include <stdio.h>

void count();

int main()

{

printf("counting the no of digits.\n");

count();

return 0;

}

void count()

{

int n; // variable declaration

int count=0; // variable declaration

printf("Enter a number: ");

scanf("%d",&n);

while(n!=0)

{

n=n/10;

count++;

}

printf("\nThe number of digits in the above no is : %d",count);

}

Output:-

counting the no of digits.

Enter a number: 20

The number of digits in the above no is : 2

b) Functions without arguments and with return type

i.check Armstrong number or not

program:-

#include <stdio.h>

int ams();

void main()

{

int amst;

printf("checking amstrong or not.\n");

amst=ams();

if(amst==0)

printf("your no is amstrong.");

else

printf("your no is not amstrong.");

}

int ams()

{

int no,rem,sum=0,a;

printf("enter a no : ");

scanf ("%d",&no);

a=no;

while(no>0)

{

rem=no%10;

sum=sum+(rem\*rem\*rem);

no=no/10;

}

if (sum==a)

{

return 0;

}

}

Output:-

checking amstrong or not.

enter a no : 154

your no is not amstrong.

ii.To evaluate the following using loops x + x^3 / 3! + x^5 / 5! +... upto 5 terms

program:-

#include <stdio.h>

int loop();

void main()

{

int sum;

printf("evaluate the following using loops x + x^3 / 3! + x^5 / 5! +..\n");

sum=loop();

printf("sum of term is : %d ",sum);

}

int loop()

{

int x,sum,inc,i;

int n,p,nn,m,d;

printf("Enter value of x: ");

scanf("%d",&x);

printf("enter the no of terms: ");

scanf("%d",&n);

sum=x;

i=1;

m=-1;

printf("The value of the series:\n ");

printf("%d",x);

do{

//incrementing the power

inc=(2\*i+1);

//power calculation

p= pow(x,inc);

//multiply into m

nn=p\*m;

//printing the new nos

printf("\n%d\n",nn);

sum=sum+nn;

m=m\*(-1);

i++;

}while(i<n);

return sum;

}

output:-

evaluate the following using loops x + x^3 / 3! + x^5 / 5! +..

Enter value of x: 2

enter the no of terms: 5

The value of the series:

2

-8

32

-128

512

sum of term is : 410

iii.Convert temperature Fahrenheit to Celsius

program :-

#include<stdio.h>

int fc();

int main()

{

float c;

printf("converting farenhite to celcious...\n ");

c=fc();

printf("celcious is: %f ",c);

}

int fc()

{

float fa,cel;

printf("enter tempreture in farenhite: ");

scanf("%f",&fa);

cel= (fa-32)\* 5/9;

return cel;

}

output:-

converting farenhite to celcious...

enter tempreture in farenhite: 72

celcious is: 22.000000

c) Functions with arguments and without return type

i. check prime number or not

program:-

#include<stdio.h>

int prim(int);

int main()

{

int no;

printf("checking prime or not...\n ");

printf("enter your no: ");

scanf("%d",&no);

prim(no);

}

int prim(int n)

{

int i,c=0;

for(i=2;i<=n/2;i++)

{

if (n%i==0)

{

c=1;

}

}

if (n==0)

printf("your no is zero.");

else if (n==1)

printf("your no natural no.");

else if (c==0)

printf("your no %d is prime",n);

else

printf("your no %d is not prime.",n);

}

output:-

checking prime or not...

enter your no: 3

your no 3 is prime

ii. find all roots of the quadratic equation

program:-

#include<stdio.h>

#include<math.h>

int quad(float,float,float);

int main ()

{

float a,b,c;

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

scanf("%f",&a);

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

scanf("%f",&b);

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

scanf("%f",&c);

quad(a,b,c);

}

int quad(float a,float b,float c)

{

float r1,r2,d,img;

d=(b\*b)-4\*a\*c;

if (d>0)

{

r1= (-b+ sqrt (d))/ 2\*a ;

r2=(-b- sqrt (d))/ 2\*a ;

printf("Quadratic equation has two roots \n");

printf("two roots are r1=%g & r2= %g ",r1,r2);

}

else if(d==0)

{

r1=r2=(-b/2\*a);

printf("two roots are equal\n");

printf("r1= %g & r2= %g",r1,r2);

}

else if (d<0)

