**/* Write C program to compute the straightline distance between two coordinates (x1,y1) and (x2,y2) */**

```
#include<stdio.h>
#include<math.h>
void main()
{
   int x1,y1,x2,y2,side1,side2,distance=0;
   printf("Enter the value of x and y for first coordinate\n");
   scanf("%d%d",&x1,&y1);
   printf("Enter the the value of x and y for second coordinate\n");
   scanf("%d%d",&x2,&y2);
   side1=x1-x2;
   side2=y1-y2;
   distance=sqrt(side1*side1 + side2*side2);          //or distance=sqrt(pow(side1,2) + pow(side2,2));
   printf("Distance is %d",distance);
}
```

**/*Write a C program  convert temperature from Celsius to Fahrenheit and vice versa*/**

```
#include<stdio.h>
void main()
{
float temperature, celsius, fahrenheit;
printf("Enter the Temperature value in celsius\n");
scanf("%f",&celsius);
fahrenheit=(celsius*9/5)+32;
printf("Temperature in fahrenheit is %f\n",fahrenheit);
printf("Enter the Temperature value in fahrenheit\n");
scanf("%f",&fahrenheit);
celsius=(fahrenheit-32)*5/9;
printf("Temperature in celsius is %f",celsius);
}
```

**/* Write a c program to find area, circumference and diameter of a circle using symbolic constants */**

```
#include<stdio.h>
#define PI 3.142
void main()
{
float radius,diameter,area,circumference;
printf("Enter the radius of the circle\n");
scanf("%f",&radius);
area=PI*radius*radius;
diameter = 2*radius;
circumference=2*PI*radius;
printf("Area of circle is %f, Diameter is %f and circumfernce of circle is %f",area,diameter,circumference);
}
```

**/* Program to find whether given number is positive negative or zero */**

```
#include <stdio.h>
void main()
{
   int n;
   printf("Enter the number\n");
   scanf("%d",&n);
   (n>0)? printf("%d is positive\n",n) : ((n<0)? printf("%d is negative\n",n) : printf("The number is zero\n"));
}
```

**/* Program to find biggest of three numbers using ternary operator */**

```
#include <stdio.h>
void main()
{
   int a,b,c;
   printf("Enter three numbers\n");
   scanf("%d%d%d",&a,&b,&c);
   (a>b)? ((a>c)? printf("%d is biggest\n",a) : printf("%d is biggest\n",c)) :
   (b>c)? printf("%d is biggest\n",b) : printf("%d is biggest\n",c);
}
```

**/*program to check whether a character is alphabet, digit, punctuation or white space using simple if */**

```
#include <stdio.h>
#include <ctype.h>
void main()
{
   char ch;
   printf("Enter the character\n");
   scanf("%c",&ch);
   if(isalpha(ch))
    printf("%c is a character",ch);
   if(isdigit(ch))
    printf("%c is a digit",ch);
   if(ispunct(ch))
     printf("%c is punctuation",ch);
   if(isspace(ch))
      printf("The entered character is space",ch);
}
```

**/*program to find roots of a quadratic equation*/**

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

```
#include<math.h>
void main()
{
   float a,b,c,d=0,r1,r2;
   printf("Enter the co-efficients of a quadratic equation\n");
   scanf("%f%f%f",&a,&b,&c);
   if((a==0)||(b==0)||(c==0))
   {
   printf("Enter a quadratic equation\n");
   exit(0);
   }
   d=(b*b-4*a*c);
   printf("%f",d);
   if(d==0)
   {
      printf("Roots are equal");
      r1=-b/(2*a);
      r2=r1;
      printf("root1=%f, root2=%f",r1,r2);
   }
   else if(d>0)
   {
      printf("Roots are real and distinct\n");
      r1=(-b+sqrt(d))/(2*a);
      r2=(-b-sqrt(d))/(2*a);
      printf("Root1=%f, Root2=%f",r1,r2);
   }
   else
   {
       printf("Roots are imaginary\n");
       r1= -b/(2*a);
       r2= sqrt(fabs(d))/(2*a);
       printf("Root1 is %f +i %f   Root2 is %f -i %f",r1,r2,r1,r2);
   }
}
```

**/*program to find grade of a student*/**

```
#include <stdio.h>
#include <stdlib.h>
void main()
{
  float s1,s2,s3,s4,s5,s6,total=0,per=0;
```

```
 printf("Enter the marks of student in six subjects\n");
 scanf("%f%f%f%f%f%f",&s1,&s2,&s3,&s4,&s5,&s6);
 if((s1<40)||(s2<40)||(s3<40)||(s4<40)||(s5<40)||(s6<40))
 {
    printf("Fail\n");
    exit(0);
 }
 total=s1+s2+s3+s4+s5+s6;
 per=total/6;
 if(per>=90)
printf("S grade\n");
 else if(per>=75)
printf("A grade\n");
 else if(per>=60)
printf("B grade\n");
 else if(per>=50)
printf("C grade\n");
 else if(per>=40)
printf("D grade\n");
 else
printf("Fail");
 }
```

