GOVERNMENT MCA COLLEGE MANINAGAR

Problem Solving Using C (619401)

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Name:	Harsh Prajapati	Enrollment No:		
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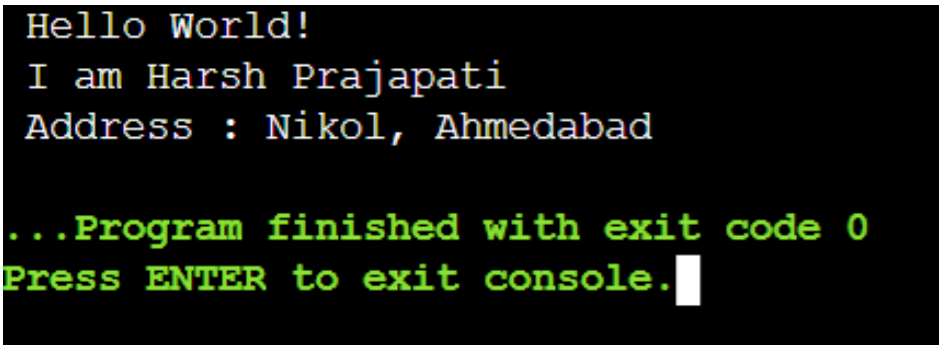
…. Extra Programs ….				

Program 1 : Print Hello World, Name and Address.

Input :

```
// Print Hello World,Name and Name

#include<stdio.h>
#include<conio.h>

void main()
{
   printf(" Hello World!");
   printf("\n I am Harsh Prajapati");
   printf("\n Address : Nikol, Ahmedabad");

   getch();

}
```

Output :

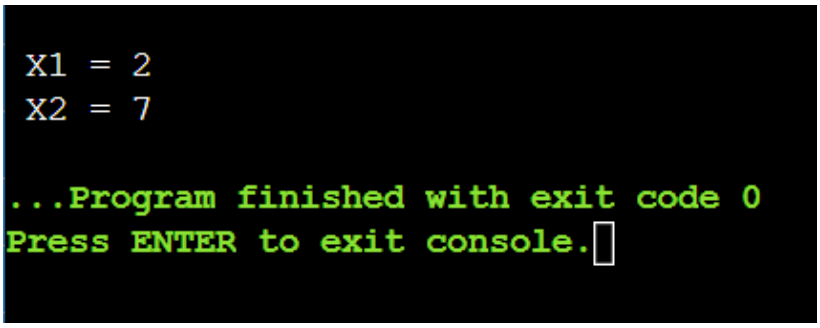


Program 2 : X1 = 2, X2 = 7 Print both values.

Input :

```
// Print Values

#include<stdio.h>
#include<conio.h>

void main()
{
   int x1 = 2, x2 = 7;

   printf("\n X1 = %d",x1);
   printf("\n X2 = %d",x2);

   getch();

}
```

Output :



Program 3 : Write a program to take 5 integer and find and print the total and average of the 5 numbers, repeat the same for floating point numbers instead of integers.

Input :

```
//Print Sum and Average of Numbers

#include <stdio.h>
#include <conio.h>

int main()
{
      //For Integer Sum and Average
         int a=10,b=20,c=30,d=40,e=50;
         printf("\n Given Five Numbers : %d %d %d %d %d",a,b,c,d,e);
         int sum=a+b+c+d+e;
         printf("\n\n Sum of Integer Value : %d",sum);
         int avg=sum/5;
         printf("\n Average of Integer Value : %d \n",avg);

         printf("\n------------------------------------------------------------------\n");

      //For Float Sum and Integer
         float f=1.5,g=2.5,h=3.5,i=4.5,j=5.5,sumf,avgf;
         printf("\n Given Five Numbers : %f %f %f %f %f",f,g,h,i,j);
         sumf= f+g+h+i+j;
         printf("\n\n Sum of Float Value : %.2f \n",sumf);
         avgf=sumf/5;
         printf(" Average of Float Value : %.2f",avgf);

         return 0;
}
```

Output :

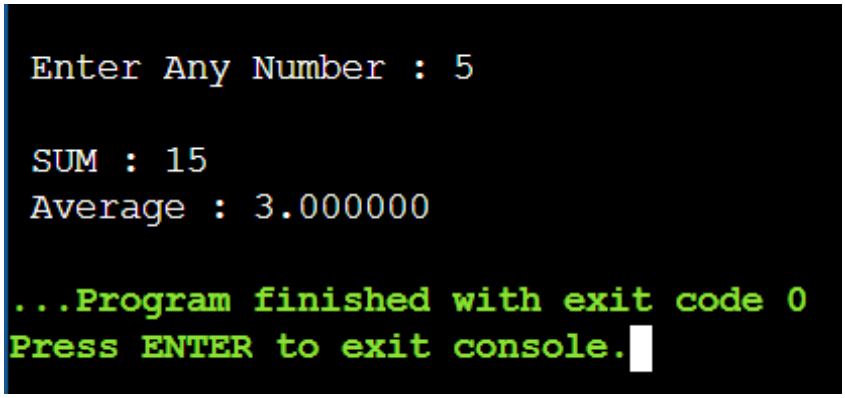
```
Given Five Numbers : 10 20 30 40 50

Sum of Integer Value : 150
Average of Integer Value : 30

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

Given Five Numbers : 1.500000 2.500000 3.500000 4.500000 5.500000

Sum of Float Value : 17.50
Average of Float Value : 3.50
```

Program 4 : Write a program to find the sum of 1, 2, 3, …, n. Print average also.

Input :

```
// Print Sum and Average of N Number

#include <stdio.h>

int main()
{
	int n,i,sum=0;
	float avg;

	printf("\nEnter Any Number : ");
	scanf("%d",&n);
	for(i=1;i<=n;i++)
	{
	   sum=sum+i;
	}
	avg = sum/n;
	printf("\nSUM : %d\n",sum);
	printf("Average : %f",avg);

	return 0;
}
```

Output :



Program 5: Write a program to accept n. Find sum of n values accepted one-by-one Also find average. Print sum, average additionally, print the input values also.

Input :

```
//Print Sum and Average
#include <stdio.h>
#include<conio.h>
void main()
{
   int i,n;
   float u,total=0,ave;

   printf(" Enter Size of Value : ");
   scanf("%d",&n);
   printf("------------------------");
   for(i=1;i<=n;i++)
   {
      printf("\n\n Enter Value : ");
      scanf("%f",&u);
      total += u;
      ave = total/i;
      printf("\n Total : %f",total);
      printf("\n Average : %f",ave);
   }
}
```

Output :

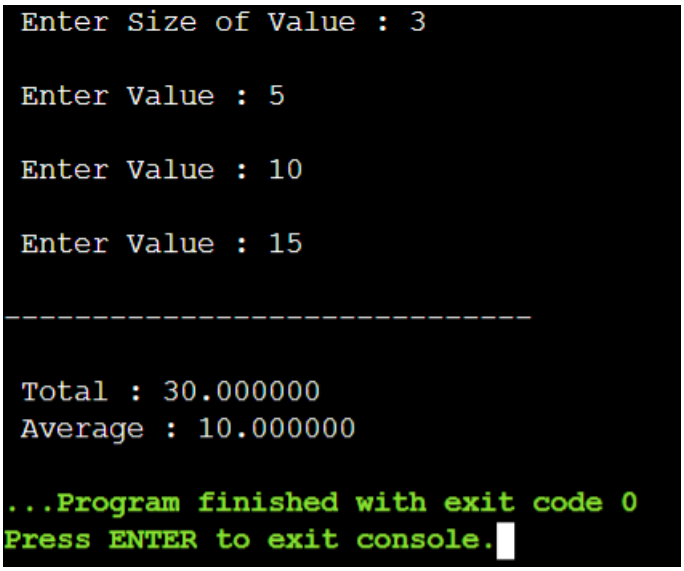
```
Enter Size of Value : 3
------------------------

Enter Value : 10

Total : 10.000000
Average : 10.000000

Enter Value : 20

Total : 30.000000
Average : 15.000000

Enter Value : 30

Total : 60.000000
Average : 20.000000
```

Program 6: Write a program to accept n and n input values to be stored in an array. Find sum and average of n values. Print input values followed by sum, average.