{

r1=r2=(-b/2\*a);

img= sqrt(-d)/2\*a;

printf("two roots are imaginary= %g \n",img);

}

return 0;

}

output:-

Enter the value of a : 1

Enter the value of b : 2

Enter the value of c : -6

Quadratic equation has two roots

two roots are r1=1.64575 & r2= -3.64575

iii. find ASCII number to character and character to ASCII number

program:-

#include <stdio.h>

int asc(int,char);

int main() {

char c;

int n;

printf("Enter a character: ");

scanf("%c", &c);

printf("enter a number: ");

scanf("%d",&n);

asc(n,c);

}

int asc(int n,char c)

{

printf("ASCII value of character \"%c\" = %d", c, c);

printf("\nASCII value of number of character \"%d\" = %c", n, n);

return 0;

}

output:-

Enter a character: D

enter a number: 66

ASCII value of character "D" = 68

ASCII value of number of character "66" = B

d) Functions with arguments and with return type

i)check perfect or abundant or deficient number

program:-

#include <stdio.h>

int pn(int);

int main()

{

int no,p=0;

printf("enter a no : \n");

scanf("%d",&no);

p = pn(no);

if (p==0)

printf("no %d is a perfect no.",no);

else

printf("no %d is not a perfect no.",no);

return 0;

}

int pn(int a)

{

int i,sum=0;

for(i=1;i<=a/2;i++)

{

if (a%i==0)

{

sum=sum+i;

}

}

if (sum==a)

return 0;

else

return 1;

}

Output:-

enter a no :

28

no 28 is a perfect no.

ii) calculate factorial of a number

program:-

#include <stdio.h>

int fact(int);

int main() {

int no,f;

printf("Enter the no : ");

scanf("%d", &no);

f=fact(no);

printf("factorial of \"%d\" is = %d ",no,f);

}

int fact(int n)

{

int i,f=1;

if (n==0)

{

return 0;

}

else if (n==1)

{

return 1;

}

else

{

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

{

f=f\*i;

}

return f;

}

}

output:-

Enter the no : 6

factorial of "6" is = 720

iii) count number of digits in a number

program:-

#include <stdio.h>

int count(int);

int main()

{

int n,nn;

printf("counting the no of digits.\n");

printf("Enter a number: ");

scanf("%d",&n);

nn=count(n);

printf("\nThe number of digits in the above no is : %d",nn);

return 0;

}

int count(int no)

{

int c=0;

while(no!=0)

{

no=no/10;

c++;

}

return c;

}

output:-

counting the no of digits.

Enter a number: 300

The number of digits in the above no is : 3

e) Function return Multiple values

• Largest and Smallest of five numbers

Program:-

#include <stdio.h>

int ls(int [],int \*);

int main() {

int no[5],i, rp,f[2];

printf("Enter five different nos: ");

for(i=0;i<5;i++)

{

scanf("%d",&no[i]);

}

rp=ls(no,f);

printf("largest no is: \"%d\" and smallest is : \"%d\"",f[0],f[1]);

return 0;

}

int ls(int a[],int \*p)

{

int i,sm,lg;

lg=sm=a[i];

for(i=0;i<5;i++)

{

if (a[i]>lg)

lg=a[i];

else if (a[i]<sm)

sm=a[i];

}

\*(p+0)=lg;

\*(p+1)=sm;

return p;

}

Output:-

Enter five different nos: 70

80

90

45

65

largest no is: "90" and smallest is : "45"

• Find Simple interest and compound interest

Program:-

#include <stdio.h>

#include<math.h>

int interest(float,float,float ,float\*);

int main() {

float amt,t,r,g[2];

printf("Enter Principal Amount: ");

scanf("%f",&amt);

printf("Enter Time Period in Year: ");

scanf("%f",&t);

printf("Enter Rate of Interest Per Year: ");

scanf("%f",&r);

interest(amt,t,r,g);

printf("compound interest is: \" %f \" and simple interest is : \" %f \"",g[1],g[0]);

return 0;

}

int interest(float p,float r,float t ,float\*i)

{

float si,ci;

si=(p\*t\*r)/100;

\*(i+0)=si;

ci= p\*(pow((1+r/100),t));

\*(i+1)=ci;

return \*(i+0),\*(i+1);