**/*C program to check whether a given year is leap year or not using if-else statement*/**

```
#include <stdio.h>
int main() {
  int year;
  printf("Enter a year: ");
  scanf("%d", &year);

  // leap year if perfectly visible by 400
  if (year % 400 == 0) {
    printf("%d is a leap year.", year);
  }
  // not a leap year if visible by 100
  // but not divisible by 400
  else if (year % 100 == 0) {
    printf("%d is not a leap year.", year);
  }
  // leap year if not divisible by 100
  // but divisible by 4
```

```
  else if (year % 4 == 0) {
    printf("%d is a leap year.", year);
  }
  // all other years are not leap year
  else {
    printf("%d is not a leap year.", year);
  }

  return 0;
}
```

```
/*C Program to check whether the triangle is Isosceles, Equilateral or Scalene using if-else statement.*/

#include<stdio.h>

int main()
{
        int side1, side2, side3;

        printf("\n Please Enter Three Sides of a Triangle : ");
        scanf("%d%d%d", &side1, &side2, &side3);

        if(side1 == side2 && side2 == side3)
        {
                printf("\n This is an Equilateral Triangle");
        }
        else if(side1 == side2 || side2 == side3 || side1 == side3)
        {
                printf("\n This is an Isosceles Triangle");
        }
        else
        {
                printf("\n This is a Scalene Triangle");
        }
        return 0;
 }
```

1. **/*Write and execute a C program to perform a desired arithmetic operation using switch statement .Declare choice as char data type and check whether the divisor is zero, if divisor is zero print "Divide by Zero error". */**

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

```
int main()
{
	float a,b,res;
	char ch;
	printf("enter choice");
	scanf("%c",&ch);
	printf("enter two values \n");
	scanf("%f%f",&a,&b);
	    switch(ch)
	{
	 case '+':
	        res=a+b;
	      break;

	 case '-':
	 {
	      res=a-b;
	      break;
	 }
	 case '*':
	 {
	      res=a*b;
	      break;
	 }
	 case '/':
	 {
	      if(b!=0)
	      {
	            res=a/b;
	            break;
	      }
```

```
        else
        {
            printf("denomintor is 0");
        }
        break;
    }
    default:
    {
    printf("entered choice not found");
    }
   }
   printf("resultant is %f",res);
}
```

-

2. **/*Write and execute a C program to read numbers using keyboard and find the area of triangle ,square, circle and rectangle using switch statement and display the result. */**

```
#include<stdio.h>
#define PI 3.147
void main()
{
        float radius, length, breadth;
        float base, height, area;
        int choice;
          printf("Enter\n1. To find area of triangle\n2. To find area of Square\n
                    3. To find area of circle\n4. To find area of rectangle\n");
        scanf("%d",&choice);
        switch(choice)
        {
                case 1:
                        printf("Enter base and height of a triangle\n");
                        scanf("%f %f", &base, &height);
                        area = (1.0/2) * base * height;
                        printf("Area of Triangle:\t%f\n", area);
                        break;

                case 2:
                        printf("Enter length of a Square\n");
                        scanf("%f", &length);
                        area = length * length;
                        printf("Area of Square:\t%f\n", area);
                        break;

                case 3:
                        printf("Enter the radius of a Circle\n");
                        scanf("%f", &radius);
                        area = PI * radius * radius;
                        printf("Area of Circle:\t%f\n", area);
                        break;

                case 4:
                        printf("Enter the length and breadth of a Rectangle\n");
                        scanf("%f %f", &length, &breadth);
                        area = length * breadth;
                        printf("Area of Rectangle:\t%f\n", area);
                        break;

                default:
                        printf("Invalid Choice\n");
        }
}
```

3. **/* Write and execute a C program to print branch name for appropriate section name using switch statement. Declare choice as char data type and print the result*/**

```
#include<stdio.h>
main()
{
        char choice,a,b,A,B;
          printf("Enter your section name to find the branch \n");
        scanf("%c",&choice);
        switch(choice)
        {

          case 'a': case 'A':case 'b': case 'B':
    printf("\nComputer Science Engineering ");
    break;

    case 'c': case 'C':case 'd': case 'D':
    printf("\nElectronics and Communication Engineering");
    break;

    case 'e': case 'E':
    printf("\nElectronics and Instrumentation Engineering");
    break;

    case 'f': case 'F':
    printf("\nChemical Engineering ");
    break;

    case 'g': case 'G':
    printf("\nMedical Electronics ");
    break;

    case 'h': case 'H':case 'i': case 'I':
    printf("\nInformation Science and Engineering");
    break;

    case 'j': case 'J':case 'k': case 'K':case 'l': case 'L':
    printf("\nMechanical Engineering");
    break;

    case 'm': case 'M':
    printf("\nIndustrial and Engineering Management ");
    break;

    case 'n': case 'N':
    printf("\nElectronics & Telecommunication Engineering ");
    break;

    case 'r': case 'R':
    printf("\nBiotechnology Engineering ");
    break;
```

```
        case 'o': case 'O':case 'p': case 'P':
        printf("\nCivil Engineering  ");
        break;

        case 'q': case 'Q':
        printf("\nElectrical and Electronics Engineering ");
        break;

            default:
                    printf("Invalid Choice\n");
            }
}
```

