



COMPUTER SCIENCE

LAB PRACTICALS

LANGUAGE

C++

NAME

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CLASS

XI – D

LAB PRACTICAL 1

Q-1

Write a program to find lateral surface area, total surface area and volume of a cuboid. Take Length, Breadth and Height from the user.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to find lateral surface area, total surface area and volume of a cuboid.
#include<iostream>

int main()
{
    float l,b,h;
    std::cout<<"Enter the length of the cuboid : ";
    std::cin>>l;
    std::cout<<"Enter the breadth of the cuboid : ";
    std::cin>>b;
    std::cout<<"Enter the height of the cuboid : ";
    std::cin>>h;
    float lsa,tsa,v;
    lsa=2*((l*h)+(b*h));
    tsa=2*((l*b)+(b*h)+(l*h));
    v=l*b*h;
    std::cout<<"\nThe lateral surface area of this cuboid is : ", std::cout<<lsa;
    std::cout<<"\nThe total surface area of this cuboid is : ", std::cout<<tsa;
    std::cout<<"\nThe volume of the cuboid is : ", std::cout<<v;
}
```

```
Enter the length of the cuboid : 15
Enter the breadth of the cuboid : 20
Enter the height of the cuboid : 12

The lateral surface area of this cuboid is : 840
The total surface area of this cuboid is : 1440
The volume of the cuboid is : 3600
-----
Process exited after 8.08 seconds with return value 0
Press any key to continue . . .
```

Q-2

Write a program to find simple interest and compound interest. Take principal, rate and time from the user.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to find simple interest and compound interest.
#include<iostream>
#include<math.h>

int main()
{
    float p,r,t;
    float SI,CI;
    std::cout<<"Enter the Principle Amount:\n";
    std::cin>>p;
    std::cout<<"Enter the Rate at which the money has been taken:\n";
    std::cin>>r;
    std::cout<<"Enter the Time Period for returning the money:\n";
    std::cin>>t;
    std::cout<<"\nThe Simple Interest of the details provided by you is:\n";
    float c=p*r*t;
    SI=c/100;
    std::cout<<SI;
    std::cout<<"\nThe Compound Interest of the details provided by you is:\n";
    float d=r/100;
    float e=1+d;
    CI=(p*(pow(e,t)))-p;
    std::cout<<CI;
}
```

```
Enter the Principle Amount:
10000
Enter the Rate at which the money has been taken:
2
Enter the Time Period for returning the money:
3

The Simple Interest of the details provided by you is:
600
The Compound Interest of the details provided by you is:
612.079
-----
Process exited after 16.82 seconds with return value 0
Press any key to continue . . .
```

Q-3

Write a program to find lateral surface area, total surface area and volume of a Cone. Take Radius and Height from the user.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to find lateral surface area, total surface area and volume of a cone.

#include<iostream>
#include<math.h>
int main()
{
    float r,h,l;
    std::cout<<"Enter the radius of the cone : ", std::cin>>r;
    std::cout<<"Enter the height of the cone : ", std::cin>>h;
    const float pi=3.14;
    l=sqrt((r*r)+(h*h));
    float lsa,tsa,v;
    lsa=pi*r*l;
    tsa=lsa+(pi*r*r);
    v=(pi*r*r*h)/3;
    std::cout<<"\nThe lateral surface area of this cone is : ", std::cout<<lsa;
    std::cout<<"\nThe total surface area of this cone is : ", std::cout<<tsa;
    std::cout<<"\nThe volume of this cone is : ", std::cout<<v;
}
```

```
Enter the radius of the cone : 3
Enter the height of the cone : 4

The lateral surface area of this cone is : 47.1
The total surface area of this cone is : 75.36
The volume of this cone is : 37.68
-----
Process exited after 7.704 seconds with return value 0
Press any key to continue . . .
```

```
Enter the radius of the cone : 6
Enter the height of the cone : 9

The lateral surface area of this cone is : 203.786
The total surface area of this cone is : 316.826
The volume of this cone is : 339.12
-----
Process exited after 19.01 seconds with return value 0
Press any key to continue . . .
```

Q-4

Write a program to find area and perimeter of a rectangle taking length and breadth from the user.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to find area and perimeter of a rectangle taking length and breadth from
the user.
#include<iostream>

int main()
{
    float a,b;
    std::cout<<"Enter the Length and Breadth : \n";
    std::cout<<"Length = ", std::cin>>a;
    std::cout<<"\nBreadth = ", std::cin>>b;
    float area=a*b;
    float perimeter=2*(a+b);
    std::cout<<"\nThe Area of the given Rectangle is : ", std::cout<<area;
    std::cout<<"\nThe Perimeter of the given Rectangle is : ",
std::cout<<perimeter;
}
```

```
Enter the Length and Breadth :
Length = 15

Breadth = 10

The Area of the given Rectangle is : 150
The Perimeter of the given Rectangle is : 50
-----
Process exited after 27.3 seconds with return value 0
Press any key to continue . . . █
```

Q-5

Write a program to convert Centigrade into Fahrenheit and vice versa.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to convert Centigrade into Fahrenheit and vice versa.
#include<iostream>

int main()
{
    float cen,fah;
    std::cout<<"Enter temperature into degree Centigrade : ", std::cin>>cen;
    float ctf=(9*cen+160)/5;
    std::cout<<"\nThis temperature is equal to ", std::cout<<ctf, std::cout<<"
degree Fahrenheit.";
    std::cout<<"\n\nEnter temperature into degree Fahrenheit : ", std::cin>>fah;
    float ftc=(5*fah-160)/9;
    std::cout<<"\nThis temperature is equal to ", std::cout<<ftc, std::cout<<"
degree Centigrade.";
}
```

```
Enter temperature into degree Centigrade : 37
This temperature is equal to 98.6 degree Fahrenheit.
Enter temperature into degree Fahrenheit : 94
This temperature is equal to 34.4444 degree Centigrade.
-----
Process exited after 10.14 seconds with return value 0
Press any key to continue . . .
```

LAB PRACTICAL 2

Q-1

Write a program to obtain a 4 digit number from the user and display the sum of digits and the reverse number. For example if user enters the number as 1534, the sum should be 13 and reverse number would be 4351.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to enter four digit number, add its digit and then reverse it.

#include<iostream>

int main()
{
    int n; //n=4 digit number.
    std::cout<<"Enter the 4-Digit number in '0000' format, \n|Where '0' denote any number 0 to 9| : ",std::cin>>n;
    if(n>9999)
    {
        std::cout<<"\nWrong Input.";
    }
    else
    {
        int aq=n/1000;
        int ar=n%1000;
        int bq=ar/100;
        int br=ar%100;
        int cq=br/10;
        int cr=br%10;
        int dq=cr;
        std::cout<<"The digits of this number are : ",
        std::cout<<aq,std::cout<<" , ",
        std::cout<<bq,std::cout<<" , ",
        std::cout<<cq,std::cout<<" and ",
        std::cout<<dq;std::cout<<"\n";
        int sum=aq+bq+cq+dq;
        std::cout<<"\nThe sum of these digits are
",std::cout<<sum,std::cout<<"\n";
        std::cout<<"The reverse of this number is
",std::cout<<dq,std::cout<<cq,std::cout<<bq,std::cout<<aq; }}
```

```
Enter the 4-Digit number in '0000' format,
|Where '0' denote any number 0 to 9| : 6543
The digits of this number are : 6, 5, 4 and 3
```

```
The sum of these digits are 18.
The reverse of this number is 3456
```

```
-----
Process exited after 8.743 seconds with return value 0
Press any key to continue . . .
```

Q-7

Write a program to obtain seconds form the user and convert and display it into Hours, minutes and numbers format. For example if user inputs seconds as 7295, you're your program should display the result as 2 Hours 60 minutes and 35 seconds.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to convert given value of seconds in Hour, Minute and Second format.
#include<iostream>

int main()
{
    int sec;//sec=second
    std::cout<<"Enter the number of seconds you want to convert in HH, MM and
SS format:\n|Where HH=Hours, MM=Minutes, SS=Second|\n";
    std::cin>>sec;
    std::cout<<"The result of the given data is:\n";
    int hrsq=sec/(60*60);//hrsq=hours quotient
    std::cout<<hrsq<<" Hours ";
    int hrsr=sec%(60*60);//hrs=hours remainder
    int minq=hrs/60;//minq=minute quotient
    std::cout<<minq<<" Minutes ";
    int minr=hrs%60;//minr=minute remainder
    std::cout<<minr<<" Second ";
}
```

```
Enter the number of seconds you want to convert in HH, MM and SS format:
|Where HH=Hours, MM=Minutes, SS=Second|
6532
The result of the given data is:
1 Hours 48 Minutes 52 Second
-----
Process exited after 3.758 seconds with return value 0
Press any key to continue . . .
```