}

Output:-

Enter Principal Amount: 10000

Enter Time Period in Year: 12

Enter Rate of Interest Per Year: 10

compound interest is: " 31058.484375 " and simple interst is : " 12000.000000 "

• simple calculator (add, sub, mul, div, mod)

Program:-

#include <stdio.h>

int calc(int,int,int\*,int\*,int\*,int\*,int\*);

int main()

{

int no1,no2,a,s,m,d,mo;

printf("enter the value of 1st no: ");

scanf("%d ",&no1);

printf("enter the value of 2nd no: ");

scanf("%d ",&no2);

calc(no1,no2,&a,&s,&m,&d,&mo);

printf("\n after addition : %d \n after subtraction : %d \n after multiplication: %d ",a,s,m);

printf("\n after division: %d \n the module is : %d",d,mo);

return 0;

}

int calc(int x,int z,int\* a,int\* s, int\* m,int\* d,int\* mo)

{

\*a=x+z;

\*s=x-z;

\*m=x\*z;

\*d=x/z;

\*mo=x%z;

}

Output:-

enter the value of 1st no: 6

enter the value of 2nd no: 4

after addition : 10

after subtraction : 2

after multiplication: 24

after division: 1

the module is : 2

f) Nesting of Functions

• Print the sum of series 1 + 1/2 + 1/3 + 1/4 + ... + 1/N.

Program:-

#include <stdio.h>

int main()

{

float a;

float input()

{

float z,c;

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

scanf("%f",&c);

float proc(float n)

{

float i,b=0;

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

{

b=b+1/i;

}

printf(" the value of the series is : %f",b);

}

proc(c);

}

input();

return 0;

}

Output:-

enter the value of N : 6

the value of the series is : 2.283334

• reverse a number

Program:-

#include <stdio.h>

int main()

{ int a;

auto int input(){

int z,c;

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

scanf("%d",&c);

int proc(int n){

int o,b=0;

for (o=1;n!=0;o++){

b=b+n%10;

b=b\*10;

n=n/10;

}b=b/10;

printf(" the reverse of N is : %d",b);

}

proc(c);

}

input();

return 0;

}

Output:-

enter the value of N :115

the reverse of N is : 511

g) Recursive Functions

• to Print Fibonacci Series

Program:-

#include <stdio.h>

int fib(int);

void main() {

int no,f;

printf("enter a no ");

scanf("%d",&no);

f=fib(no);

printf("fibonannci value is : %d",f);

}

int fib(int n)

{

if(n==0)

return 0;

else if (n==1)

return 1;

else

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

}

Output:-

enter a no 12

fibonannci value is : 144

• to convert a decimal number to binary

Program:-

#include <stdio.h>

int convert(int);

int main()

{

int dm,b;

printf("enter a decimal no: ");

scanf("%d",&dm);

b=convert(dm);

printf("binary value is : %d", b);

return 0;

}

int convert(int no)

{

if (no == 0)

return 0;

else

return (no % 2 + 10 \* convert(no/2));

}

Output

enter a decimal no: 10

binary value is : 1010

h) Passing 1D Array in Functions

• Reverse the elements of an array

Program:-

#include<stdio.h>

int main()

{

int arr[50],size,i;

printf("Enter size : ");

scanf("%d",&size);

printf("Enter %d numbers : ",size);

for(i=0; i<size; i++)

scanf("%d",&arr[i]);

for(i=0; i<size; i++)

printf("%d ",arr[i]);

printf("\nReverse ");

rev(arr,size);

for(i=0; i<size; i++)

printf("%d ",arr[i]);

return 0;

}

int rev(int arr[],int size)

{

int i,temp;

for(i=0; i<size/2; i++)

{

temp=arr[i];

arr[i]=arr[size-i-1];

arr[size-i-1]=temp;

}}

Output

Enter size : 3

Enter 3 numbers : 1

2

5

1 2 5

Reverse 5 2 1

• Find the fourth largest and Third smallest element in an array

Program:-

#include<stdio.h>

int main()

{

int arr[50],size,i;

printf("Enter size : ");

scanf("%d",&size);

printf("Enter %d numbers : ",size);

for(i=0; i<size; i++)

scanf("%d",&arr[i]);

largest(arr,size);

return 0;

}

void largest(int arr[],int size)

{

int large1,large2,large3,large4,i;

large1=large2=large3=large4=arr[0];

for(i=0; i<size; i++)