4. **/*Write and execute a C program to read a number using keyboard and print the Roman representation for a given range of numbers 1 to 5 using switch statement*/**

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

```
#include<stdlib.h>
 int main()
 {
    int num, rem;
    printf("Enter a number: ");
    scanf("%d", &num);
    printf("Roman numerals: ");
    switch(num)
    {
      case 1: printf("I");
            break;
      case 2: printf("II");
            break;
      case 3: printf("III");
            break;
      case 4: printf("IV");
            break;
      case 5: printf("V");
            break;
      default: printf("Wrong choice!");
            exit(0);
    }
    return 0;
    }
```

/* C program to read a number using keyboard, find the factorial of a number using for loop and display the result*/

```
#include <stdio.h>
void main()
{
int i,f=1,num;
printf("Input the number : ");
scanf("%d",&num);
for(i=1;i<=num;i++)
 f=f*i;
printf("The Factorial of %d is: %d\n",num,f);
}
```

/* C  program to find the sum of odd numbers and even numbers in first n natural numbers using a for loop.*/

```
#include <stdio.h>
 void main()
{
   int i, num, odd_sum = 0, even_sum = 0;
   printf("Enter the value of num\n");
```

```
   scanf("%d", &num);
   for (i = 1; i <= num; i++)
   {
      if (i % 2 == 0)
         even_sum = even_sum + i;
      else
         odd_sum = odd_sum + i;
   }
   printf("Sum of all odd numbers  = %d\n", odd_sum);
   printf("Sum of all even numbers = %d\n", even_sum);
}
```

/*C program to check whether a given number is palindrome or not using a while loop*/

```
#include <stdio.h>
int main() {
   int n, reversedN = 0, remainder, originalN;
   printf("Enter an integer: ");
   scanf("%d", &n);
   originalN = n;

   // reversed integer is stored in reversedN
   while (n != 0) {
      remainder = n % 10;
      reversedN = reversedN * 10 + remainder;
      n /= 10;
   }

   // palindrome if orignalN and reversedN are equal
   if (originalN == reversedN)
      printf("%d is a palindrome.", originalN);
   else
      printf("%d is not a palindrome.", originalN);

   return 0;
}
```

/*C program to find GCD and LCM of two numbers using a do-while loop*/

```
#include <stdio.h>
 void main()
{
   int num1, num2, gcd, lcm, remainder, numerator, denominator;
```

```
   printf("Enter two numbers\n");
   scanf("%d %d", &num1, &num2);
   if (num1 > num2)
   {
      numerator = num1;
      denominator = num2;
   }
   else
   {
      numerator = num2;
      denominator = num1;
   }
   remainder = numerator % denominator;
   while (remainder != 0)
   {
      numerator   = denominator;
      denominator = remainder;
      remainder   = numerator % denominator;
   }
   gcd = denominator;
   lcm = num1 * num2 / gcd;
   printf("GCD of %d and %d = %d\n", num1, num2, gcd);
   printf("LCM of %d and %d = %d\n", num1, num2, lcm);
}
```

/* C program to find the prime numbers within a given range using for loop and print the prime numbers within a given range*/

```
#include <stdio.h>
int main()
{
int a, b, i, flag;
printf(“\nEnter start value : “);
scanf(“%d”,&a);
printf(“\nEnter end value : “);
scanf(“%d”,&b);
printf(“\nPrime Numbers between %d and %d : “, a, b);
while (a < b)
{
        flag = 0;
        for(i = 2; i <= a/2; ++i)
        {
                if(a % i == 0)
```

```
                {
                        flag = 1;
                        break;
                }
        }
        if (flag == 0)
        printf("%d ", a);
        ++a;
}
printf("\n");
return 0;
}
```

**/*Program to read 'n' positive numbers using keyboard, calculate its average and display the result using break and continue*/**

```
#include<stdio.h>
void main()
{
   int i,count=0;
   float x,sum=0,avg;
   printf("Enter values one after another\n");
   printf("Enter a negative number to end\n");
   for(i=1;i<=1000;i++)
   {
    scanf("%f",&x);
    if(x==0)
      continue;
    if(x<0)
     break;
    sum=sum+x;
    count++;
   }
     avg=sum/count;
  printf(" sum is %f, Average is %f",sum,avg);
}
```