```
Enter the number of seconds you want to convert in HH, MM and SS format:
|Where HH=Hours, MM=Minutes, SS=Second|
5676
The result of the given data is:
1 Hours 34 Minutes 36 Second
-----
Process exited after 8.98 seconds with return value 0
Press any key to continue . . .
```


Q-8

Write a program which accepts amount as integer and display total number of Notes of Rs. 500, 100, 50, 20, 10, 5 and 1.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to arrange given amount in notes of different format.
#include<iostream>

int main()
{
    int amt;    //amt=amount
    std::cout<<"Enter the amount in digits to arrange it into no. of notes : ",
std::cin>>amt;
    int fi_q;    //fi_q=five hundred quotient
    fi_q=amt/500;
    std::cout<<"\nNo. of the notes of five hundred : ",std::cout<<fi_q;
    int fi_r;    //fi_r=five hundred remainder
    fi_r=amt%500;
    int hun_q; //hun_q=hundred quotient
    hun_q=(fi_r)/100;
    std::cout<<"\nNo. of the notes of hundred : ",std::cout<<hun_q;
    int hun_r; //hun_r=hundred remainder
    hun_r=(fi_r)%100;
    int fif_q; //fif_q=fifty quotient
    fif_q=(hun_r)/50;
    std::cout<<"\nNo. of the notes of fifty : ",std::cout<<fif_q;
    int fif_r; //fifty remainder
    fif_r=(hun_r)%50;
    int twn_q; //twenty quotient
    twn_q=(fif_r)/20;
    std::cout<<"\nNo. of the notes of twenty : ",std::cout<<twn_q;
    int twn_r; //twenty remainder
    twn_r=(fif_r)%20;
    int ten_q; //ten quotient
    ten_q=(twn_r)/10;
    std::cout<<"\nNo. of the notes of ten : ",std::cout<<ten_q;
    int ten_r; //ten remainder
    ten_r=(twn_r)%10;
    int five_q; //five quotient
    five_q=(ten_r)/5;
    std::cout<<"\nNo. of the coins/notes of five : ",std::cout<<five_q;
    int five_r; //five remainder
    five_r=(ten_r)%5;
    int one_q; //one quotient
    one_q=(five_r);
    std::cout<<"\nNo. of the coins/notes of one : ",std::cout<<one_q;
}
```

Enter the amount in digits to arrange it into no. of notes : 879

No. of the notes of five hundred : 1

No. of the notes of hundred : 3

No. of the notes of fifty : 1

No. of the notes of twenty : 1

No. of the notes of ten : 0

No. of the coins/notes of five : 1

No. of the coins/notes of one : 4

Process exited after 4.647 seconds with return value 0

Press any key to continue . . . █

Enter the amount in digits to arrange it into no. of notes : 437

No. of the notes of five hundred : 0

No. of the notes of hundred : 4

No. of the notes of fifty : 0

No. of the notes of twenty : 1

No. of the notes of ten : 1

No. of the coins/notes of five : 1

No. of the coins/notes of one : 2

Process exited after 7.859 seconds with return value 0

Press any key to continue . . .

Q-4

Write a program which accepts length1 and length2 in meters and centimeters and display their sum also in meter and centimeter form.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program which accepts length1 and length2 in meters and centimeters and display
their sum also in meter and centimeter form.
#include<iostream>

int main()
{
    int m1,m2,cm1,cm2,length1,length2;
    std::cout<<"Enter the Length 1 in meters and centimeters = \n";
    std::cin>>m1;
    std::cin>>cm1;
    std::cout<<"Enter the Length 2 in meters and centimeters = \n";
    std::cin>>m2;
    std::cin>>cm2;
    length1=(m1*100)+cm1;
    length2=(m2*100)+cm2;
    float total_length=length1+length2;
    int length3=total_length;
    std::cout<<"The sum of the above length is : ",
    std::cout<<length3/100,
    std::cout<<" m ",
    std::cout<<length3%100,
    std::cout<<" cm ";
}
```

```
Enter the Length 1 in meters and centimeters =
3
45
Enter the Length 2 in meters and centimeters =
4
60
The sum of the above length is : 8 m 5 cm
-----
Process exited after 18.89 seconds with return value 0
Press any key to continue . . .
```

LAB PRACTICAL 3

Q-1

Write a program to check whether the given number is even or odd (using ? : ternary operator).

[PROGRAMMING and OUTPUT]

```
//DEV C++  
//Program to find whether a given number is odd or even.  
#include<iostream>  
  
int main()  
{   int a;  
    std::cout<<"Enter the number you want to check:\n";  
    std::cin>>a;  
    (a%2==0)?std::cout<<"\nRESULT-The number you have entered is even.\n":  
    std::cout<<"\nRESULT-The number you have entered is odd.\n";  
}
```

Enter the number you want to check:

65

RESULT-The number you have entered is odd.

Process exited after 2.403 seconds with return value 0

Press any key to continue . . .

Enter the number you want to check:

26

RESULT-The number you have entered is even.

Process exited after 5.608 seconds with return value 0

Press any key to continue . . .

Q-2

Write a program to find the greatest of three unequal numbers (using ? : ternary operator).

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to check the greatest of the three unequal numbers.
#include<iostream>

int main()
{
    int a,b,c,max;
    std::cout<<"Enter the three numbers : \n";
    std::cout<<"Number 1 = ";
    std::cin>>a;
    std::cout<<"\nNumber 2 = ";
    std::cin>>b;
    std::cout<<"\nNumber 3 = ";
    std::cin>>c;
    max=(a>b)?a:(b>c)?b:c;
    std::cout<<"\nThe greatest number out of these three values is
",std::cout<<max;
}
```

Enter the three numbers :

Number 1 = 65

Number 2 = 98

Number 3 = 103

The greatest number out of these three values is 103

Process exited after 8.238 seconds with return value 0

Press any key to continue . . .

Q-
Write a program to find the eligibility for voting (using ? : ternary operator).

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to check eligibility for voting.
#include <iostream>

int main()
{
    int a;
    int b=18;
    std::cout<<"\n|Program to check the 'Eligibility' for voting|\n\n";
    std::cout<<"Enter your current age:\n";
    std::cin>>a;
    (a>=18)?std::cout<<"\nCongratulation! You are eligible for voting.\n":
    std::cout<<"\nOops! Sorry, you have to wait for some more years.\n";}
```

|Program to check the 'Eligibility' for voting|

Enter your current age:

26

Congratulation! You are eligible for voting.

Process exited after 10.38 seconds with return value 0

Press any key to continue . . . █

|Program to check the 'Eligibility' for voting|

Enter your current age:

15

Oops! Sorry, you have to wait for some more years.

Process exited after 3.269 seconds with return value 0

Press any key to continue . . . █

Q-

Write a program to find the nature of roots of quadratic equation (using ? : ternary operator).

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to find the nature off roots of a quadratic equation.
#include<iostream>

int main()
{
    int a,b,c;
    std::cout<<"Enter the three quantities of a quadratic equation : ";
    std::cout<<"\na = ",std::cin>>a;
    std::cout<<"\nb = ",std::cin>>b;
    std::cout<<"\nc = ",std::cin>>c;
    float disc=(b*b)-(4*a*c);
    (disc>0)?std::cout<<"\nRoots are Real and Unequal.":
    (disc==0)?std::cout<<"\nRoots are Real and Equal.":
    std::cout<<"\nRoots are imaginary.";
}
```

```
Enter the three quantities of a quadratic equation :
a = 4
b = 8
c = 3

Roots are Real and Unequal.
-----
Process exited after 10.22 seconds with return value 0
Press any key to continue . . .
```

LAB PRACTICAL 4

Q-1

If the ages of Ram, Sulabh and Ajay are input by the user, write a program to determine the youngest of the three.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to find the youngest of the three.

#include<iostream>

int main()
{
    int a,b,c;
    std::cout<<"Enter the ages of the following : \n";
    std::cout<<"Person 1 = ";
    std::cin>>a;
    std::cout<<"\nPerson 2 = ";
    std::cin>>b;
    std::cout<<"\nPerson 3 = ";
    std::cin>>c;
    if(a<b)
    {
        if(a<c)
        {
            std::cout<<"\nPerson 1 is the smallest of all.";
        }
        else
        {
            std::cout<<"\nPerson 3 is the smallest of all.";
        }
    }
    else//(a>b)
    {
        if(b<c)
        {
            std::cout<<"\nPerson 2 is the smallest of all.";
        }
        else//(b>c)
        {
            std::cout<<"\nPerson 3 is the smallest of all.";
        }
    }
}
```



```
Enter the ages of the following :
Person 1 = 56

Person 2 = 45

Person 3 = 78

Person 2 is the smallest of all.
-----
Process exited after 8.675 seconds with return value 0
Press any key to continue . . .
```

```
Enter the ages of the following :
Person 1 = 12

Person 2 = 65

Person 3 = 26

Person 1 is the smallest of all.
-----
Process exited after 6.73 seconds with return value 0
Press any key to continue . . . █
```

```
Enter the ages of the following :
Person 1 = 65

Person 2 = 89

Person 3 = 34

Person 3 is the smallest of all.
-----
Process exited after 7.742 seconds with return value 0
Press any key to continue . . . █
```

Q-2

The marks obtained by a student in 5 different subjects are input by the user. The student gets a division as per the following rules:

Percentage above or equal to 60 - First division, Percentage between 50 and 59 - Second division, Percentage between 40 and 49 - Third division, Percentage less than 40 – Fail. Write a program to calculate the division obtained by the student.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to enter marks in five subjects and display the division of passing.

#include<iostream>

int main()
{
    float h,e,m,s,sc;
    std::cout<<"Enter your marks in five subjects given below out of 50 : ";
    std::cout<<"\nHindi : ";
    std::cin>>h;
    std::cout<<"\nEnglish : ";
    std::cin>>e;
    std::cout<<"\nMaths : ";
    std::cin>>m;
    std::cout<<"\nSSt : ";
    std::cin>>s;
    std::cout<<"\nScience : ";
    std::cin>>sc;
    if(h>50||e>50||m>50||s>50||sc>50)
    {
        std::cout<<"\nWrong input_Check your data again.";
    }
    else
    {
        float const max=250;
        float total=h+e+m+s+sc;
        float perc=(total/max)*100;
        if(perc>=60)
        {
            std::cout<<"\nYou have passed with first division.";
        }
        else
        {
            if(perc>=50&&perc<60)
            {
                std::cout<<"\nYou have passed with second division.";
            }
            else
            {
                if(perc>=40&&perc<50)
                {
                    std::cout<<"\nYou have passed with third division.";
                }
                else
                {
                    std::cout<<"\nYou have failed the examination.{}{}{}{}";
                }
            }
        }
    }
}
```

```
Enter your marks in five subjects given below out of 50 :  
Hindi : 45  
  
English : 47  
  
Maths : 50  
  
SSt : 36  
  
Science : 42  
  
You have passed with first division.  
-----  
Process exited after 41.66 seconds with return value 0  
Press any key to continue . . .
```

```
Enter your marks in five subjects given below out of 50 :  
Hindi : 25  
  
English : 17  
  
Maths : 19  
  
SSt : 21  
  
Science : 27  
  
You have passed with third division.  
-----  
Process exited after 12.58 seconds with return value 0  
Press any key to continue . . .
```

```
Enter your marks in five subjects given below out of 50 :  
Hindi : 9  
  
English : 8  
  
Maths : 10  
  
SSt : 5  
  
Science : 6  
  
You have failed the examination.  
-----  
Process exited after 8.896 seconds with return value 0  
Press any key to continue . . .
```

```
Enter your marks in five subjects given below out of 50 :  
Hindi : 34  
  
English : 25  
  
Maths : 32  
  
SSt : 21  
  
Science : 27  
  
You have passed with second division.  
-----  
Process exited after 21.76 seconds with return value 0  
Press any key to continue . . .
```

Q-

Write a program to calculate the monthly telephone bills as per the following rule:

Minimum Rs. 200 for upto 100 calls.