{

if(arr[i]>large1)

{

large4=large3;

large3=large2;

large2=large1;

large1=arr[i];

}

else if(arr[i]>large2 && large1!=arr[i])

{

large4=large3;

large3=large2;

large2=arr[i];

}

else if(arr[i]>large3 && large2!=arr[i])

{

large4=large3;

large3=arr[i];

}

else if(arr[i]>large4 && large3!=arr[i])

{

large4=arr[i];

}

}

printf("3rd largest %d\n4th largest %d",large3,large4);

}

Output

Enter size : 5

Enter 5 numbers : 4

5

6

7

8

3rd largest 6

4th largest 5

i) Passing 2D Array in Functions

• Sum of upper triangular and lower triangular elements of mxm array

Program:-

#include <stdio.h>

void sum(int mat[3][3], int r, int c)

{

int i, j;

int usum = 0;

int lsum = 0;

for (i = 0; i < r; i++)

for (j = 0; j < c; j++)

{

if (i <= j)

{

usum += mat[i][j];

}

}

printf("Upper sum is %d\n", usum);

for (i = 0; i < r; i++)

for (j = 0; j < c; j++)

{

if (j <= i)

{

lsum += mat[i][j];

}

}

printf("Lower sum is %d", lsum);

}

int main()

{

int r = 3;

int c = 3;

int mat[3][3] = {{ 6, 5, 4 },

{ 1, 2, 5 },

{ 7, 9, 7 }};

sum(mat, r, c);

return 0;

}

Output

Upper sum is 29

Lower sum is 32

• Perform matrix multiplication between two mxn array

Program:-

#include <stdio.h>

#define N 4

void multiply(int mat1[][N], int mat2[][N], int res[][N])

{

int i, j, k;

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

{

for (j = 0; j < N; j++)

{

res[i][j] = 0;

for (k = 0; k < N; k++)

res[i][j] += mat1[i][k] \* mat2[k][j];

}

}

}

int main()

{

int mat1[N][N] = { { 1, 1, 1, 1 },

{ 2, 2, 2, 2 },

{ 3, 3, 3, 3 },

{ 4, 4, 4, 4 } };

int mat2[N][N] = { { 1, 1, 1, 1 },

{ 2, 2, 2, 2 },

{ 3, 3, 3, 3 },

{ 4, 4, 4, 4 } };

int res[N][N];

int i, j;

multiply(mat1, mat2, res);

printf("Result matrix is \n");

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

{

for (j = 0; j < N; j++)

printf("%d ", res[i][j]);

printf("\n");

}

return 0;

}

output

Result matrix is

10 10 10 10

20 20 20 20

30 30 30 30

40 40 40 40

j) Passing Strings in Functions

• to perform Substring Extraction (With and Without String Handling Functions).

Program:-

#include <stdio.h>

int show(char[]);

int main()

{

char a[20]="he is a good boy.";

show(a);

return 0;

}

int show(char s[])

{

char \*b;

printf("substring is : %s",b=strstr(s,"a"));

}

Output

substring is : a good boy.

Program:- without string func

#include <stdio.h>

int show(char[],int );

int main()

{

char str[100] ;

int pos, len;

printf("Input a string: ");

gets(str);

printf("Enter the starting position of substring: ");

scanf("%d", &pos);

show(str,pos);

return 0;

}

int show(char a[],int p)

{

char sub[100];

int i=0,l;

l=strlen(a);

while (i<l)

{

sub[i]=a[p+i-1];

i++;

}

sub[i]='\0';

printf("substring is : %s",sub);

}

Output

Input a string: he is agood boy

Enter the starting position of substring: 2

substring is : e is agood boy

• to read a string and prints if it is a palindrome or not.

Program:-

#include<stdio.h>

#include<string.h>

int pal(char[]);

int main()

{

char str[20];

char c;

printf("Enter a string: ");

scanf("%s", str);

c=pal(str);

if (c==1)

{

printf("%s is not a palindrome", str);

}

else

{

printf("%s is a palindrome", str);

}

}

int pal(char s[])

{

int i, len,c;

c= 0;

len = strlen(s);

for(i=0;i < len ;i++)

{

if(s[i] != s[len-i-1])

{

c=1;

break;

}

}

return c;

}

Output

Enter a string: guug

guug is a palindrome