**/*Program to read five numbers from the keyboard,display the square root of each number using goto statement*/**

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

```
void main()
{
   int x,y,count=1;
   printf("Enter five positive numbers\n");
   read:
    printf("Enter the number\n");
    scanf("%d",&x);
    printf("\n");
    if(x<0)
    {
    printf("value %d is negative\n",x);
    goto read;
    }
    else
    {
       y=sqrt(x);
       printf("Square root of %d is %d\n",x,y);
    }
    count++;
    if(count<=5)
      goto read;
    printf("End of computation\n");
}
```

**/*program to find sum of  elements of array */**

```
#include<stdio.h>
void main()
{
int a[10],i,n,sum=0;
printf("Enter the no. of elements in an array\n");
scanf("%d",&n);
printf("Enter elements of the array\n");
for(i=0;i<n;i++)
scanf("%d",&a[i]);
for(i=0;i<n;i++)
sum=sum+a[i];
printf("The elements of array are\n");
for(i=0;i<n;i++)
printf("%d\t",a[i]);
printf("Sum is %d",sum);
}
```

**/* program to print fibonacci series using arrays*/**

```
#include<stdio.h>
void main()
{
int fib[10],i,n;
printf("Enter the no.till which u want to print fibonacci series\n");
scanf("%d",&n);
fib[0]=0;
fib[1]=1;
for(i=2;i<n;i++)
fib[i]=fib[i-1]+fib[i-2];
printf("The first %d fibonacci elements are\n",n);
for(i=0;i<n;i++)
printf("%d\t",fib[i]);
}
```

**/*Write and execute a C program to read numbers using keyboard, find the mean, variance and standard deviation of the numbers in an array */**

```
#include <stdio.h>
#include <math.h>
void main()
{
   float x[10];
   int  i, n;
   float mean, variance, std_deviation, sum = 0, sum_variance = 0;

   printf("Enter the value of N \n");
   scanf("%d", &n);
   printf("Enter %d real numbers \n", n);
   for (i = 0; i < n; i++)
   {
      scanf("%f", &x[i]);
   }
   /*  Compute the sum of all elements */
   for (i = 0; i < n; i++)
   {
      sum = sum + x[i];
   }
  mean = sum / (float)n; //calcuate mean
   /*  Compute  variance  and standard deviation  */
```

```
    for (i = 0; i < n; i++)
    {
        sum_variance = sum_variance + pow((x[i] - mean), 2);
    }
    variance = sum_variance/n;
    std_deviation = sqrt(variance);
    printf("mean of given elements = %f\n", mean);
    printf("variance of given elements = %f\n", variance);
    printf("Standard deviation = %f\n", std_deviation);
}
```

**/*C Program to find Smallest Number in an Array  and print its position*/**

```
#include<stdio.h>
void main()
{
  float a[10];
  int n, i, min, pos;
   printf("\n Enter the size of an array \n");
  scanf("%d",&n);

  printf("\n Enter the elements of an array: \n");
  for(i=0; i<n; i++)
   {
            scanf("%f",&a[i]);
   }

min = a[0];
  for(i=1; i<n; i++)
   {
    if(min > a[i])
     {
       min = a[i];
       pos = i;
            }
   }
  printf("\nSmallest element in an Array = %d", min);
  printf("\nposition of the Smallest element = %d", pos+1);
}
```

**/*program to find whether a given element is present in array using linear search */**

```
#include<stdio.h>
void main()
{
int a[10],i,n,key,flag=0;
printf("Enter the no. of elements in an array\n");
scanf("%d",&n);
printf("Enter elements of the array\n");
for(i=0;i<n;i++)
scanf("%d",&a[i]);
printf("Enter the element to be searched\n");
scanf("%d",&key);
for(i=0;i<n;i++)
{
 if(a[i]==key)
  {
  flag=1;
  break;
  }
 }
 if(flag==1)
printf("Element found in position %d",i+1);
else
 printf("Element not found");
}
```

**/*program to find whether a given element is present in array using binary search */**

```
#include<stdio.h>
void main()
{
int a[10],i,n,key,flag=0,high,low,mid;
printf("Enter the no. of elements in an array\n");
scanf("%d",&n);
printf("Enter elements of the array in ascending order\n");
for(i=0;i<n;i++)
scanf("%d",&a[i]);
printf("Enter the element to be searched\n");
scanf("%d",&key);
low=0;
high=n-1;
while(low<=high)
{
```

```
mid=(low+high)/2;
if(a[mid]==key)
{
flag=1;
break;
}
if(key>mid)
low=mid+1;
else
high=mid-1;
}
 if(flag==1)
 printf("Element found in position %d",mid+1);
 else
  printf("Element not found");
}
```