Input :

```
//Find Sum and Average Using Array

#include <stdio.h>
#include<conio.h>

   void main()
   {
      int i,n;
      float ar[100],total=0;
      float ave;
      printf(" Enter Size of Value : ");
      scanf("%d",&n);
      for(i=0;i<n;i++){
      printf("\n Enter Value : ");
      scanf("%f",&ar[i]);

      total += ar[i];
      ave = total/n;
   }
   printf("\n-----------------------------\n");
   printf("\n Total : %f",total);
   printf("\n Average : %f",ave);
}
```

Output :

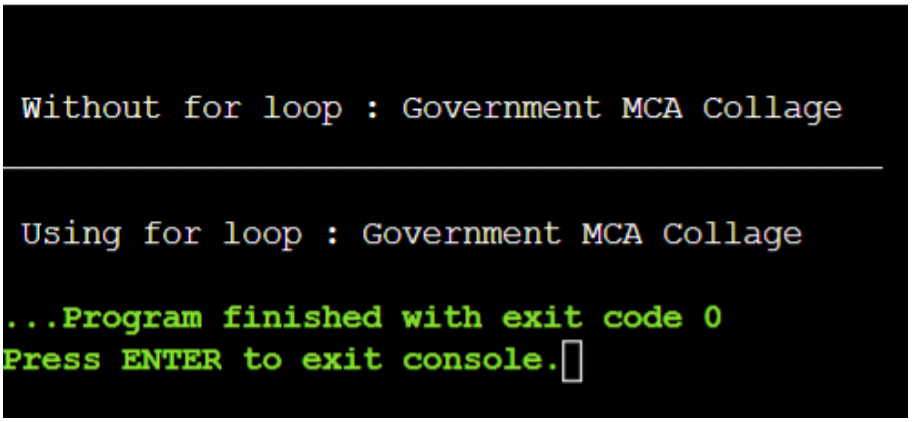


Program 7: Write a program to declare string and print "Government MCA College"

Input :

```
//Declare String Value and print.

#include <stdio.h>
#include <string.h>

void main()
{
        char ch[] = "Government MCA Collage";
        printf("\n\n Without for loop : %s",ch);

        printf("\n_____\n");

        int i;
        printf("\n Using for loop : ");
        for(i=0;i<=strlen(ch);i++)
        {
                printf("%c",ch[i]);
         }
}
```

Output :



Program 8: Write a program to accept as input first name, middle name and surname then print name, first as

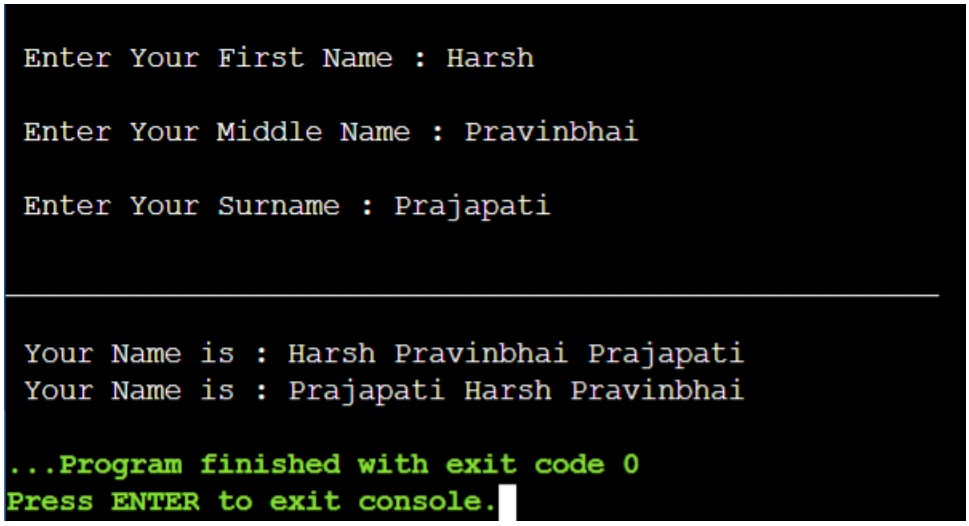
(a) FirstName MiddleName SurName.

(b) SurName FirstName MiddleName

Input :

```
//Print FirstName MiddleName LastName

#include <stdio.h>
#include <conio.h>

void main()
{
   char fn[100],mn[100],srn[100];
   printf("\n\n Enter Your First Name : ");
   scanf("%s",&fn);
   printf("\n Enter Your Middle Name : ");
   scanf("%s",&mn);
   printf("\n Enter Your Surname : ");
   scanf("%s",&srn);
   printf("\n_____\n");
   printf("\n Your Name is : %s %s %s",fn,mn,srn);
   printf("\n Your Name is : %s %s %s",srn,fn,mn);

   getch();
}
```

Output :



Program 9: Write a program to find a string length. Is this string length same as no of characters in the string?

Input :

```
//Find String Length and Print

#include <stdio.h>
#include <conio.h>

void main()
{
   char str[] = "Government MCA College";

   int count=0;

   //Using String Function

   int a = strlen(str);
   printf("\n\n %s",str);
   printf("\n_____\n");
   printf("\n String Length is Using Fuction : %d",a);

   //Our Method

   for(int i = 0;str[i] != NULL;i++)
   {
      count++;
   }
   printf("\n String Length Using Own Method : %d",count);
}
```

Output :

```
Government MCA College

_____

String Length is Using Fuction : 22
String Length Using Own Method : 22

...Program finished with exit code 0
Press ENTER to exit console.
```

Program 10: Write a program to find string length by using function for finding string length.

Test this program to find lengths of first, mid, and surname.

Input :

```
//Print Length Of Your Name

#include <conio.h>

void main()
{
   char fn[100],mn[100],srn[100];
   printf(" Enter Your First Name : ");
   scanf("%s",&fn);
   printf("\n Enter Your Middle Name : ");
   scanf("%s",&mn);
   printf("\n Enter Your Surname : ");
   scanf("%s",&srn);
   printf("\n Your Name is : %s %s %s",fn,mn,srn);
   printf("\n\n Length Of First Name : %d",strlen(fn));
   printf("\n Length Of Middle Name : %d",strlen(mn));
   printf("\n Length Of Surname Name : %d",strlen(srn));
   int total;
   total = strlen(fn)+strlen(mn)+strlen(srn);
   printf("\n_____\n");
   printf("\n Total Length is : %d",total);
   getch();
}
```

Output :

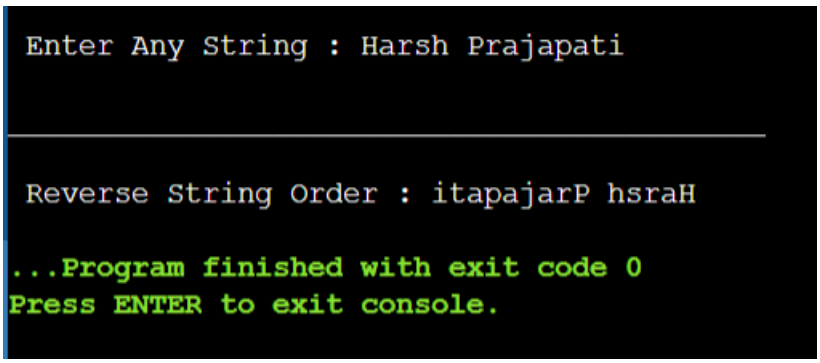
```
Enter Your First Name : Harsh

Enter Your Middle Name : Pravinbhai

Enter Your Surname : Prajapati

Your Name is : Harsh Pravinbhai Prajapati

Length Of First Name : 5
Length Of Middle Name : 10
Length Of Surname Name : 9
_____

Total Length is : 24
```

Program 11 : Write a program to print a string in a reverse order.