Plus Rs. 0.60 per call for next 50 calls.

Plus Rs. 0.50 per call for next 50 calls.

Plus Rs. 0.40 per call for any call beyond 200 calls.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to find the telephone bill.
#include<iostream>

int main()
{
    std::cout<<"Enter the number of calls you have done the last month : ";
    float n; //'n' denoting the number of calls.
    std::cin>>n;
    float c; //'c' denoting charges.
    if(n<=100)
    {
        c=200;//Fixed charge.
    }
    if(n>100&& n<=150)
    {
        c=200+((n-100)*0.60);//60 paise charge for next 50 calls above 100.
    }
    if(n>150&& n<=200)
    {
        c=200+30+((n-150)*0.50);//50 paise charge for next 50 calls above 150.
    }
    if(n>200)
    {
        c=200+30+25+((n-200)*0.40);//40 paise charge for next calls above
200.
    }
    std::cout<<"The total charge for your usage is ", std::cout<<c, std::cout<<"
Rupees.\n";
}
```

```
Enter the number of calls you have done the last month : 173
The total charge for your usage is 241.5 Rupees.
```

```
-----
Process exited after 3.243 seconds with return value 0
Press any key to continue . . . _
```

Q-

Write a program to calculate the total expenses. Quantity and price per item are input by the user and discount of 10% is offered if the expense is more than 5000.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to calculate the total expenses. Quantity and price per item are input by
the user and discount of 10% is offered if the expense is more than 5000.
#include<iostream>

int main()
{
    int q;
    float p;
    std::cout<<"Enter the quantity of the item : ";
    std::cin>>q;
    std::cout<<"\nEnter the price of the item : ";
    std::cin>>p;
    float total=p*(float)q;
    std::cout<<"\nTotal amount of the item is : ";
    std::cout<<total;
    if(total>5000)
    {
        float final=total-((p*q)*10/100);
        std::cout<<"\nTotal amount you have to pay is : ";
        std::cout<<final;
        std::cout<<"\n|Discount added|";
    }
    else
    {
        std::cout<<"\nTotal amount you have to pay is : ";
        std::cout<<total;
    }
}
```

Enter the quantity of the item : 6

Enter the price of the item : 3000

Total amount of the item is : 18000

Total amount you have to pay is : 16200

|Discount added|

Process exited after 13.06 seconds with return value 0

Press any key to continue . . . █

Q-

Any character is entered by the user; write a program to determine whether the character entered is a capital letter, a small case letter, a digit or a special symbol.

|PROGRAMMING and OUTPUT|

```
//DEV C++
//Program to determine whether the character entered is a capital letter, a small case
letter, a digit or a special symbol.

#include<iostream>

int main()
{
    char n,i;
    std::cout<<"Enter the character : ";
    std::cin>>n;
    {
        {
            if(n>=65&&n<=90)
                std::cout<<"\nIt's a capital letter.";
            if(n>=97&&n<=122)
                std::cout<<"\nIt's a small case letter.";
            if(n>=48&&n<=57)
                std::cout<<"\nIt's a digit.";

            if(n>=0&&n<=47||n>=58&&n<=64||n>=91&&n<=96||n>=123&&n<=127)
                std::cout<<"\nIt's an special character.";
        }
    }
}
```

Enter the character : h

It's a small case letter.

Process exited after 2.769 seconds with return value 0

Press any key to continue . . .

Enter the character : ?

It's an special character.

Process exited after 6.138 seconds with return value 0

Press any key to continue . . .

LAB PRACTICAL 5

Q-1

Write a program to display name of the day when user enters the day as a digit.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to display name of the day when user enters the day as a digit.

#include<iostream>

int main()
{
    int n; //n=No. of that day.
    std::cout<<"Enter the number of that day between 0 to 7 : ";
    std::cin>>n;
    switch(n)
    {
        case 1:std::cout<<"\nIt's Monday.";
        break;
        case 2:std::cout<<"\nIt's Tuesday.";
        break;
        case 3:std::cout<<"\nIt's Wednesday.";
        break;
        case 4:std::cout<<"\nIt's Thursday.";
        break;
        case 5:std::cout<<"\nIt's Friday.";
        break;
        case 6:std::cout<<"\nIt's Saturday.";
        break;
        case 7:std::cout<<"\nIt's Sunday.";
        break;
        default:std::cout<<"\n|Wrong Input| Please enter the number from
0 to 7.\n";
    }
}
```

Enter the number of that day between 0 to 7 : 6

It's Saturday.

Process exited after 2.117 seconds with return value 0

Enter the number of that day between 0 to 7 : 9

|Wrong Input| Please enter the number from 0 to 7.

Process exited after 3.39 seconds with return value 0

Q-2

Write a program to display name of the month when user enters the month as a number.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to display name of the month when user enters the month.

#include<iostream>
int main()
{
    int n;
    std::cout<<"Enter the number of the month from 1-12 : ";
    std::cin>>n;
    switch(n)
    {
        case 1:std::cout<<"\nIt's January.";
        break;
        case 2:std::cout<<"\nIt's February.";
        break;
        case 3:std::cout<<"\nIt's March.";
        break;
        case 4:std::cout<<"\nIt's April.";
        break;
        case 5:std::cout<<"\nIt's May.";
        break;
        case 6:std::cout<<"\nIt's June.";
        break;
        case 7:std::cout<<"\nIt's July.";
        break;
        case 8:std::cout<<"\nIt's August.";
        break;
        case 9:std::cout<<"\nIt's September.";
        break;
        case 10:std::cout<<"\nIt's October.";
        break;
        case 11:std::cout<<"\nIt's November.";
        break;
        case 12:std::cout<<"\nIt's December.";
        break;
        default:std::cout<<"|Wrong Input|";
    }
}
```



```
Enter the number of the month from 1-12 : 8
```

```
It's August.
```

```
-----  
Process exited after 2.317 seconds with return value 0  
Press any key to continue . . .
```

```
Enter the number of the month from 1-12 : 15
```

```
|Wrong Input|
```

```
-----  
Process exited after 6.51 seconds with return value 0  
Press any key to continue . . .
```

Q-3

Write a program to display a menu of sports like 1.Cricket, 2.Football, 3.Basketball etc and ask the user to enter his/her choice. Display the name of the sport chosen by the user.

[PROGRAMMING and OUTPUT]

```
//DEV C++  
//Program to display a menu of sports like 1.Cricket, 2.Football, 3.Basketball etc and  
ask the user to enter his/her choice.  
  
#include<iostream>  
  
int main()  
{  
    std::cout<<"|Enter your choise you like the most from the following  
options|\n";  
    std::cout<<"1.Cricket.\n";  
    std::cout<<"2.Football.\n";  
    std::cout<<"3.Basketball.\n";  
    int n;  
    std::cin>>n;  
    switch(n)  
    {  
        case 1:std::cout<<"OK! So, you like to play cricket.";  
        break;  
        case 2:std::cout<<"OK! So, you like to play Football.";  
        break;  
        case 3:std::cout<<"OK! So, you like to play Basketball.";  
        break;  
        default:std::cout<<"|Wrong Input|";  
    }  
}
```

```
|Enter your choise you like the most from the following options|
1.Cricket.
2.Football.
3.Basketball.
3
OK! So, you like to play Basketball.
-----
Process exited after 2.884 seconds with return value 0
Press any key to continue . . . _
```

```
|Enter your choise you like the most from the following options|
1.Cricket.
2.Football.
3.Basketball.
5
|Wrong Input|
-----
Process exited after 2.128 seconds with return value 0
Press any key to continue . . .
```

```
|Enter your choise you like the most from the following options|
1.Cricket.
2.Football.
3.Basketball.
1
OK! So, you like to play cricket.
-----
Process exited after 1.398 seconds with return value 0
Press any key to continue . . .
```

Q-4

Write a program to display QUADRANT of the angle entered by the user.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to display QUADRANT of the angle entered by the user.