**/* Program to sort elements in ascending order using bubble sort */**

```
#include<stdio.h>
void main()
{
int a[10],i,j,temp,n;
printf("Enter the no. of elements in an array\n");
scanf("%d",&n);
printf("Enter elements of the array\n");
for(i=0;i<n;i++)
scanf("%d",&a[i]);
printf("The elements of array before sorting are\n");
for(i=0;i<n;i++)
printf("%d\t",a[i]);
for(i=0;i<n-1;i++)
for(j=1;j<n-i;j++)
if(a[j]<a[j-1])
{
temp=a[j];
a[j]=a[j-1];
a[j-1]=temp;
}
printf("\nThe elements of array before sorting are\n");
for(i=0;i<n;i++)
printf("%d\t",a[i]);
}
```

**/* program to perform selection sort*/**

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

```
void main( )
{
int a[50],temp,i,n,loc,j,pos;
printf("Enter the number of elements in the array\n");
scanf("%d",&n);
printf("Enter the elements for the array\n");
for(i=0;i<n;i++)
scanf("%d",&a[i]);
printf("\n Elements of array before sorting are \n");
for(i=0;i<n;i++)
printf("%d\t",a[i]);
for(i=0;i<n;i++)
{
pos=i;
for(j=i+1;j<n;j++)
if(a[pos]>a[j])          //find location of the smallest element
pos=j;
temp=a[i];              //Move smallest element to the start of array
a[i]=a[pos];
a[pos]=temp;
}
printf("\n Elements of array in after sorting are \n");
for(i=0;i<n;i++)
printf("%d\t",a[i]);
}
```

**/* Program to find perform addition of two matrices using 2 dimensional arrays */**

```
#include <stdio.h>
#include<stdlib.h>
#include <math.h>
void main( )
{
int m,n,i,j,p,q;

int a[10][10],b[10][10],c[10][10];

printf("Enter the order of matrix A : ");
scanf("%d%d",&m,&n);

printf("Enter the order of matrix B : ");
scanf("%d%d",&p,&q);

if((m!=p) || (n!=q))
{
printf("cannot perform addition");
```

```
exit(0);
}

printf("Enter ( %d ) elements for matrix A",m*n);
for (i=0; i<m;i++)
for(j=0;j<n;j++)
scanf ("%d",&a[i][j]);

printf("Enter ( %d )  elements for matrix B",p*q);
for (i=0; i<p;i++)
for(j=0;j<q;j++)
scanf ("%d",&b[i][j]);

printf("The elements of matrix A are\n");
for (i=0; i<m;i++)
{
for(j=0;j<n;j++)
printf("\t%d",a[i][j]);
printf("\n");
}

printf("The elements of matrix B are\n");
for (i=0; i<p;i++)
{
for(j=0;j<q;j++)
printf("\t%d",b[i][j]);
printf("\n");
}

for (i=0; i<m;i++)
for(j=0;j<q;j++)
c[i][j]=a[i][j]+b[i][j];

printf("\n sum of A and B matrices are\n");
for (i=0; i<m;i++)
{
for(j=0;j<q;j++)
printf("\t%d",c[i][j]);
printf("\n");
}

} //end main
```

**/* Program to find product of two matrices using 2 dimensional arrays */**

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

void main( )
{
int m,n,i,j,p,q,k;
int a[10][10],b[10][10],mul[10][10];

printf("Enter the order of matrix A : ");
scanf("%d%d",&m,&n);

printf("Enter the order of matrix B : ");
scanf("%d%d",&p,&q);

if(n!=p)
{
printf("multiplication not possible\n");
exit(0);
}

else

printf("Enter the elements ( %d ) for matrix A",m*n);
for (i=0; i<m;i++)
for(j=0;j<n;j++)
scanf ("%d",&a[i][j]);

printf("Enter the elements ( %d ) for matrix B",p*q);
for (i=0; i<p;i++)
for(j=0;j<q;j++)
scanf ("%d",&b[i][j]);

printf("The elements of matrix A are\n");
for (i=0; i<m;i++)
{
for(j=0;j<n;j++)
printf("\t%d",a[i][j]);
printf("\n");
}

printf("The elements of matrix B are\n");
for (i=0; i<p;i++)
```

```
{
for(j=0;j<q;j++)
printf("\t%d",b[i][j]);
printf("\n");
}


printf("\n product of A and B matrices are\n");

for (i = 0;i < m; i++)
for (j = 0;j < q; j++)
{
mul[i][j] = 0;
for (k = 0;k < p; k++)
mul[i][j] = mul[i][j] + a[i][k] * b[k][j];
}