Input :

```
//Print String In Reverse Order

#include <stdio.h>
#include <string.h>

void main()
{
	char ch[100];
	int i,tmp;

	printf("\n Enter Any String : ");
	gets(ch);
	tmp = strlen(ch);


	printf("\n_____\n");
	printf("\nGiven String In Reverse Order : ");
	for(i=tmp-1;i>=0;i--)
	{
		printf("%c",ch[i]);
	 }
}
```

Output :



Program 12: Write a program to take Input n, and n values of temperature in F, convert these into C and print the values in a table with 1st column containing F and 2nd column C.

Input :

```
// Celsius to Fahrenheit Converter

#include <stdio.h>
#include<conio.h>

void main()
{
   float values[100],a;
   int choose,sizevalue;

   printf("\n Choose F2C or C2F Press 1 or 2 : ");
   scanf("%d",&choose);

   if(choose == 1)
   {
      printf("\n Enter the Number of Value : ");
      scanf("%d",&sizevalue);

      for(int i = 0; i<sizevalue;i++)
      {
         printf("\n Enter Vaule of Fahrenheit : ");
         scanf("%f",&values[i]);
      }
      printf("-----------------------------------------------------");
      printf("\n Fahrenheit value || Celsius Value\n-----------------------------------------------------");
      for(int i = 0; i<values[i];i++)
      {
         a = values[i]-32;
         a = a*5;
         a = a/9;
         printf("\n Fahrenheit value : %f || Celsius is : %f ",values[i],a);
      }
         printf("\n-----------------------------------------------------");
   }
```

```
  if(choose == 2)
  {
     printf("\n Enter the Number of Value : ");
     scanf("%d",&sizevalue);
     for(int i = 0; i<sizevalue;i++)
     {
        printf("\n Enter Vaule of Celsius : ");
        scanf("%f",&values[i]);
     }
     printf("-----------------------------------------------------");
     printf("\n Celsius value || Fahrenheit Value\n-----------------------------------------------------");
     for(int i = 0; i<values[i];i++)
     {
        a = 32*5;
        a = 9*values[i]+a;
        a = a/5;
        printf("\n Celsius value : %f || Fahrenheit is : %f ",values[i],a);
     }
     printf("\n-----------------------------------------------------");
  }
}
```

Output :

```
Choose F2C or C2F Press 1 or 2 : 1

Enter the Number of Value : 3

Enter Vaule of Fahrenheit : 98

Enter Vaule of Fahrenheit : 97

Enter Vaule of Fahrenheit : 99
-----------------------------------------------------
Fahrenheit value || Celsius Value
-----------------------------------------------------
Fahrenheit value : 98.000000 || Celsius is : 36.666668
Fahrenheit value : 97.000000 || Celsius is : 36.111111
Fahrenheit value : 99.000000 || Celsius is : 37.222221
-----------------------------------------------------

...Program finished with exit code 0
Press ENTER to exit console.
```

Program 13: Modify the previous program to convert temperature in C into F. Write a function c2f () for this operation.

```
// celsius to fahrenheit converter
#include <stdio.h>
void main()
{
   float values[100], a;
   int choose, sizevalue;
   printf("\n Choose F2C or C2F Press 1 or 2 : ");
   scanf("%d", &choose);
   c2f(choose);
   void c2f(int check)
   {
      if (check == 1)
      {
         printf("\n Enter the Number of Value : ");
         scanf("%d", &sizevalue);
         for (int i = 0; i < sizevalue; i++)
         {
            printf("\n Enter Vaule of Fahrenheit : ");
            scanf("%f", &values[i]);
         }
         printf("-----------------------------------------------------");
         printf("\n Fahrenheit value           ||  Celsius Value
          \n-----------------------------------------------------");
         for (int i = 0; i < values[i]; i++)
         {
            a = values[i] - 32;
            a = a * 5;
            a = a / 9;
            printf("\n Fahrenheit value : %f ||  Celsius is : %f ", values[i], a);
         }
         printf("\n-----------------------------------------------------");
      }
      if (choose == 2)
      {
         printf("\n Enter the Number of Value : ");
         scanf("%d", &sizevalue);
         for (int i = 0; i < sizevalue; i++)
         {
```

```
            printf("\n Enter Vaule of Celsius : ");
            scanf("%f", &values[i]);
        }
        printf("-----------------------------------------------------");
        printf("\n Celsius value          ||  Fahrenheit Value
         \n-----------------------------------------------------");
        for (int i = 0; i < values[i]; i++)
        {
            a = 32 * 5;
            a = 9 * values[i] + a;
            a = a / 5;
            printf("\n Celsius value : %f ||  Fahrenheit is : %f ", values[i], a);
        }
        printf("\n-----------------------------------------------------");
    }
  }
}
```

Output :

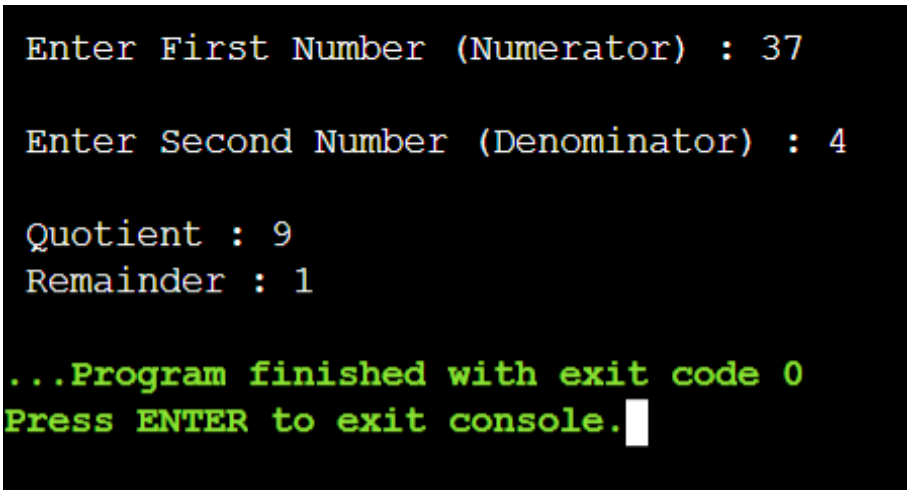
```
Choose F2C or C2F Press 1 or 2 : 2

Enter the Number of Value : 2

Enter Vaule of Celsius : 36

Enter Vaule of Celsius : 94
-----------------------------------------------------
Celsius value            ||  Fahrenheit Value
-----------------------------------------------------
Celsius value : 36.000000 ||  Fahrenheit is : 96.800003
Celsius value : 94.000000 ||  Fahrenheit is : 201.199997
-----------------------------------------------------
```

Program 14: Take two integer values from user as Numerator (num1) and Denominator (num2), Find out Quotient (q) and Remainder (r). Repeat above program for floating point number.