#include<iostream>

int main()
{
    int n; //n=angle to be entered by the user.
    std::cout<<"Enter the angle : ";
    std::cin>>n;
    if(n>=360)
    {
        int n360=n/360;
        int n90=(n%360)/90;
        switch(n90)
        {
            case 0:std::cout<<"\nThe angle lie in I quadrant.";
            break;
            case 1:std::cout<<"\nThe angle lie in II quadrant.";
            break;
            case 2:std::cout<<"\nThe angle lie in III quadrant.";
            break;
            case 3:std::cout<<"\nThe angle lie in IV quadrant.";
            break;
        }
    }
    else
    {
        int n90=n/90;
        switch(n90)
        {
            case 0:std::cout<<"\nThe angle lie in I quadrant.";
            break;
            case 1:std::cout<<"\nThe angle lie in II quadrant.";
            break;
            case 2:std::cout<<"\nThe angle lie in III quadrant.";
            break;
            case 3:std::cout<<"\nThe angle lie in IV quadrant.";
            break;
        }
    }
}
```

Enter the angle : 706

The angle lie in IV quadrant.

Process exited after 2.353 seconds with return value 0

Press any key to continue . . . _

Enter the angle : 480

The angle lie in II quadrant.

Process exited after 23.14 seconds with return value 0

Press any key to continue . . .

Enter the angle : 564

The angle lie in III quadrant.

Process exited after 4.336 seconds with return value 0

Press any key to continue . . .

Enter the angle : 735

The angle lie in I quadrant.

Process exited after 9.876 seconds with return value 0

Press any key to continue . . . _

LAB PRACTICAL 6

Q-1

Write a program to find the factorial value of any number entered through the keyboard.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to find the factorial value of any number entered through the keyboard.
#include<iostream>
int main()
{
    int n;
    int fact=1;
    std::cout<<"Enter the number : ";
    std::cin>>n;
    while(n>=1)
    {
        fact=fact*n;
        --n;
    }
    std::cout<<"\nThe factorial value of the number you have entered is : 
"<<fact<<"\n";
}
```

Enter the number : 6

The factorial value of the number you have entered is : 720

Process exited after 12.33 seconds with return value 0

Press any key to continue . . .

Enter the number : 4

The factorial value of the number you have entered is : 24

Process exited after 6.491 seconds with return value 0

Press any key to continue . . .

Q-

Two numbers are entered through the keyboard. Write a program to find the value of one number raised to the power of another.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Two numbers are entered through the keyboard. Program to find the value of one
number raised to the power of another.
#include<iostream>
int main()
{
    int n1,n2;
    std::cout<<"Enter number 1 : ";
    std::cin>>n1;
    std::cout<<"\nEnter number 2 : ";
    std::cin>>n2;
    int i=n2;
    int pow=1;
    while(i)
    {
        pow=pow*n1;
        --i;
    }
    std::cout<<"\nThe power of number 1 raised to the number 2 is : "<<pow;
}
```

Enter number 1 : 2

Enter number 2 : 4

The power of number 1 raised to the number 2 is : 16

Process exited after 3.669 seconds with return value 0

Press any key to continue . . . █

Enter number 1 : 8

Enter number 2 : 4

The power of number 1 raised to the number 2 is : 4096

Process exited after 4.057 seconds with return value 0

Press any key to continue . . . █

Q-

Write a program to sum of digits of given integer number.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to sum up the digits of given integer number.
#include<iostream>
int main()
{
    int n;
    std::cout<<"Enter the number : ";
    std::cin>>n;
    int s=0;
    int r;
    while (n)    /*Note-
                Here, in while (x), if x comes to be 0, then loop is over.
                It can also be while (x>0), it means the same.*/
    {
        r=n%10;
        s=s+r;
        n=n/10;
    }
    std::cout<<"\nThe sum of the digits of the number entered by you is : ";
    std::cout<<s;
}
```

Enter the number : 56748

The sum of the digits of the number entered by you is : 30

Process exited after 4.582 seconds with return value 0

Press any key to continue . . .

Enter the number : 3452

The sum of the digits of the number entered by you is : 14

Process exited after 2.98 seconds with return value 0

Press any key to continue . . .

Q-

Write a program to reverse any given POSITIVE integer number.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to reverse any given POSITIVE integer number.
#include<iostream>

int main()
{
    int n;
    std::cout<<"Enter the number to be reversed : ";
    std::cin>>n;
    int num=0;
    int r;
    while (n)
    {
        r=n%10;
        num=(num*10)+r;
        n=n/10;
    }
    std::cout<<"\nThe reverse of the number is : "<<num;
}
```

Enter the number to be reversed : 45673

The reverse of the number is : 37654

Process exited after 2.634 seconds with return value 0

Press any key to continue . . . █

Enter the number to be reversed : 12345

The reverse of the number is : 54321

Process exited after 3.266 seconds with return value 0

Press any key to continue . . .

Q-

Write a program to check given number is prime or not.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to check given number is prime or not.
#include<iostream>

int main()
{
    int n;
    std::cout<<"Enter the number : ";
    std::cin>>n;
    //First step to find the number of factor.
    int i=n;
    int nf=0;
    while(i)
    {
        if(n%i==0)
        {
            ++nf;
            std::cout<<i;
            if(i>1)
                std::cout<<" _ ";
        }
        --i;
    }
    std::cout<<"\n|Above numbers are the factors of the number entered by you|";
    std::cout<<"\n\nThen, the number of factors of the number entered by you is : ";
    "<<nf;
    if(nf==2)
        std::cout<<"\nSo,The number you have entered is a Prime number.";
    else
        std::cout<<"\nSo,The number you have entered is a Composite
number.";
}
```

```
Enter the number : 45
45 _ 15 _ 9 _ 5 _ 3 _ 1
|Above numbers are the factors of the number entered by you|

Then, the number of factors of the number entered by you is : 6
So,The number you have entered is a Composite number.
-----
Process exited after 9.944 seconds with return value 0
Press any key to continue . . . _
```

Q-

Write a program to check or print out all Armstrong numbers between 1 and the input by the user.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to check or print out all Armstrong numbers between 1 and the input by
the user.
#include<iostream>
int main()
{
    std::cout<<"|Choose from the following options :|";
    std::cout<<"\n1.Find weather entered number is armstrong or not.";
    std::cout<<"\n2.Print armstrong number between 1 to your input.";
    int c;
    std::cout<<"\n\nEnter your choise : ";
    std::cin>>c;
    if(c==1)
    {
        std::cout<<"\nEnter the number : ";
        int n;
        std::cin>>n;
        int num=n;
        int s=0,r;
        while(n)
        {
            r=n%10;
            s=s+r*r*r;
            n=n/10;
        }
        if(s==num)
            std::cout<<"\nThe number you have entered is an armstrong number.";
        else
            std::cout<<"\nThe number you have entered is not an armstrong number."; }
    if(c==2)
    {
        std::cout<<"\nEnter the number : ";
        int n;
        std::cin>>n;
        int i=1;
        while(i<=n)
        {
            int s=0,r;
            int i2=i;
            while(i2)
            {
                r=i2%10;
                s=s+(r*r*r);
                i2=i2/10;
            }
            if(s==i)
                std::cout<<i<<" _ ";
            i++;
        }
        std::cout<<"\nThese are the armstrong number between 1 to "<<n<<".";
        if(n>=407)
            {std::cout<<"\n|Note-In general, these are the only armstrong number
between 1 to infinite.|";}
    }
    if(c<1||c>2)
        std::cout<<"\n|WRONG INPUT|"; }
```

|Choose from the following options :|

1.Find weather entered number is armstrong or not.

2.Print armstrong number between 1 to your input.

Enter your choise : 1

Enter the number : 153

The number you have entered is an armstrong number.

Process exited after 19.7 seconds with return value 0

Press any key to continue . . .

|Choose from the following options :|

1.Find weather entered number is armstrong or not.

2.Print armstrong number between 1 to your input.

Enter your choise : 2

Enter the number : 654

1 _ 153 _ 370 _ 371 _ 407 _

These are the armstrong number between 1 to 654.

|Note-In general, these are the only armstrong numbers|

Process exited after 4.108 seconds with return value 0

Press any key to continue . . . _

Q-
Write a program to print Fibonacci series of n terms where n is input by user.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to print Fibonacci series of n terms where n is input by user.
#include<iostream>
using namespace std;

int main()
{
    int a=0,b=1;
    int c,n;
    cout<<"Enter the n terms : ";
    cin>>n;
    int i=3;
    cout<<"\nThe Fibonacci series of "<<n<<" terms are the numbers : \n";
    cout<<a<<"", "<<b<<"", " ";
    while(i<=n)
    {
        c=a+b;
        a=b;
        b=c;
        cout<<c<<"", " ";
        i++;
    }
}
```

Enter the n terms : 15

The Fibonacci series of 15 terms are the numbers :
0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233, 377,

Process exited after 3.889 seconds with return value 0

Press any key to continue . . . █

Enter the n terms : 13

The Fibonacci series of 13 terms are the numbers :
0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144,

Process exited after 1.78 seconds with return value 0

Press any key to continue . . . █

Q-

Write a program to calculate the sum of following series where n is input by user:

$1 + 1/2 + 1/3 + 1/4 + 1/5 + \dots 1/n$.

[PROGRAMMING and OUTPUT]

```
//DEV C++
/*Program to calculate the sum of following series where n is input by user:
1 + 1/2 + 1/3 + 1/4 + 1/5 +... .....1/n*/
#include<iostream>
using namespace std;

int main()
{
    float s=0;
    float n;
    cout<<"Enter n to find the sum of series - 1 + 1/2 + 1/3 + 1/4 + 1/5 +..... 1/n
: ";
    cin>>n;
    float i=1;
    while(i<=n)
    {
        float v=1/i;
        s=s+v;
        i++;
    }
    cout<<"\nThe sum of the series is : "<s;
}
```

Enter n to find the sum of series - 1 + 1/2 + 1/3 + 1/4 + 1/5 +.....1/n : 14

The sum of the series is : 3.25156

Process exited after 7.366 seconds with return value 0

Press any key to continue . . . █

Enter n to find the sum of series - 1 + 1/2 + 1/3 + 1/4 + 1/5 +.....1/n : 3

The sum of the series is : 1.83333

Process exited after 2.126 seconds with return value 0

Press any key to continue . . . █

Q-

Write a program to calculate HCF of two given number.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to calculate HCF of Two given number.
#include<iostream>
using namespace std;
int main()
{
    int a, b, x, y, temp, hcf, lcm;
    cout<<"Enter Number 1 : ";
    cin>>x;
    cout<<"Enter Number 2 : ";
    cin>>y;
    a=x;
    b=y;
    while(b!=0)
    {
        temp=b;
        b=a%b;
        a=temp;
    }
    hcf=a;
    lcm=(x*y)/hcf;
    cout<<"\nThe HCF of the numbers is : "<<hcf<<"\n";
    cout<<"The LCM of the numbers is : "<<lcm<<"\n";
}
```

Enter Number 1 : 15

Enter Number 2 : 25

The HCF of the numbers is : 5

The LCM of the numbers is : 75

Process exited after 3.556 seconds with return value 0

Press any key to continue . . .

Q-38

Write a program to enter the numbers till the user wants and at the end it should display the count of positive, negative and zeros entered.

[PROGRAMMING and OUTPUT]