for (i=0; i<m;i++)
{
for(j=0;j<q;j++)
printf("\t%d",mul[i][j]);
printf("\n");
}

} //end main
```

**/* Program to find transpose of a given matrix */**

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

void main()
{
int m,n,i,j;
int a[10][10],t[10][10];

printf("Enter the order of matrix  : ");
scanf("%d%d",&m,&n);
```

```
printf("Enter the elements ( %d ) for matrix A",m*n);
for (i=0; i<m;i++)
for(j=0;j<n;j++)
scanf ("%d",&a[i][j]);

printf("The elements of matrix are\n\n");
for (i=0; i<m;i++)
{
for(j=0;j<n;j++)
printf("\t%d",a[i][j]);
printf("\n");
}

for (i=0;i<n;i++)
for(j=0;j<m;j++)
t[i][j]=a[j][i];

printf("The transpose matrix is\n\n");
for (i=0; i<n;i++)
{
for(j=0;j<m;j++)
printf("\t%d",t[i][j]);
printf("\n");
}
}
```

**/* program to find trace and norm of a matrix */**

```
#include <stdio.h>
#include <math.h>
void main( )
{
int m,n,i,j,norm,sum=0,trace=0;
int a[10][10];

printf("Enter the order of matrix  : ");
scanf("%d%d",&m,&n);

printf("Enter ( %d )  elements for matrix A",m*n);
for (i=0; i<m;i++)
for(j=0;j<n;j++)
```

```
scanf ("%d",&a[i][j]);

printf("The elements of matrix are\n\n");
for (i=0; i<m;i++)
{
for(j=0;j<n;j++)
printf("\t%d",a[i][j]);
printf("\n");
}

for (i=0; i<m;i++)
for(j=0;j<n;j++)
{
if(i==j)
trace=trace+a[i][j];
sum=sum+ a[i][j]*a[i][j];
}
norm=sqrt(sum);
printf("Trace of given matrix is %d",trace);
printf("Norm of the given matrix is %d",norm);
}
```

1. **Write and execute a c program to read a matrix and perform row_sum, column_sum and sum of all elements of a given matrix and display the result.**

```
#include <stdio.h>
void main()
{
   int i, j, m, n;
   int matrix[10][20];
   int sumR, sumC,sum=0;
   printf("Enter number of rows : ");
   scanf("%d", &m);
   printf("Enter number of columns : ");
   scanf("%d", &n);

   /* Input data in matrix */
   for (i = 0; i < m; i++)
   {
      for (j = 0; j < n; j++)
      {
         printf("Enter data in [%d][%d]: ", i, j);
         scanf("%d", &matrix[i][j]);
      }
   }
```

```
printf("\n");

/* Display the matrix */
for (i = 0; i < m; i++)
{
   for (j = 0; j < n; j++)
   {
      printf("%d\t", matrix[i][j]);
   }
   printf("\n");
}

printf("\n");

/* Find the row-wise sum of matrix */
for (i = 0; i < m; i++)
{
   sumR = 0;
   for (j = 0; j < n; j++)
   {
      sumR += matrix[i][j];
   }
   printf("Sum of row %d = %d\n", i + 1, sumR);
}

printf("\n");

/* Find the column-wise sum of matrix */
for (i = 0; i < n; i++)
{
   sumC = 0;
   for (j = 0; j < m; j++)
   {
      sumC += matrix[j][i];
   }
   printf("Sum of column %d = %d\n", i + 1, sumC);
}

sum=0;
for (i = 0; i < m; i++)
{

   for (j = 0; j < n; j++)
   {
      sum+= matrix[i][j];
   }

}
```

```
   printf("Sum of all elements in a matrix %d\n", sum);
}
```

2. **Write and execute a c program to read marks scored by 5 students in three subjects into a two dimensional array using keyboard, Find the highest marks scored in each subject and display the result.**

```
#include <stdio.h>
void main()
{
  int marks[5][3],maxMark[4],r, c;

  //input
  for(r = 0; r < 5; r++)
  {
    printf("Enter marks of 3 tests of Student #%d: ", (r + 1));
    for(c = 0; c < 3; c++)
    {
      scanf("%d", &marks[r][c]);
    }
  }
  //find max mark
  for(r = 0; r < 5; r++)
  {
    maxMark[r] = 0;
    for(c = 0; c < 3; c++)
    {
      if (marks[r][c] > maxMark[r])
      {
        maxMark[r] = marks[r][c];
      }
    }
  }

  //output
  printf("---------- Max Marks ----------\n");
  for(r = 0; r < 5; r++)
  {
    printf("Max mark of Student #%d is %d\n", (r + 1), maxMark[r]);
  }
}
```