Input :

```
// Quotient And Remainder Finder

#include <stdio.h>

void main()
{
   int n1,n2,q,r;
   printf("\n Enter First Number (Numerator) : ");
   scanf("%d",&n1);
   printf("\n Enter Second Number (Denominator) : ");
   scanf("%d",&n2);

   q = n1/n2;              //Computes Quotient
   r = n1%n2;              //Computes Remainder

   printf("\n Quotient : %d",q);
   printf("\n Remainder : %d",r);
}
```

Output :



Program 15: Input array (a list) of n integers, find and print as a table whether numbers are even or odd.

```
// Check value even or odd using array
#include <stdio.h>
void main()
{
	int a[100],n,i;
	printf("\n How many numbers are you entered : ");
	scanf("%d",&n);
	for(i=1;i<=n;i++)
	{
		printf("\n Enter %d Elements : ",i);
		scanf("%d",&a[i]);
	}
	printf("\n Even Numbers : ");
	for(i=1;i<=n;i++)
	{
		if(a[i]%2==0)
		  {
			printf("\n %d ",a[i]);
		}
	}
	printf("\n\n Odd Numbers : ");
	for(i=1;i<=n;i++)
	{
		 if(a[i]%2==1)
		{
		printf("\n %d ",a[i]);
		}
	}
}
```

```
How many numbers are you entered : 3

Enter 1 Elements : 10

Enter 2 Elements : 13

Enter 3 Elements : 12

Even Numbers :
10
12

Odd Numbers :
13
```

Program 16: Print all primes in the first n (n>1) integers.

Input :

```
//print prime number given range.

#include <stdio.h>
#include <conio.h>

void main(){
   int n,c;
   printf("\n Enter Value : ");
   scanf("%d",&n);
   for (int i = 2; i <= n; i++) {c=0;
      for(int j=1;j<=i;j++)
      {
         if(i%j==0)
         {
            c++;
            //printf("\n First loop : %d : Second loop :  %d : value :   %d",i,j,i%j);
         }
         else{
         //printf("\n First loop : %d : Second loop :  %d : value :   %d",i,j,i%j);
         }
      }
     if(c==2)
      {
         printf("\n Prime No : %d ",i);
      }
      //printf("\n");
   }
}
```

Output :

```
Enter Value : 15

Prime No : 2
Prime No : 3
Prime No : 5
Prime No : 7
Prime No : 11
Prime No : 13

...Program finished with exit code 0
Press ENTER to exit console.
```

Program 17: Given two integers m and n (m,n>= 0), develop an algorithm and write a program in c to find their greatest common divisor (GCD).

Input :

```
//Find GCD

#include <stdio.h>

void main()
{
   int m,n,gcd;

   printf("\n Enter First Number : ");
   scanf("%d",&m);
   printf("\n Enter Second Number : ");
   scanf("%d",&n);

   for(int i=1;i<=m && i<=n;i++)
   {
      if(m%i==0 && n%i==0)
      {
         gcd=i;
      }
   }

   printf("\n-------------------------------\n");
   printf("Greatest Common Divisor Is : %d",gcd);
   printf("\n-------------------------------\n");
}
```

Output :

```
 Enter First Number : 15

 Enter Second Number : 40

--------------------------------
Greatest Common Divisor Is : 5
--------------------------------
```

Program 18: Write a program in c to rearrange the elements in an array so that they appear in reverse order.

Input :

```
#include <stdio.h>

void main()
{
   int a[100],n,i,last,first,tmp;
   printf(" How many Elements are you added ? : ");
   scanf("%d",&n);
   printf("\n Enter No Of Elements :\n");

   for(i=0;i<n;i++)
   {
      scanf("%d",&a[i]);
   }

   printf("\n No Of Elements are     : ");
   for(i=0;i<n;i++)
   {
      printf("%d\t",a[i]);
   }
   printf("\n\n-------------------------------------------------------\n");
   printf("\n Re-arrange Elements are : ");
   for (int i = n-1; i >= 0; i--)
   {
      printf("%d\t", a[i]);
   }
}
```

Output :

```
 How many Elements are you added ? : 5

 Enter No Of Elements :
10
16
8
20
7

 No Of Elements are      : 10   16      8       20      7

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

 Re-arrange Elements are : 7    20      8       16      10
```

Program 24: Write a program to evaluate sin(x).

Input :

```
#include <stdio.h>
#include<math.h>

void main()
{
   int n,i,sign=-1,fact=1;
   float x,ans;

   printf("\n Enter a value of Degree : ");
   scanf("%f",&x);

   printf(" Enter a value of N : ");
   scanf("%d",&n);

   x = x * 3.14 / 180;
   ans = x;
   printf("\n Degree Convert Into Radian : %.4f",ans);

   for(i=3;i<=n;i+=2)
   {
      fact = fact * i * (i-1);
      ans = ans + sign * (pow(x,i) / fact);
      sign = sign * -1;
   }

   printf("\n\n Value Of Sin(%.4f) : %.4f",x,ans);
}
```

Output :

```
Enter a value of Degree : 40
Enter a value of N : 5

Degree Convert Into Radian : 0.6978

Value Of Sin(0.6978) : 0.6425

...Program finished with exit code 0
Press ENTER to exit console.
```

Program 25: Write a program to determine & display the maximum height reached when the ball is thrown at 5 miles/hour at an angle of 60 degree. (Hint:Make sure to convert the initial velocity into the correct units.)

Input :

```
#include <stdio.h>
#include <math.h>

void main()
{
   float v,x,h,ans,feet,v2,sin2;

   printf("\n Enter a Value of Velocity (Speed of Ball (MPH)) : ");
   scanf("%f",&v);
   printf(" Enter a Value of Degree (Angle of Ball (Degree)) : ");
   scanf("%f",&x);

   v = (v * 5280) / 3600;  // covert Feet
   feet = v;
   x = x * 3.14 / 180;  // convert Degree

   printf("\n ------------------------------------\n");
   printf("\n Degree into radian : %.4f",x);
   printf("\n Converted into Feet/Sec : %.4f",feet);

   v2 = feet * feet;
   sin2 = sin(x) * sin(x);

   h = (0.5 * v2 * sin2) / 32.2;

   printf("\n Height of the ball : %.4f",h);

}
```

Output :

```
Enter a Value of Velocity (Speed of Ball (MPH)) : 5
Enter a Value of Degree (Angle of Ball (Degree)) : 60

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

Degree into radian : 1.0467
Converted into Feet/Sec : 7.3333
Height of the ball : 0.6259
```

```
Enter a Value of Velocity (Speed of Ball (MPH)) : 8
Enter a Value of Degree (Angle of Ball (Degree)) : 50

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

Degree into radian : 0.8722
Converted into Feet/Sec : 11.7333
Height of the ball : 1.2536
```

Program 26: Write a program to calculate & print height of the ladder. Where ladder is kept at angle θ with the horizontal base and length of the ladder l. (A)L=20,θ=85° (B)L=25,θ=75°.