```
//DEV C++
/*Program to enter the numbers till the user wants
and at the end it should display the count of positive, negative and zeros entered.*/
#include<iostream>
using namespace std;

int main()
{
    int num;
    char choice;
    int positive=0,negative=0,zero=0;
    do
    {
        cout<<"Enter the number : ";
        cin>>num;
        if(num>0)
            ++positive;
        if(num<0)
            ++negative;
        if(num==0)
            ++zero;
        cout<<"Do you want to continue (Y/y) : ";
        cin>>choice;
    }
    while(choice=='Y' || choice=='y');
    cout<<"\nThe number of positive number entered : "<<positive;
    cout<<"\nThe number of negative number entered : "<<negative;
    cout<<"\nThe number of times zero entered : "<<zero;
}
```

```
Enter the number : 5
Do you want to continue (Y/y) : y
Enter the number : 0
Do you want to continue (Y/y) : y
Enter the number : -7
Do you want to continue (Y/y) : y
Enter the number : -6
Do you want to continue (Y/y) : y
Enter the number : 5
Do you want to continue (Y/y) : y
Enter the number : -3
Do you want to continue (Y/y) : n

The number of positive number entered : 2
The number of negative number entered : 3
The number of times zero entered : 1
-----
Process exited after 28 seconds with return value 0
Press any key to continue . . .
```

Q-39

Write a program to enter the numbers till the user wants and at the end it should display the maximum and minimum number entered.

[PROGRAMMING and OUTPUT]

```
//DEV C++
/*Program to enter the numbers till the user wants
and at the end it should display the maximum number entered.*/
#include<iostream>
using namespace std;

int main()
{
    int num,n;
    char choice;
    cout<<"Enter the initial number : ";
    cin>>n;
    int max=n;
    do
    {
        cout<<"Enter the number : ";
        cin>>num;
        if(num>max)
            max=num;
        cout<<"Do you want to continue (Y/y) : ";
        cin>>choice;
    }
    while(choice=='Y' || choice=='y');

    cout<<"\nThe maximum out of the number you entered is : "<<max;
}
```

```
Enter the initial number : 6
Enter the number : 5
Do you want to continue (Y/y) : y
Enter the number : 3
Do you want to continue (Y/y) : y
Enter the number : 2
Do you want to continue (Y/y) : y
Enter the number : -5
Do you want to continue (Y/y) : y
Enter the number : 0
Do you want to continue (Y/y) : y
Enter the number : -2
Do you want to continue (Y/y) : n

The maximum out of the number you entered is : 6
-----
Process exited after 26.97 seconds with return value 0
Press any key to continue . . . _
```


Q-40

Compute the natural logarithm of 2, by adding up to n terms in the series $1 - 1/2 + 1/3 - 1/4 + \dots 1/n$. Where n is a positive integer and input by user.

[PROGRAMMING and OUTPUT]

```
//DEV C++
/*Program to compute the natural logarithm of 2,
by adding up to n terms in the series 1 - 1/2 + 1/3 - 1/4 + 1/5 -... 1/n*/
#include<iostream>
using namespace std;
int main()
{
    int n;
    cout<<"Enter the number of terms : ";
    cin>>n;
    int i=1;
    float sum1=0;
    float sum2=0;
    while(i<=n)
    {
        if(i%2==0)
        {
            sum1=sum1+(1/(float)i);
        }
        else
        {
            sum2=sum2+(1/(float)i);
        }
        i++;
    }
    float sum3=sum2-sum1;
    cout<<"\nThe sum of the series of\n 1 - 1/2 + 1/3 - 1/4 + 1/5 -... to n terms is
: "<<sum3;
}
```

Enter the number of terms : 6

The sum of the series of

1 - 1/2 + 1/3 - 1/4 + 1/5 -... to n terms is : 0.616667

Process exited after 3.366 seconds with return value 0

Press any key to continue . . .

Q-41

Write a program to calculate Fibonacci series upto n terms and print only those numbers that are prime.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to print Fibonacci series of n terms which contain only prime.
#include<iostream>
using namespace std;
int main()
{
    int a=0,b=1,c;
    int nf=0,i=3,i2;
    int num;
    cout<<"Enter the upto terms you want to check : ";
    cin>>num;
    cout<<"\nFibonacci series upto "<<num<<" terms which are prime are :\n";
    //not showing a and b as 0 and 1 are not prime.
    while(i<=num)
    {
        c=a+b;
        i2=c;
        while(i2)
        {
            if(c%i2==0)
                ++nf;
            --i2;
        }
        if(nf==2)
            cout<<c<<" ";
        nf=0;
        a=b;
        b=c;
        ++i;
    }
}
```

Enter the upto terms you want to check : 50

Fibonacci series upto 50 terms which are prime are :
2 3 5 13 89 233 1597 28657 514229

ASSIGNMENT ON LOOPING

[Program to print series]

1.

[PROGRAMMING and OUTPUT]

```
//DEV C++
#include<iostream>
using namespace std;
int main()
{
    int n,i,i2,j=1;
    cout<<"Enter no. =";
    cin>>n;
    for(i=1;i<=n;++i)
    {
        for(i2=1;i2<=j;++i2)
            cout<<"*";
        cout<<endl;
        ++j;
    }
}
```

- Use i(...) and j(...) for loops.
- Use x(...) for output statements.
- Use y(...) and z(...) for storing values of i(...) and x(...) respectively.

Enter no. =4

```
*
**
***
****
```

Process exited after 1.698 seconds with return value 0
Press any key to continue . . . █

Enter no. =5

```
*
**
***
****
*****
```

Process exited after 1.567 seconds with return value 0
Press any key to continue . . . █

[PROGRAMMING and OUTPUT]

```
//DEV C++
#include<iostream>
using namespace std;
int main()
{
    int n,i,i2,j=1,x;
    cout<<"Enter no. =";
    cin>>n;
    for(i=1;i<=n;++i)
    {
        for(i2=1,x=1;i2<=j;++i2)
        {
            cout<<x;
            ++x;
        }
        cout<<"\n";
        ++j;
    }
}
```

Enter no. =4

1
12
123
1234

Process exited after 1.305 seconds with return value 0
Press any key to continue . . . █

Enter no. =5

1
12
123
1234
12345

Process exited after 1.649 seconds with return value 0
Press any key to continue . . . █

[PROGRAMMING and OUTPUT]

```
//DEV C++
#include<iostream>
using namespace std;
int main()
{
    int n,i,i2,j=1,x=1;
    cout<<"Enter no. =";
    cin>>n;
    for(i=1;i<=n;++i)
    {
        for(i2=1;i2<=j;++i2)
            cout<<x;
        cout<<endl;
        ++x;++j;
    }
}
```

Enter no. =4

1
22
333
4444

Process exited after 0.4228 seconds with return value 0
Press any key to continue . . .

Enter no. =5

1
22
333
4444
55555

Process exited after 2.296 seconds with return value 0
Press any key to continue . . .

```
//DEV C++
#include<iostream>
using namespace std;
int main()
{
    int n,i,i2,j=1,x=1,z;
    cout<<"Enter no. =";
    cin>>n;
    for(i=1;i<=n;++i)
    {
        z=x; //z to store x.
        for(i2=1;i2<=j;++i2)
        {
            cout<<x;
            --x;
        }
        cout<<"endl;
        x=z;
        ++x;++j;
    }
}
```

Enter no. =4

1
21
321
4321

Process exited after 0.4189 seconds with return value 0
Press any key to continue . . .

Enter no. =5

1
21
321
4321
54321

Process exited after 5.846 seconds with return value 0
Press any key to continue . . .

```
//DEV C++
#include<iostream>
using namespace std;
int main()
{
    int n,i,i2,j=1,x;
    cout<<"Enter no. =";
    cin>>n;
    for(i=1;i<=n;++i)
    {
        for(i2=1,x=n;i2<=j;++i2)
        {
            cout<<x;
            --x;
        }
        cout<<endl;
        ++j;
    }
}
```

Enter no. =4

4
43
432
4321

Process exited after 1.027 seconds with return value 0
Press any key to continue . . . _

Enter no. =5

5
54
543
5432
54321

Process exited after 1.14 seconds with return value 0
Press any key to continue . . . _

```
//DEV C++
#include<iostream>
using namespace std;
int main()
{
    int n,i,i2,j=1,x,z;
    cout<<"Enter no. =";
    cin>>n;
    x=n;
    for(i=1;i<=n;++i)
    {
        z=x;
        for(i2=1;i2<=j;++i2)
        {
            cout<<x;
            ++x;
        }
        cout<<endl;
        x=z;
        --x;++j;
    }
}
```

Enter no. =4

4
34
234
1234

Process exited after 4.694 seconds with return value 0
Press any key to continue . . .

Enter no. =5

5
45
345
2345
12345

Process exited after 1.865 seconds with return value 0
Press any key to continue . . .

[PROGRAMMING and OUTPUT]

```
//DEV C++
#include<iostream>
using namespace std;
int main()
{
    int n,i,i2,i3,j,j2=1,x=1;
    cout<<"Enter no. =";
    cin>>n;
    j=n;
    for(i=1;i<=n;++i)
    {
        for(i2=1;i2<j;++i2)
            cout<<" ";
        for(i3=1,x=1;i3<=j2;++i3)
        {
            cout<<x;
            ++x;
        }
        cout<<endl;
        --j;++j2;
    }
}
```

Enter no. =4

1
12
123
1234

Process exited after 2.961 seconds with return value 0
Press any key to continue . . .