3. **Write and execute a c program to read a matrix using keyboard, count the total number of non-zero elements in it and display the result.**

```
#include <stdio.h>
void main()
{
```

```
    int a[10][10],i,j,c=0,m,n;
    printf("Enter size of row in a matrix");
    scanf("%d",&m);
    printf("Enter size of col in a matrix");
    scanf("%d",&n);
    printf("Enter Elements for Matrix :\n\n");
    for(i=0;i<m;i++) // j is used for rows
        for(j=0;j<n;j++) // i is used for columns
        {
            scanf("%d",&a[i][j]);
        }
    /*Printing Matrix */
    printf("\nMatrix of Size 3*5: \n\n");
    for(i=0;i<m;i++)
    {
        for(j=0;j<n;j++)
        {
            printf("%3d ",a[i][j]);
        }
        printf("\n");
    }
   /* Count the total number of zeros in matrix 3*5 */
    for(i=0;i<m;i++)
        for(j=0;j<n;j++)
            if(a[i][j]!=0)
                c++;
    printf("Non zeros present in the Matrix: %d",c);
}
```

4. **Write and execute a c program to read a matrix using keyboard and initialize all the diagonal elements to zero for a two-dimensional array and print the result in matrix format**.

```
#include <stdio.h>
void main()
{

   int m,n,mat[10][10];
   printf("Enter size of matrix\n");
   scanf("%d%d",&m,&n);
   printf("Enter elements\n");
    for (int i = 0; i < m; i++)
  {
      for (int j = 0; j < n; j++)
```

```
            scanf("%d",&mat[i][j]);
        }


        for (int i = 0; i < n; i++)
        {
            for (int j = 0; j < m; j++)
            {

                if (i == j|| (i + j + 1) == n)
                    mat[i][j] = 0;
            }
        }
        Printf("Resultant matrix is \n");
        for (int i = 0; i < n; i++)
        {
            for (int j = 0; j < m; j++)
                printf("%d\t",mat[i][j]);
                printf("\n");
          }
      }
```

**/*program to combine/concatenate string1 and string2 and store the result in a separate string without using built in functions*/**

```
#include<stdio.h>
#include<string.h>
void main()
{
char str1[30],str2[10],str[30];
int i,len1,len2,j;
printf("Enter the string1\n");
gets(str1);
printf("Enter the string2\n");
gets(str2);
len1=strlen(str1);
len2=strlen(str2);
for(i=0;str[i]!='\0';i++)
str[i]=str1[i];
puts(str);
for(j=0,i=len1;str2[j]!='\0';j++,i++)
str[i]=str2[j];
str[i]='\0';
printf("concatenated  string is ");
puts(str);
```

```
}
/*program to compare two string1 and string2 without using built in functions*/
#include<stdio.h>
#include<string.h>
void main()
{
char str1[30],str2[10];
int i,len,j,flag=0;
printf("Enter the string1\n");
gets(str1);
printf("Enter the string2\n");
gets(str2);
len=strlen(str1);
for(i=0;i<len;i++)
if(str1[i]!=str2[i])
flag=1;
if(flag==0)
printf("strings are equal");
else
printf(“strings are not equal”);
}

/*program to find whether a given string is a palindrome or not without using built in functions*/
#include<stdio.h>
#include<string.h>
void main()
{
char str[10],str1[10];
int i,j,n,flag=0;
printf("Enter the string\n");
gets(str);
n=strlen(str);
for(j=0,i=n-1;i>=0;i--,j++)
str1[j]=str[i];
str1[j]='\0';
printf("reverse of a string\n");
puts(str1);
for(i=0;i<n;i++)
if(str[i]!=str1[i])
flag=1;
if(flag==1)
printf("string is not a palindrome\n");
else
```

```
printf("String is a palindrome\n");
}

/*program to demonstrate the use of built in string functions like strcpy(), strcat(),strcmp() and strlen() */
#include <stdio.h>
#include <string.h>
void main()
{
  char s[20],s1[20];
  printf("Enter the string\n");
  gets(s);
  strcpy(s1,s);
 printf("copied string is %s\n",s1);
 strcat(s1,s);
 printf("concatenated string is %s\n",s1);
 printf("length of concatenated string is %d\n",strlen(s1));
 if(strcmp(s1,s)==0)
 printf("strings are equal\n");
 else
 printf("strings are not equal\n");
}
```

**Write a program to enter a number and find factorial using function with argument and with return type**

```
#include <stdio.h>

int factorial (int n);

void main()

{

   int fact,n;

   printf("Enter a number: ");

   scanf("%d",&n);

   fact=factorial(n);

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

}
```

```
int factorial(int n)
{
   int fact;
   if(n==1)
   {
      return 1;
   }
   else
   {
      fact=n*factorial(n-1);
   }
   return fact;
}
```