Input :

```
// find length of ladder
#include <stdio.h>
#include <math.h>

void main()
{
   int l;
   float x,h;
   printf("\n Enter a length of the ladder : ");
   scanf("%d",&l);
   printf(" Enter a value in Degree : ");
   scanf("%f",&x);

   x = x * 3.14 / 180;

   printf("\n ------------------------------");
   printf("\n Converted into radian : %.4f",x);

   h = l * sin(x);

   printf("\n ------------------------------");
   printf("\n Height of the ladder : %.4f",h);
}
```

Output :

```
Enter a length of the ladder : 20
Enter a value in Degree : 85

------------------------------
Converted into radian : 1.4828
------------------------------
Height of the ladder : 19.9226
```

```
Enter a length of the ladder : 25
Enter a value in Degree : 75

------------------------------
Converted into radian : 1.3083
------------------------------
Height of the ladder : 24.1438
```

```
Enter a length of the ladder : 30
Enter a value in Degree : 60

------------------------------
Converted into radian : 1.0467
------------------------------
Height of the ladder : 25.9728
```

```
Enter a length of the ladder : 15
Enter a value in Degree : 65

------------------------------
Converted into radian : 1.1339
------------------------------
Height of the ladder : 13.5910
```

Program 27: Write a program that calculates x & y co-ordinates of the point whose polar co-ordinates are (A)r=10,θ=30° (B)r=12.5,θ=67.8°.

Input :

```
#include <stdio.h>
#include <math.h>

void main()
{
   float r,a,x,y;

   printf("\n Enter a value of radius : ");
   scanf("%f",&r);

   printf(" Enter a value in Degree : ");
   scanf("%f",&a);

   a = a * 3.14 / 180;

   printf("\n----------------------------\n");

   printf("\n Converted into radian : %.4f",a);

   x = r * cos(a);
   y = r * sin(a);

   printf("\n Coordinates Of X Is : %.4f",x);
   printf("\n Coordinates Of Y Is : %.4f",y);
}
```

Output :

```
Enter a value of radius : 10
Enter a value in Degree : 30

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

Converted into radian : 0.5233
Coordinates Of X Is : 8.6616
Coordinates Of Y Is : 4.9977

...Program finished with exit code 0
Press ENTER to exit console.
```

```
Enter a value of radius : 12.5
Enter a value in Degree : 67.8

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

Converted into radian : 1.1827
Coordinates Of X Is : 4.7300
Coordinates Of Y Is : 11.5705

...Program finished with exit code 0
Press ENTER to exit console.
```

Program 30: Write a program in c to find factorial of n. (n!)

```
#include <stdio.h>
int Factorial(int);
void main()
{
   int n,i,fact=1,recur_fact;
   printf("\n Enter The Value Of N : ");
   scanf("%d",&n);

   for(i=1;i<=n;i++)
   {
      fact = fact*i;
   }

   printf("\n---------------------------------\n");
   printf("\n Factorial Using Iterative Method\n");
   printf("\n Factorial Number Is : %d",fact);
   printf("\n---------------------------------\n");
   printf("\n Factorial Using Recursive Method\n");

   recur_fact = Factorial(n);
   printf("\n Factorial Number Is : %d",recur_fact);
}

int Factorial(int n)
{
   if(n==0)
   {
      return 1;
   }
   else
   {
      return n*Factorial(n-1);
   }
}
```

```
Enter The Value Of N : 5

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

Factorial Using Iterative Method

Factorial Number Is : 120
---------------------------------

Factorial Using Recursive Method

Factorial Number Is : 120
```

Program 31: Write a program in c to find first n terms of the Fibonacci sequence using an iterative algorithm.

```
#include <stdio.h>
int Fibo(int);
void main()
{
   int n,n1,n2,i,sum;
   printf("\n Enter Any Number : ");
   scanf("%d",&n);
   printf("----------------------\n");
   n1=0;
   n2=1;
   sum=0;
   printf("\n Fibonacci Series Is Using Iterative Algorithm :  %d   %d ",n1,n2);

   for(i=2;i<=n;i++)
   {
      sum=n1+n2;
      printf("  %d ",sum);
      n1=n2;
      n2=sum;
   }

   printf("\n\n-----------------------------------------------------------------------------------------\n");
   printf("\n Fibonacci Series Is Using Recursive Algorithm : ");
   for(i=0;i<=n;i++)
   {
      printf(" %d  ",Fibo(i));
   }
}

int Fibo(int n)
{
   if(n<=1)
      return n;
   else
      return Fibo(n-1) + Fibo(n-2);
}
```

```
Enter Any Number : 8
----------------------

Fibonacci Series Is Using Iterative Algorithm :  0   1   1   2   3   5   8   13   21

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

Fibonacci Series Is Using Recursive Algorithm :  0   1   1   2   3   5   8   13   21
```

Program 32: Write a C program to exchange values of two variable.

```
#include<stdio.h>
int main()
{
	int a,b,x;
	printf("Enter 1st Number : ");
	scanf("%d",&a);
	printf("Enter 2nd Number : ");
	scanf("%d",&b);
	printf("\n1 : Using + And - Operator ");
	printf("\n2 : Using * And / Operator ");
	printf("\n3 : Using XOR Gate ");
	printf("\n------------------------");
	printf("\nEnter Your Choice : ");
	scanf("%d",&x);
	switch(x)
	{
		case 1:
			a=a+b;		b=a-b;		a=a-b;
			printf("\n1st Number : %d",a);
			printf("\n2nd Number : %d",b);
			break;
		case 2:
			a=a*b;		b=a/b;		a=a/b;
			printf("\n1st Number : %d",a);
			printf("\n2nd Number : %d",b);
			break;
		case 3:
			a=a^b;		b=a^b;		a=a^b;
			printf("\n1st Number : %d",a);
			printf("\n2nd Number : %d",b);
			break;
		default:
			printf("Enter Valid Value");
	}
	return 0;
}
```

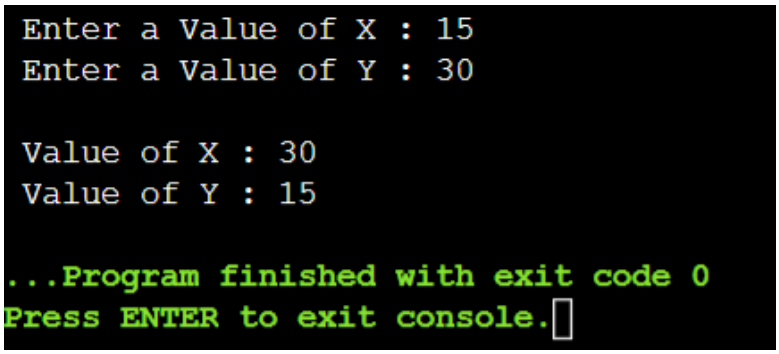
```
Enter 1st Number : 10
Enter 2nd Number : 20

1 : Using + And - Operator
2 : Using * And / Operator
3 : Using XOR Gate
------------------------
Enter Your Choice : 1

1st Number : 20
2nd Number : 10
```

Program 33: Implement the program in C for "exchanging the values of two variable" using function (which will require use of pointers for function arguments in c).

Input :

```
#include <stdio.h>

int swap(int *a,int *b);

void main()
{
   int x,y;

   printf("\n Enter a Value of X : ");
   scanf("%d",&x);
   printf(" Enter a Value of Y : ");
   scanf("%d",&y);

   swap(&x,&y);

   printf("\n Value of X : %d",x);
   printf("\n Value of Y : %d",y);
}

int swap(int *a,int *b)
{
   *a = *a + *b;
   *b = *a - *b;
   *a = *a - *b;

   return *a,*b;
}
```

Output :

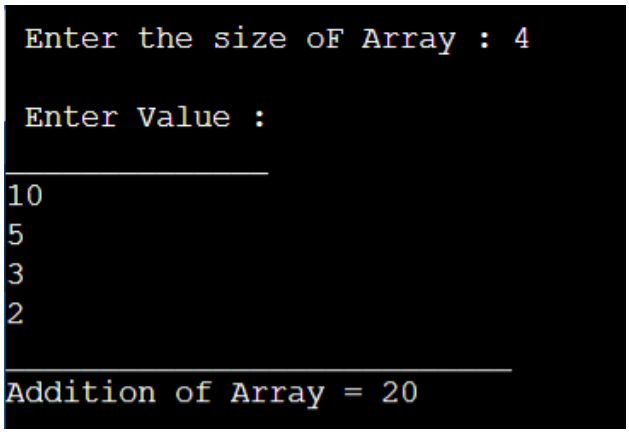


Program 34: Write a C program to find sum of n values a_i,i=1 to n,using pointer instead of arrays.