Enter no. =5

1
12
123
1234
12345

Process exited after 1.967 seconds with return value 0
Press any key to continue . . .

[PROGRAMMING and OUTPUT]

```
//DEV C++
#include<iostream>
using namespace std;
int main()
{
    int n,i,i2,i3,j,j2=1,x=1,z;
    cout<<"Enter no. =";
    cin>>n;
    j=n;
    for(i=1;i<=n;++i)
    {
        z=x;
        for(i2=1;i2<j;++i2)
            cout<<" ";
        for(i3=1;i3<=j2;++i3)
        {
            cout<<x;
            --x;
        }
        cout<<endl;
        x=z;++x;
        --j;++j2;
    }
}
```

Enter no. =4

1
21
321
4321

Process exited after 1.266 seconds with return value 0
Press any key to continue . . . █

Enter no. =5

1
21
321
4321
54321

Process exited after 4.384 seconds with return value 0
Press any key to continue . . . █

[PROGRAMMING and OUTPUT]

```
//DEV C++
#include<iostream>
using namespace std;
int main()
{
    int n,i,i2,i3,j,j2=1,x;
    cout<<"Enter no. =";
    cin>>n;
    j=n;
    for(i=1;i<=n;++i)
    {
        for(i2=1;i2<j;++i2)
            cout<<" ";
        for(i3=1,x=n;i3<=j2;++i3)
        {
            cout<<x;
            --x;
        }
        cout<<endl;
        --j;++j2;
    }
}
```

Enter no. =4

4
43
432
4321

Process exited after 1.902 seconds with return value 0
Press any key to continue . . .

Enter no. =5

5
54
543
5432
54321

Process exited after 1.781 seconds with return value 0
Press any key to continue . . .

51.

[PROGRAMMING and OUTPUT]

```
//DEV C++
#include<iostream>
using namespace std;
int main()
{
    char chr,i,i2,j,x;
    cout<<"Enter letter(in capital) =";
    cin>>chr;
    j='A';
    for(i='A';i<=chr;++i)
    {
        for(i2='A',x='A';i2<=j;++i2)
        {
            cout<<x;
            ++x;
        }
        cout<<endl;
        ++j;
    }
}
```

- Enter character as chr.
- Directly use the characters.
- Use x(...) for output.
- Use i(...) and j(...) to control the loop.

Enter letter(in capital) =D

A
AB
ABC
ABCD

Process exited after 2.45 seconds with return value 0
Press any key to continue . . .

Enter letter(in capital) =E

A
AB
ABC
ABCD
ABCDE

Process exited after 4.972 seconds with return value 0
Press any key to continue . . .

[PROGRAMMING and OUTPUT]

```
//DEV C++
#include<iostream>
using namespace std;
int main()
{
    char chr,i,i2,j,x,z;
    cout<<"Enter letter(in capital) =";
    cin>>chr;
    x='A';j='A';
    for(i='A';i<=chr;++i)
    {
        z=x;
        for(i2='A';i2<=j;++i2)
        {
            cout<<x;
            --x;
        }
        cout<<endl;
        x=z;
        ++x;++j;
    }
}
```

Enter letter(in capital) =D

A
BA
CBA
DCBA

Process exited after 1.361 seconds with return value 0
Press any key to continue . . .

Enter letter(in capital) =E

A
BA
CBA
DCBA
EDCBA

Process exited after 3.141 seconds with return value 0
Press any key to continue . . .

```
//DEV C++
#include<iostream>
using namespace std;
int main()
{
    char chr,i,i2,j,x;
    cout<<"Enter letter(in capital) =";
    cin>>chr;
    j='A';
    for(i='A';i<=chr;++i)
    {
        for(i2='A',x=chr;i2<=j;++i2)
        {
            cout<<x;
            --x;
        }
        cout<<endl;
        ++j;
    }
}
```

Enter letter(in capital) =D

D
DC
DCB
DCBA

Process exited after 2.612 seconds with return value 0
Press any key to continue . . . █

Enter letter(in capital) =E

E
ED
EDC
EDCB
EDCBA

Process exited after 2.139 seconds with return value 0
Press any key to continue . . . █

54.

[PROGRAMMING and OUTPUT]

```
//DEV C++
#include<iostream>
using namespace std;
int main()
{
    char chr,i,i2,i3,j,j2,x,z;
    cout<<"Enter letter(in capital) =";
    cin>>chr;
    x='A';j=chr;j2='A';
    for(i='A';i<=chr;++i)
    {
        z=x;
        for(i2='A';i2<j;++i2)
            cout<<" ";
        for(i3='A';i3<=j2;++i3)
        {
            cout<<x;
            --x;
        }
        cout<<endl;
        x=z;++x;
        --j;++j2;
    }
}
```

Enter letter(in capital) =D

A
BA
CBA
DCBA

Process exited after 10.9 seconds with return value 0
Press any key to continue . . .

Enter letter(in capital) =E

A
BA
CBA
DCBA
EDCBA

Process exited after 2.837 seconds with return value 0
Press any key to continue . . .

55.

[PROGRAMMING and OUTPUT]

```
//DEV C++
#include<iostream>
using namespace std;
int main()
{
    char chr,i,i2,i3,j,j2,x,z;
    cout<<"Enter letter(in capital) =";
    cin>>chr;
    x='A';j=chr;j2='A';
    for(i='A';i<=chr;++i)
    {
        for(i2='A';i2<j;++i2)
            cout<<" ";
        for(i3='A',x=chr;i3<=j2;++i3)
        {
            cout<<x;
            --x;
        }
        cout<<endl;
        --j;++j2;
    }
}
```

Enter letter(in capital) =D

D
DC
DCB
DCBA

Process exited after 0.9836 seconds with return value 0
Press any key to continue . . . █

Enter letter(in capital) =E

E
ED
EDC
EDCB
EDCBA

Process exited after 1.342 seconds with return value 0
Press any key to continue . . . █

56.

[PROGRAMMING and OUTPUT]

```
//DEV C++
#include<iostream>
using namespace std;
int main()
{
    int n,i,i2,i3,i4,j,j2=1,j3=1;
    cout<<"Enter no. =";
    cin>>n;
    j=n;
    for(i=1;i<=n;++i)
    {
        for(i2=1;i2<j;++i2)
            cout<<" ";
        for(i3=1;i3<=j2;++i3)
            cout<<"*";
        for(i4=1;i4<j3;++i4)
            cout<<"*";
        cout<<endl;
        --j;++j2;++j3;
    }
}
```

Enter no. =4

```
  *
 ***
*****
*****
```

Process exited after 1.627 seconds with return value 0
Press any key to continue . . .

Enter no. =5

```
  *
 ***
*****
*****
*****
```

Process exited after 2.769 seconds with return value 0
Press any key to continue . . .

57.

[PROGRAMMING and OUTPUT]

```
//DEV C++
#include<iostream>
using namespace std;
int main()
{
    int n,i,i2,i3,i4,j,j2=1,j3=1,x1,x2=0,z2;
    cout<<"Enter no. =";
    cin>>n;
    j=n;
    for(i=1;i<=n;++i)
    {
        z2=x2;
        for(i2=1;i2<j;++i2)
            cout<<" ";
        for(i3=1,x1=1;i3<=j2;++i3)
        {
            cout<<x1;
            ++x1;
        }
        for(i4=1;i4<j3;++i4)
        {
            cout<<x2;
            --x2;
        }
        cout<<endl;
        x2=z2;++x2;
        --j;++j2;++j3;
    }
}
```

Enter no. =5

1

121

12321

1234321

123454321

Process exited after 6.648 seconds with return value 0
Press any key to continue . . . █

58.

[PROGRAMMING and OUTPUT]

```
//DEV C++
#include<iostream>
using namespace std;
int main()
{
    int n,i,i2,i3,i4,j,j2,j3;
    cout<<"Enter no. =";
    cin>>n;
    j=n;j2=1;j3=n;
    for(i=1;i<=n;++i)
    {
        for(i2=1;i2<=j;++i2)
            cout<<"o";
        for(i3=1;i3<j3;++i3)
            cout<<"o";
        cout<<endl;
        for(i4=1;i4<=j2;++i4)
            cout<<" ";
        --j;++j2;--j3;
    }
}
```

Enter no. =4

```
oooooooo
  ooooo
    ooo
      o
```

Process exited after 1.146 seconds with return value 0
Press any key to continue . . .

Enter no. =5

```
oooooooooooo
  oooooooo
    ooooo
      ooo
        o
```

Process exited after 2.261 seconds with return value 0
Press any key to continue . . .

[PROGRAMMING and OUTPUT]

```
//DEV C++
#include<iostream>
using namespace std;
int main()
{
    int n,i,i2,i3,i4,j,j2,j3;
    cout<<"Enter no. =";
    cin>>n;
    j=n;j2=1;
    for(i=1;i<n;++i)
    {
        for(i2=1;i2<j;++i2)
            cout<<" ";
        cout<<"*";
        if(i!=1)
        {
            for(i3=1;i3<=j2;++i3)
                cout<<" ";
            cout<<"*";
            j2+=2;
        }
        cout<<endl;
        --j;
    }
    j3=2*n;
    for(i4=1;i4<j3;++i4)
        cout<<"*";
}
```

Enter no. =7

```

      *
    * *
  *   *
 *     *
*       *
*       *
*       *
*****

```

 Process exited after 5.988 seconds with return value 0
 Press any key to continue . . . █

[Program to find sum of the series]

Q1 - $1/1! + 1/2! + 1/3! + 1/4! \dots$ upto n terms.