**Write a program to fine the GCD and LCM of 2 numbers using functions with arguments and without return type and display them**

```
#include <stdio.h>
void gcd (int a,int b);
void main()
{
   int x,y;
   printf("Enter 2 numbers: ");
   scanf("%d%d",&x,&y);
   gcd(x,y);
}

void gcd(int a,int b)
{
   int rem=0,temp1=a,temp2=b;
   do
   {
      rem=a/b;
      a=b;
      b=rem;
   }
   while(rem!=0);
   printf("GCD is %d",a);
   int lcm=(temp1*temp2)/2;
```

```
    printf("LCM is %d",lcm);
}
```

**Write a program to take input from the user and find whether a number is palindrome or not using function without argument and with return type**

```
#include <stdio.h>
int palindrome();
void main()
{
    Int a=palindrome();
    if(a==1)
    printf("Palindrome");
    else
    printf("Not palindrome");
}
int palindrome()
{
   int n,rem,rev=0,originaln;
   printf("Enter a number: ");
   scanf("%d",&n);
   originaln=n;
   while(n!=0)
   {
       rem=n%10;
       rev=rev*10+rem;
       n=n/10;
```

```
    }
    if(rev==originaln)
    return 1;
    else
    return 0;
}
```

**Write a program to fine whether a given number is prime or not using function without argument and without return type**

```
#include <stdio.h>
int prime();
void main()
{
    prime();
}
int prime()
{
   int a,i,flag;
   printf("Enter a number");
   scanf("%d",&a);
   for(i=2;i<=a/2;i++)
   {
      flag=0;
      if(a%i==0)
      {
         flag=1;    break;
      }
   }
   if(a==1)
   printf("It is neither prime not composite");
   else
```

```
  {
    if(flag==0)
      printf("It is a prime number");
    else
      printf("It is not a prime number");
  }}
```

1. **Write and execute C program to read marks of 3 students and 3 subjects using a structure ,calculate the total marks scored, student wise , subject wise and store them as part of the defined structure . Display using arrays of structures in the program.**

```
#include<stdio.h>
struct student
{
   char name[10];
   int rollno;
   int subject[3],total;
};
main ( )
{
   static struct student s[10];
   int n,i,j;
   //clrscr();

   printf("Enter the Marks of 3 Subjects: ");
   for(i=0; i<3; i++)
   {
      printf("\nEnter student[%d] student marks",i);
      s[i].total=0;
      for(j=0; j<3; j++)
      {
         scanf("%d",&s[i].subject[j]);
         s[i].total=s[i].total+s[i].subject[j];
      }
      printf("\nTotal marks scored=%d\n",s[i].total);
   }
}
```

2. **Write and execute a c program to declare structure time that has three fields hr,min,sec. Create 2 variables start_time and end_time. Input the values from user. Then while start_time reaches the end_time display GOOD DAY on the screen.**

```
#include <stdio.h>
struct time
```

```
{
  int hr, min, sec;
};
Void main ()
{
 struct time start_time, end_time;
 printf ("Enter the start time in hours, minutes and seconds\n");
 scanf ("%d%d%d", &start_time.hr, &start_time.min, &start_time.sec);
 printf ("Enter the end time in hours, minutes and seconds\n");
scanf ("%d%d%d", &end_time.hr, &end_time.min, &end_time.sec);
while (!((start_time.hr == end_time.hr) && (start_time.min == end_time.min)&& (start_time.sec ==
end_time.sec)))
{      printf ("Time is  %dhour %dminutes %dseconds \n",start_time.hr,start_time.min,start_time.sec);          if
(start_time.sec == 60)
{

            start_time.min++;
           start_time.sec = 0;

           }
   if (start_time.min == 60)
   {           start_time.hr++;
           start_time.min = 0;
    }
      start_time.sec++;
    }
  printf ("Good Day\n");
}
```

3. **Write and execute a C program to an array of elements and compute sum of all elements stored in an array using pointers and display the result.**

```
#include<stdio.h>
void main()
{
  int num[10];
  int i, sum = 0,n;
  int *ptr;

  printf("\nEnter size of an array: ");
  scanf("%d",&n);
  printf("Enter array elements\n");

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

  ptr = num; /* a=&a[0] */
```

```
    for (i = 0; i < n; i++) {
      sum = sum + *ptr;
      ptr++;
    }

    printf("The sum of array elements : %d", sum);
}
```

4. Write and execute a C program to swap two numbers using pointers and display the result.

```
#include <stdio.h>
void swap(int*, int*);

int main()
{
int x, y;

printf("Enter the value of x and y\n");
scanf("%d%d",&x,&y);

printf("Before Swapping\nx = %d\ny = %d\n", x, y);

swap(&x, &y);

printf("After Swapping\nx = %d\ny = %d\n", x, y);

return 0;
}


void swap(int *a, int *b)
{
int t;

t = *b;
*b = *a;
*a = t;
}
```