Input :

```
#include <stdio.h>

void main()
{
   int i, n, sum = 0;
   int *a;
   printf("\n Enter the size oF Array : ");
   scanf("%d", &n);

   printf("\n Enter Value : ");
   printf("\n_____________\n");
   for (i = 0; i < n; i++)
   {
       scanf(" %d", a + i);
   }
   for (i = 0; i < n; i++)
   {
        sum = sum + *(a + i);
   }

   printf("_____________________________");
   printf("\nAddition of Array = %d ", sum);

}
```

Output :



Program 35: Write a C program tocount number of words in a given text by representing text string as pointer.

Input :

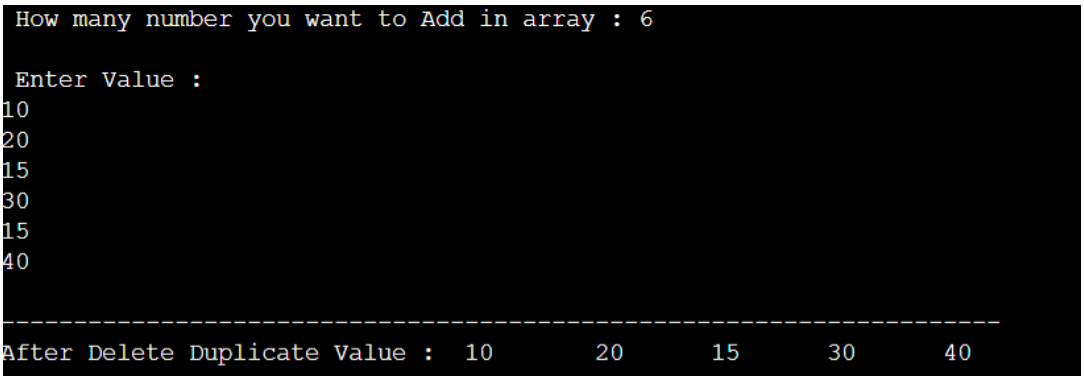
```
#include <stdio.h>
#include <string.h>

 void main()
{
   char*s[200],*c;
   int count = 0, i;
   printf("\nEnter the string: ");
   gets(s);
   c = s;
   while(*c!='\0')
   {
      if (c[i] == ' ' && c[i+1] != ' ')
      i++;
      c++;
   }
   printf("Number of words in given string are: %d\n", i+1);
}
```

Output :

```
Enter the string: Programming Using C
Number of words in given string are: 3
```

Program 36: Write a program to remove all duplicates from an ordered array and contract the array accordingly.

```
#include <stdio.h>
void main()
{
   int arr[100],i,j,k,size;
   printf(" How many number you want to Add in array : ");
   scanf("%d",&size);
   printf("\n Enter Value : \n");
   for(i=0;i<size;i++)
   {
      scanf("%d",&arr[i]);
   }
   for(i=0;i<size;i++)
   {
      for(j=i+1;j<size;j++)
      {
         if(arr[i]==arr[j])
         {
            for(k=j;k<size-1;k++)
            {
               arr[k]=arr[k+1];
            }
            size--;
            j--;
         }
      }
   }
   printf("\n----------------------------------------------------------------------\n");
   printf("After Delete Duplicate Value : ");
   for(i=0;i<size;i++)
   {
      printf(" %d\t",arr[i]);
   }
}
```

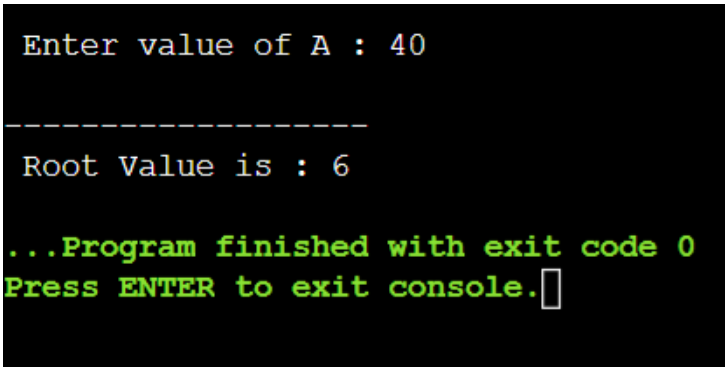


Program 37: Given a number >=20 develop an algorithm & write a program in c to compute square root of a given non-negative number by divide-conquer method.

Input :

```
#include<stdio.h>

void main()
{
   int a;
   printf("\n Enter value of A : ");
   scanf("%d",&a);
   int s=1,l=a,mid=0;
   while(s<l)
   {
      mid=(s+l)/2;
      if((mid*mid)==a)
      {
         break;
      }
      else if((mid*mid)<a)
      {
         s=mid+1;
      }
      else{
         l=mid;
      }
   }

   printf("\n-------------------\n");
   printf(" Root Value is : %d",mid);
}
```

Output :



Program 38: Write a c program using an improved algorithm to compute square root using Newton's method and other methods.

Input :

```
#include <stdio.h>

void main()
{
   float n,x,f=0.0001,root=1,temp=2;
   printf(" Enter the value of n : ");
   scanf("%f",&n);
   x=n;
   while(f<(temp-root))
   {
      root=0.5*(x+(n/x));
      temp=x;
      x=root;
   }

   printf("\n-----------------------------\n");
   printf(" Root of given number : %.4f ",root);
}
```

Output :

```
Enter the value of n : 57

-----------------------------
Root of given number : 7.5498

...Program finished with exit code 0
Press ENTER to exit console.
```

Program 19: Write a program to calculate and display the value of the slope of the line connecting the two points whose coordinates are(3,7) and (8,12). Slope of a line between two points (x1,y1) and (x2,y2) is (y2-y1)/(x2-x1). Run the same program for the line connecting the points (2,10) and (12,6) and other pairs of points.

```
#include<stdio.h>
#include<conio.h>
void main()
{
   int x1, y1, x2, y2;
   float slope;
   printf(" Enter the value for 1st point(X1, Y1) : \n");
   scanf("%d%d", &x1, &y1);
   printf("\n Enter the value of 2nd point(X2, Y2) : \n");
   scanf("%d%d", &x2, &y2);
   slope = ((1.0)* (y2 - y1)) / (x2 - x1);
   printf("----------------------------------------");
   printf("\n\n Slope = %.2f\n", slope);
}
```

```
 Enter the value for 1st point(X1, Y1) :
2
10

 Enter the value of 2nd point(X2, Y2) :
12
6
----------------------------------------

 Slope = -0.40
```

```
 Enter the value for 1st point(X1, Y1) :
3
7

 Enter the value of 2nd point(X2, Y2) :
8
12
----------------------------------------

 Slope = 1.00
```

```
 Enter the value for 1st point(X1, Y1) :
15
12

 Enter the value of 2nd point(X2, Y2) :
18
7
----------------------------------------

 Slope = -1.67
```