[PROGRAMMING and OUTPUT]

```
//DEV C++
#include<iostream>
#include<math.h>
using namespace std;
int fact(int);
int main()
{
    int n,i;
    float dr,sum=0;
    cout<<"Enter the upto terms : ";
    cin>>n;
    for(i=1;i<=n;++i)
    {
        dr=fact(i);
        sum+=1/dr;
    }
    cout<<"\nThe result of the series \n|1/1! + 1/2! + 1/3! + 1/4! to n terms| is :
"<<sum;
}
int fact(int x)
{
    int i,fact=1;
    for(i=1;i<=x;++i)
        fact*=i;
    return fact;
}
```

Enter the upto terms : 3

The result of the series

|1/1! + 1/2! + 1/3! + 1/4! to n terms| is : 1.66667

Process exited after 1.541 seconds with return value 0

Press any key to continue . . . _

Q2 - $1/4! - 2/9! + 3/16! - 4/25! + 5/36! \dots$ upto n terms.

[PROGRAMMING and OUTPUT]

```
//DEV C++
#include<iostream>
#include<math.h>
using namespace std;
int fact(int);
int main()
{
    int n,i;
    float nr=1,dr,sum=0;
    cout<<"Enter the upto terms : ";
    cin>>n;
    for(i=1;i<=n;++i)
    {
        dr=fact(pow((nr+1),2));
        if(i%2!=0)
            sum+=nr/dr;
        else
            sum-=nr/dr;
        ++nr;
    }
    cout<<"\nThe result of the series \n|1/4! - 2/9! + 3/16! - 4/25! to n terms| is :
"<<sum;
}
int fact(int x)
{
    int i,fact=1;
    for(i=1;i<=x;++i)
        fact*=i;
    return fact;
}
```

Enter the upto terms : 3

The result of the series

|1/4! - 2/9! + 3/16! - 4/25! to n terms| is : 0.0416612

Process exited after 1.208 seconds with return value 0

Press any key to continue . . .

Q62 - $x/1! + x^2/2! + x^3/3! + x^4/4! + \dots$ upto n

[PROGRAMMING and OUTPUT]

```
//DEV C++
#include<iostream>
#include<math.h>
using namespace std;
int fact(int);
int main()
{
    int n,x,i,pwr=1;
    float nr,dr,sum=0;
    cout<<"Enter the value of X : ";
    cin>>x;
    cout<<"Enter the upto terms : ";
    cin>>n;
    for(i=1;i<=n;++i)
    {
        nr=pow(x,pwr);
        dr=fact(pwr);
        sum+=nr/dr;
        ++pwr;
    }
    cout<<"\nThe result of the series \n|x/1! + x2/2! + x3/3! to n terms| is :
"<<sum;
}
int fact(int x)
{
    int i,fact=1;
    for(i=1;i<=x;++i)
        fact*=i;
    return fact;
}
```

Enter the value of X : 3

Enter the upto terms : 3

The result of the series

|x/1! + x2/2! + x3/3! to n terms| is : 12

Process exited after 4.064 seconds with return value 0

Press any key to continue . . . █

Q4 - $x/2! + x^2/4! + x^3/6! + x^4/8! + \dots$ upto n terms.

[PROGRAMMING and OUTPUT]

```
//DEV C++
#include<iostream>
#include<math.h>
using namespace std;
int fact(int);
int main()
{
    int n,x,i,pwr=1;
    float nr,dr,sum=0;
    cout<<"Enter the value of X : ";
    cin>>x;
    cout<<"Enter the upto terms : ";
    cin>>n;
    for(i=1;i<=n;++i)
    {
        nr=pow(x,pwr);
        dr=fact(2*pwr);
        sum+=nr/dr;
        ++pwr;
    }
    cout<<"\nThe result of the series \n|x/2! + x2/4! + x3/6! to n terms| is :
"<<sum;
}
int fact(int x)
{
    int i,fact=1;
    for(i=1;i<=x;++i)
        fact*=i;
    return fact;
}
```

Enter the value of X : 3

Enter the upto terms : 3

The result of the series

|x/2! + x2/4! + x3/6! to n terms| is : 1.9125

Process exited after 2.967 seconds with return value 0

Press any key to continue . . . █

Q5 - $x^2/1! + x^4/2! + x^6/3! + \dots$ upto n terms.

[PROGRAMMING and OUTPUT]

```
//DEV C++
#include<iostream>
#include<math.h>
using namespace std;
int fact(int);
int main()
{
    int n,x,i,pwr=2;
    float nr,dr,sum=0;
    cout<<"Enter the value of X : ";
    cin>>x;
    cout<<"Enter the upto terms : ";
    cin>>n;
    for(i=1;i<=n;++i)
    {
        nr=pow(x,pwr);
        dr=fact(pwr/2);
        sum+=nr/dr;
        pwr+=2;
    }
    cout<<"\nThe result of the series \n|x2/1! + x4/2! + x6/3! to n terms| is :
"<<sum;
}
int fact(int x)
{
    int i,fact=1;
    for(i=1;i<=x;++i)
        fact*=i;
    return fact;
}
```

Enter the value of X : 3

Enter the upto terms : 3

The result of the series

|x2/1! + x4/2! + x6/3! to n terms| is : 171

Process exited after 2.712 seconds with return value 0

Press any key to continue . . . █

Q6 - $x/1! - x^2/2! + x^3/3! - x^4/4! + \dots$ upto n terms.

[PROGRAMMING and OUTPUT]

```
//DEV C++
#include<iostream>
#include<math.h>
using namespace std;
int fact(int);
int main()
{
    int n,x,i,pwr=2;
    float nr,dr,sum=0;
    cout<<"Enter the value of X : ";
    cin>>x;
    cout<<"Enter the upto terms : ";
    cin>>n;
    for(i=1;i<=n;++i)
    {
        nr=pow(x,pwr);
        dr=fact(pwr/2);
        sum+=nr/dr;
        pwr+=2;
    }
    cout<<"\nThe result of the series \n|x2/1! + x4/2! + x6/3! to n terms| is :
"<<sum;
}
int fact(int x)
{
    int i,fact=1;
    for(i=1;i<=x;++i)
        fact*=i;
    return fact;
}
```

Enter the value of X : 3

Enter the upto terms : 3

The result of the series

|x/1! - x²/2! + x³/3! - x⁴/4! to n terms| is : 3

Process exited after 3.82 seconds with return value 0

Press any key to continue . . .

Q7 - $x^3/3! + x^5/5! + x^7/7! + x^9/9! + \dots$ upto n terms.

[PROGRAMMING and OUTPUT]

```
//DEV C++
#include<iostream>
#include<math.h>
using namespace std;
int fact(int);
int main()
{
    int n,x,i,pwr=3;
    float nr,dr,sum=0;
    cout<<"Enter the value of X : ";
    cin>>x;
    cout<<"Enter the upto terms : ";
    cin>>n;
    for(i=1;i<=n;++i)
    {
        nr=pow(x,pwr);
        dr=fact(pwr);
        sum+=nr/dr;
        pwr+=2;
    }
    cout<<"\nThe result of the series \n|x3/3! + x5/5! + x7/7! to n terms| is :
"<<sum;
}
int fact(int x)
{
    int i,fact=1;
    for(i=1;i<=x;++i)
        fact*=i;
    return fact;
}
```

Enter the value of X : 3

Enter the upto terms : 3

The result of the series

|x3/3! + x5/5! + x7/7! to n terms| is : 6.95893

Process exited after 2.653 seconds with return value 0

Press any key to continue . . . █

Q8 - $x^3/3! - x^5/5! + x^7/7! - x^9/9! + \dots$ upto n terms.

[PROGRAMMING and OUTPUT]

```
//DEV C++
#include<iostream>
#include<math.h>
using namespace std;
int fact(int);
int main()
{
    int n,x,i,pwr=3;
    float nr,dr,sum=0;
    cout<<"Enter the value of X : ";
    cin>>x;
    cout<<"Enter the upto terms : ";
    cin>>n;
    for(i=1;i<=n;++i)
    {
        nr=pow(x,pwr);
        dr=fact(pwr);
        if(i%2!=0)
            sum+=nr/dr;
        else
            sum-=nr/dr;
        pwr+=2;
    }
    cout<<"\nThe result of the series \n|x3/3! - x5/5! + x7/7! - ... to n terms| is :
"<<sum;
}
int fact(int x)
{
    int i,fact=1;
    for(i=1;i<=x;++i)
        fact*=i;
    return fact;
}
```

Enter the value of X : 3

Enter the upto terms : 3

The result of the series

|x3/3! - x5/5! + x7/7! - ... to n terms| is : 2.90893

Process exited after 2.771 seconds with return value 0

Press any key to continue . . .

Q9 - $1 - x^2/2! + x^4/4! - x^6/6! + \dots$ upto n terms.

[PROGRAMMING and OUTPUT]

```
//DEV C++
#include<iostream>
#include<math.h>
using namespace std;
int fact(int);
int main()
{
    int n,x,i,pwr=0;
    float nr,dr,sum=0;
    cout<<"Enter the value of X : ";
    cin>>x;
    cout<<"Enter the upto terms : ";
    cin>>n;
    for(i=1;i<=n;++i)
    {
        nr=pow(x,pwr);
        dr=fact(pwr);
        if(i%2!=0)
            sum+=nr/dr;
        else
            sum-=nr/dr;
        pwr+=2;
    }
    cout<<"\nThe result of the series\n|1 - x2/2! + x4/4! - x6/6! to n terms is
: "<<sum;
}
int fact(int x)
{
    int i,fact=1;
    for(i=1;i<=x;++i)
        fact*=i;
    return fact;
}
```

Enter the value of X : 3

Enter the upto terms : 3

The result of the series

|1 - x²/2! + x⁴/4! - x⁶/6! to n terms is : -0.125

Process exited after 2.352 seconds with return value 0

Press any key to continue . . .

LAB PRACTICAL 7

Q-1

Write a program to find the maximum and the minimum values in an array of 'n' elements.'