Program 20: Write a program to calculate and display the coordinates of the midpoint of the line connecting the two points given in the previous exercise. The co-ordinates of the midpoint between two points having co-ordinates (x1,y1) and (x2,y2) are ((x1+x2)/2 , (y1+y2)/2).

```
#include<stdio.h>
void main()
{
   int x1,x2,y1,y2,midx,midy;
   printf(" Enter X1 value : ");
   scanf("%d",&x1);
   printf(" Enter X2 value : ");
   scanf("%d",&x2);
   printf(" Enter Y1 value : ");
   scanf("%d",&y1);
   printf(" Enter Y2 value : ");
   scanf("%d",&y2);
   midx=(x1+x2)/2;
   midy=(y1+y2)/2;
   printf("----------------------\n");
   printf(" Midpoint of X : %d",midx);
   printf("\n Midpoint of Y : %d",midy);
}
```

```
 Enter X1 value : 5
 Enter X2 value : 15
 Enter Y1 value : 25
 Enter Y2 value : 35
----------------------
 Midpoint of X : 10
 Midpoint of Y : 30

...Program finished with exit code 0
Press ENTER to exit console.
```

```
 Enter X1 value : 10
 Enter X2 value : 20
 Enter Y1 value : 30
 Enter Y2 value : 40
----------------------
 Midpoint of X : 15
 Midpoint of Y : 35

...Program finished with exit code 0
Press ENTER to exit console.
```

Program 21: Write a program that calculates the distance between two points whose coordinates are (7,12) and (3,9). Distance between two points having coordinates (x1, y1) and (y1,y2) = sqrt([x1-x2]2 + [y1-y2]2). Also, run the program for the points (-12, -15) and (22,5) and a few other points.

```
#include <stdio.h>
#include <math.h>
void main()
{
   float x1, y1, x2, y2, distance;
   printf(" X1 : ");
   scanf("%f", &x1);
   printf(" Y1 : ");
   scanf("%f", &y1);
   printf(" X2 : ");
   scanf("%f", &x2);
   printf(" Y2 : ");
   scanf("%f", &y2);
   distance = ((x1-x2)*(x1-x2))+((y1-y2)*(y1-y2));
   printf("\n----------------------------------------\n");
   printf("Distance between the two points : %.4f", sqrt(distance));
   printf("\n");
}
```

```
X1 : 7
Y1 : 12
X2 : 3
Y2 : 9

----------------------------------------
Distance between the two points : 5.0000
```

```
X1 : -12
Y1 : -15
X2 : 22
Y2 : 5

----------------------------------------
Distance between the two points : 39.4462
```

```
X1 : 10
Y1 : 20
X2 : 30
Y2 : 40

----------------------------------------
Distance between the two points : 28.2843
```

Program 22: Given some integer x , develop an algorithm and write a program to compute the value of x^n where n is considerably larger than 1. This algorithm has time complexity O(n).

```
#include<stdio.h>

int power(int x,int y)
{
   if (y == 0)
      return 1;
   else if (y%2 == 0)
      return power(x, y/2)*power(x, y/2);
   else
      return x*power(x, y/2)*power(x, y/2);
}

void main()
{
   int n1,n2;
   printf(" Enter Base Value : ");
   scanf("%d",&n1);
   printf(" Enter Exponent Value : ");
   scanf("%d",&n2);
   printf("------------------------\n");
   printf(" x ^ y is : %d", power(n1, n2));
}
```

```
 Enter Base Value : 3
 Enter Exponent Value : 4
------------------------
 x ^ y is : 81

...Program finished with exit code 0
Press ENTER to exit console.
```

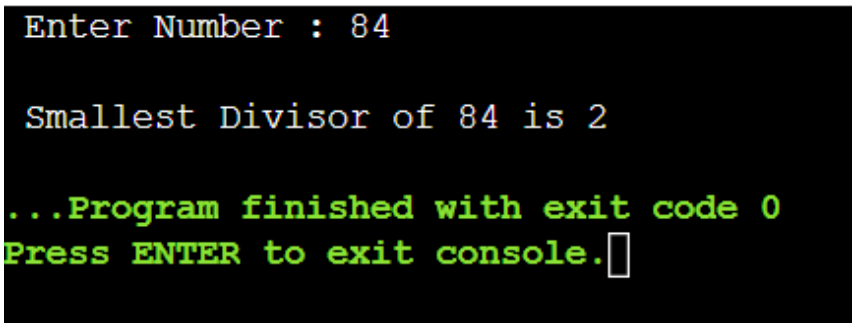
Program 23: Develop an improved algorithm having time complexity O(log2n).

```
#include<stdio.h>

int power(int x,int y)
{
   int temp;
   if( y == 0)
      return 1;
   temp = power(x, y/2);
   if (y%2 == 0)
      return temp*temp;
   else return x*temp*temp;
}

void main()
{
   int n1,n2;
   printf(" Enter Base Value : ");
   scanf("%d",&n1);
   printf(" Enter Exponent Value : ");
   scanf("%d",&n2);
   printf("\n-------------------------\n");
   printf(" x ^ y is : %d", power(n1, n2));
}
```

```
Enter Base Value : 2
Enter Exponent Value : 4

-------------------------
x ^ y is : 16

...Program finished with exit code 0
Press ENTER to exit console.
```

Program 28: Given an integer n>=1 , develop an algorithm and write a program to find the smallest exact divisor of n other than one.

```
#include<stdio.h>
#include<math.h>

void main()
{
   int i,n;
   printf(" Enter Number : ");
   scanf("%d",&n);

   if(n>1)
   {
      for(i=2;i<=sqrt(n);++i)
      {
         if(n%i==0)
         {
            printf("\n Smallest Divisor of %d is %d",n,i);
            break; //if you not break then print all the divisor
         }
      }
   }
   else
   {
   printf("\n smallest divisor of %d = %d",n,n);
   }
}
```



Program 29: Every integer can be expressed as a product prime numbers. Develop an algorithm and write a program to compute all the prime factors of a given integer n>0.

```
#include <stdio.h>
#include <math.h>

int main()
{
   int num,i,j,prim;
   printf(" Enter a number : ");
   scanf("%d",&num);
   printf("\n Prime factors :\n ");
   printf("--------------------\n\n");
   for(i=2;i<=num;i++)
   {
      if(num%i==0)
      {
         prim=1;
         for(j=2;j<i/2;j++)
         {
            if(i%j==0);
            {
               prim=0;
               break;
            }
         }
         if(prim==1)
         {
            printf("%d\t",i);
         }
      }
   }
   return 0;
}
```

```
 Enter a number : 24

 Prime factors :
 --------------------

2       3       4

...Program finished with exit code 0
Press ENTER to exit console.
```

Program 39: write a c program to find maximum and minimum values in a given array of values. Also write the c program using pointers instead of array.

```
#include<stdio.h>
void main()
{
   int array[50], *maximum, *minimum, size, i;
   printf(" Enter The Number Of Elements In Array : ");
   scanf("%d", &size);
   printf("\n Enter Array Elements : \n\n");
   for ( i = 0 ; i < size ; i++ )
   {
      scanf("%d", &array[i]);
   }
   maximum = array;
   minimum = array;

   for (i = 0; i < size; i++)
   {
      if (*(array+i) > *maximum)
      {
         *maximum = *(array+i);
      }
   }
   printf("-------------------------------------");
   printf("\n Maximum element in the array is %d\n", *maximum);

   for (i = 0; i < size; i++)
   {
      if (*(array+i) < *minimum)
      {
         *minimum = *(array+i);
      }
   }
   printf(" Minimum element in the array is %d\n", *minimum);
}
```

```
Enter The Number Of Elements In Array : 5

Enter Array Elements :

10
3
15
7
11
-------------------------------------
Maximum element in the array is 15
Minimum element in the array is 3
```

EXTRA PROGRAM

Program-40. Check whether the given Number is Armstrong Number or not.

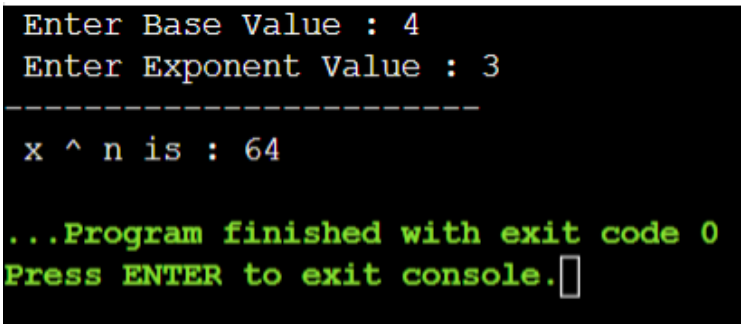
```
#include<stdio.h>
#include<conio.h>

void main()
{
   int n,r,sum=0,temp;
   printf(" Enter Number : ");
   scanf("%d",&n);
   printf("-----------------\n");
   temp=n;
   while(n>0)
   {
      r=n%10;
      sum=sum+(r*r*r);
      n=n/10;
   }
   if(temp==sum)
      printf(" Armstrong Number ");
   else
      printf(" Not Armstrong Number");
}
```

```
 Enter Number : 153
-----------------
 Armstrong Number

...Program finished with exit code 0
Press ENTER to exit console.
```

```
 Enter Number : 175
-----------------
 Not Armstrong Number

...Program finished with exit code 0
Press ENTER to exit console.
```

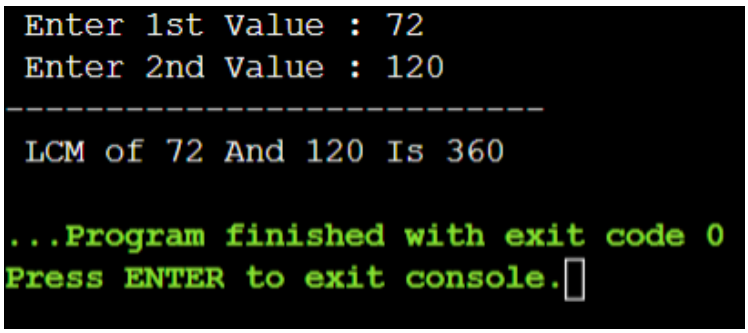
41. Write a program to Calculate power of a number x^n.

```
#include<stdio.h>

void main()
{
   int x,n,i,ans=1;
   printf(" Enter Base Value : ");
   scanf("%d",&x);
   printf(" Enter Exponent Value : ");
   scanf("%d",&n);
   printf("-----------------------\n");
   for(i=1;i<=n;i++)
   {
      ans=ans*x;
   }
   printf(" x ^ n is : %d",ans);
}
```



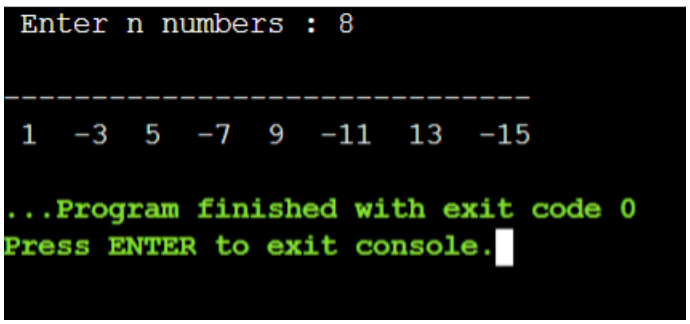
42. Write a program to calculate LCM of two number.

```
#include<stdio.h>

void main()
{
   int n1, n2, i, gcd,lcm;
   printf(" Enter 1st Value : ");
   scanf("%d",&n1);
   printf(" Enter 2nd Value : ");
   scanf("%d",&n2);
   printf("--------------------------\n");
   for(i=1; i <= n1 && i <= n2; ++i)
   {
      if(n1%i==0 && n2%i==0)
      {
         gcd = i;
      }
   }
   lcm=(n1*n2)/gcd;
   printf(" LCM of %d And %d Is %d", n1, n2, lcm);
}
```



43. Write a program to print the series 1 -3 5 -7 9 -11….

```
#include<stdio.h>

void main()
{
   int n,i=1,f=1,c=1;
   printf("Enter n numbers : ");
   scanf("%d",&n);
   printf("\n----------------------------\n");
   for(c=1;c<=n;c++)
   {
      if(f%2==0)
      {
          printf(" %d ",-i);
      }
      else
      {
         printf(" %d ",i);
      }
      i+=2;
      f++;
   }
}
```



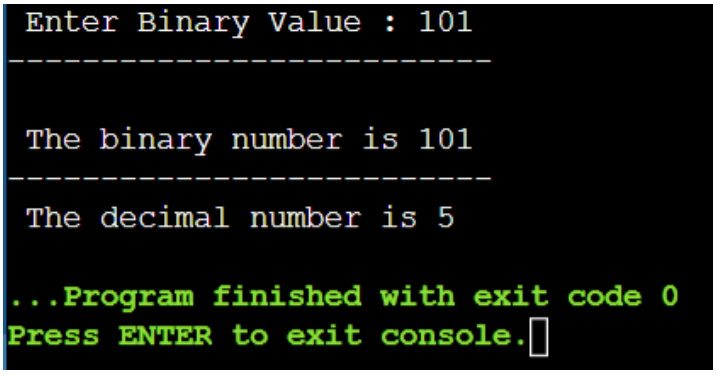
44. Write a program to count number of digits in the given integer number also find sum of all digits.

```
#include <stdio.h>

void main()
{
  int n,sum=0,r;
  int count=0;
  printf(" Enter a number : ");
  scanf("%d",&n);
  while(n!=0)
  {
     r=n%10;
     n=n/10;
     count++;
     sum=sum+r;
  }
  printf("\n-------------------------------------------------");
  printf("\n The number of digits in an integer is : %d",count);
  printf("\n-------------------------------------------------");
  printf("\n Sum:%d",sum);
}
```

```
 Enter a number : 5457

-------------------------------------------------
 The number of digits in an integer is : 4
-------------------------------------------------
 Sum:21

...Program finished with exit code 0
Press ENTER to exit console.
```

45. Write a program to Convert to given integer Binary to Decimal.

```
#include <stdio.h>

void main()
{
   int num, b, d = 0, base = 1, rem;
   printf(" Enter Binary Value : ");
   scanf(" %d", &num);
   printf("-------------------------\n\n");
   b= num;
   while ( num > 0)
   {
      rem = num % 10;
      d = d + rem * base;
      num = num / 10;
      base = base * 2;
   }
   printf ( " The binary number is %d \t", b);
   printf("\n-------------------------");
   printf (" \n The decimal number is %d \t", d);
}
```



46. Write a program to convert given integer Decimal to Binary.

```
#include<stdio.h>

void main()
{
   int a[10],n,i;
   printf(" Enter Decimal Number : ");
   scanf("%d",&n);
   printf("--------------------------------");
   for(i=0; n>0; i++)
   {
      a[i]=n%2;
      n=n/2;
   }
   printf("\n Binary of Given Number is = ");
   for(i=i-1; i>=0; i--)
   {
      printf("%d",a[i]);
   }
}
```