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to find max. and min. element from an array.
#include<iostream>
using namespace std;
int main()
{
    int a[15],n,i,max,min;
    again:
    cout<<"Enter the size of the array(<15) : ";
    cin>>n;
    if(n>15)
    {
        cout<<"Please enter a value less than 15.\n";
        goto again;
    }
    cout<<"Enter the array elements : \n";
    cin>>a[0];
    max=min=a[0];
    for(i=1;i<n;++i)
    {
        cin>>a[i];
        if(a[i]>max)
            max=a[i];
        else if(a[i]<min)
            min=a[i];
    }
    cout<<"Largest number entered in the array is "<<max<<" and smallest
    number entered is "<<min<<.";
}
```

```
Enter the size of the array(<15) : 6
Enter the array elements :
56
87
76
45
34
65
Largest number entered in the array is 87 and smallest number entered is 34.
-----
Process exited after 8.354 seconds with return value 0
Press any key to continue . . .
```

Q-
Write a program to reverse an array of 'n' elements.'

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to reverse an integer array in memory.
#include<iostream>
using namespace std;
int main()
{
    int a[15],i,j,n,temp;
    again:
    cout<<"Enter the size of the array(<15) : ";
    cin>>n;
    if(n>15)
    {
        cout<<"Please enter a value less than 15.\n";
        goto again;
    }
    cout<<"Enter the array elements : \n";
    for(i=0;i<n;++i)
        cin>>a[i];
    for(i=0,j=n-1;i<n/2;++i,--j)
    {
        temp=a[i];
        a[i]=a[j];
        a[j]=temp;
    }
    cout<<"\nReverse array is : \n";
    for(i=0;i<n;++i)
        cout<<a[i]<<"\t";
}
```

```
Enter the size of the array(<15) : 6
Enter the array elements :
34
56
78
23
43
58

Reverse array is :
58      43      23      78      56      34
-----
Process exited after 7.757 seconds with return value 0
Press any key to continue . . .
```

Q-

Write a program to combine the contents two equi sized arrays A and B by adding their corresponding elements as the formula $A[i] + B[i]$; where value i varies from 0 to $N-1$ and transfer the resultant content in the third same sized array C.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to add elements of two arrays and store resultant in 3rd array.
#include<iostream>
using namespace std;
int main()
{
    int a[15],b[15],c[15],i,n;
    cout<<"Enter the size of array (<15) : ";
    cin>>n;
    cout<<"Enter array 1 elements :\n";
    for(i=0;i<n;++i)
        cin>>a[i];
    cout<<"Enter array 2 elements :\n";
    for(i=0;i<n;++i)
        cin>>b[i];
    for(i=0;i<n;++i)
        c[i]=a[i]+b[i];
    cout<<"Array 1 entered by you : \n";
    for(i=0;i<n;++i)
        cout<<a[i]<<"\t";
    cout<<"\nArray 2 entered by you : \n";
    for(i=0;i<n;++i)
        cout<<b[i]<<"\t";
    cout<<"\nNew desired array : \n";
    for(i=0;i<n;++i)
        cout<<c[i]<<"\t";
}
```

```
Enter the size of array (<15) : 3
Enter array 1 elements :
23
54
65
Enter array 2 elements :
23
66
98
Array 1 entered by you :
23    54    65
Array 2 entered by you :
23    66    98
New desired array :
46    120    163
-----
Process exited after 7.082 seconds with return value 0
Press any key to continue . . .
```


Q-

Write a program to create two arrays A and B. Obtain values of A and B from the user. Now, copy last 3 elements of B after first 3 elements of A to create another array C.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to create 2 arrays and copy first 3 elements from array 1 and last 3 array
from array 2 to array 3.
#include<iostream>
using namespace std;
int main()
{
    int a[15],b[15],c[6],n1,n2,i,k;
    cout<<"Enter the size of array 1 : ";
    cin>>n1;
    cout<<"Enter the size of array 2 : ";
    cin>>n2;

    cout<<"Enter array 1 elements : \n";
    for(i=0;i<n1;++i)
        cin>>a[i];

    cout<<"Enter array 2 elements : \n";
    for(i=0;i<n2;++i)
        cin>>b[i];

    for(i=0;i<3;++i)
        c[i]=a[i];

    k=i;
    for(i=n2-3;i<n2;++i,++k)
        c[k]=b[i];

    cout<<"Elements of array 1 are : \n";
    for(i=0;i<n1;++i)
        cout<<a[i]<<"\t";

    cout<<"\nElements of array 2 are : \n";
    for(i=0;i<n2;++i)
        cout<<b[i]<<"\t";

    cout<<"\nDesired elements of array 3 are : \n";
    for(i=0;i<6;++i)
        cout<<c[i]<<"\t";
}
```

```

Enter the size of array 1 : 3
Enter the size of array 2 : 4
Enter array 1 elements :
65
98
09
Enter array 2 elements :
78
56
76
34
Elements of array 1 are :
65      98      9
Elements of array 2 are :
78      56      76      34
Desired elements of array 3 are :
65      98      9      56      76      34
-----
Process exited after 20.36 seconds with return value 0
Press any key to continue . . . _

```

```

Enter the size of array 1 : 5
Enter the size of array 2 : 4
Enter array 1 elements :
4
5
87
32
45
Enter array 2 elements :
54
12
91
63
Elements of array 1 are :
4      5      87      32      45
Elements of array 2 are :
54      12      91      63
Desired elements of array 3 are :
4      5      87      12      91      63
-----
Process exited after 27.19 seconds with return value 0
Press any key to continue . . . _

```

Q-5

Write a program to swap every alternate elements.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to swap every element of array with its alternate element.
#include<iostream>
using namespace std;
int main()
{
    int a[15],n,n1,i,cnt,temp;
    again:
    cout<<"Enter the size of the array(<15) : ";
    cin>>n;
    if(n>15)
        {
            cout<<"Please enter a value less than 15.\n";
            goto again;
        }
    if(n%2==0)
        n1=n;
    else
        n1=n-1;
    cout<<"Enter the array elements : \n";
    for(i=0;i<n;++i)
        cin>>a[i];
    for(i=0;i<n1;i+=2)
        {
            temp=a[i];
            a[i]=a[i+1];
            a[i+1]=temp;
        }
    cout<<"Desired modified array is : \n";
    for(i=0,cnt=0;i<n;++i)
        {
            cout<<a[i]<<"\t";
            ++cnt;
            if(cnt%5==0)
                cout<<endl;
        }
}
```

Enter the size of the array(<15) : 5

Enter the array elements :

34

56

97

81

23

Desired modified array is :

56 34 81 97 23

Process exited after 6.038 seconds with return value 0

Press any key to continue . . .

Q-6

Write a program to modify integer array in increasing order.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to modify an integer array in increasing order.
#include<iostream>
using namespace std;
int main()
{
    int a[15],i,i2,n,temp;
    cout<<"Enter the size of the array(<15) : ";
    cin>>n;
    cout<<"Enter the array elements : \n";
    for(i=0;i<n;++i)
        cin>>a[i];
    for(i=0;i<n-1;++i)
        for(i2=0;i2<n-1-i;++i2)
        {
            if(a[i2]>a[i2+1])
            {
                temp=a[i2];
                a[i2]=a[i2+1];
                a[i2+1]=temp;
            }
        }
    cout<<"Desired modified array is : \n";
    for(i=0;i<n;++i)
        cout<<a[i]<<"\t";
    cout<<"\nMaximum of the entered element is : "<<a[n-1];
    cout<<"\nMinimum of the entered element is : "<<a[0];
}
```

```
Enter the size of the array(<15) : 5
Enter the array elements :
34
76
21
76
98
Desired modified array is :
21      34      76      76      98
Maximum of the entered element is : 98
Minimum of the entered element is : 21
-----
Process exited after 9.781 seconds with return value 0
Press any key to continue . . .
```

LAB PRACTICAL 8

Q-1

Write a program to concatenate one string contents to another.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to concatenate one string contents to another.
#include<iostream>
#include<stdio.h>
using namespace std;
int main()
{
    char a[30],b[15];
    int i,k,cnt1=0,cnt2=0;
    cout<<"Enter string 1 : ";
    gets(a);
    cout<<"Enter string 2 : ";
    gets(b);
    for(i=0;a[i]!='\0';++i)
        ++cnt1;
    for(i=0;b[i]!='\0';++i)
        ++cnt2;
    for(i=cnt1,k=0;k+1<=cnt2;++i,++k)
        a[i]=b[k];
    cout<<"Desired modified string is : "<<a;
}
```

```
Enter string 1 : I have
Enter string 2 : DONE IT.
Desired modified string is : I have DONE IT.
-----
Process exited after 10.34 seconds with return value 0
Press any key to continue . . . █
```

```
Enter string 1 : this is the
Enter string 2 : joined output
Desired modified string is : this is the joined output
-----
Process exited after 36.86 seconds with return value 0
Press any key to continue . . .
```

Q-2

Write a program to compare two strings they are exact equal or not.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to compare two strings they are exact equal or not.
#include<iostream>
#include<stdio.h>
#include<process.h>
using namespace std;
int main()
{
    char a[15],b[15];
    int i,n,cnt1=0,cnt2=0,flag=0;
    cout<<"Enter string 1 : \n";
    gets(a);
    cout<<"Enter string 2 : \n";
    gets(b);
    for(i=0;a[i]!='\0';++i)
        ++cnt1;
    for(i=0;b[i]!='\0';++i)
        ++cnt2;
    if(cnt1!=cnt2)
    {
        cout<<"No, the two strings entered by you are not equal.";
        exit(0);
    }
    for(i=0;i<cnt1;++i)
        if(a[i]!=b[i])
        {
            flag=1;
            break;
        }
    if(flag==1)
        cout<<"No, the two strings entered by you are not equal.";
    else
        cout<<"Yes, the two strings entered by you are equal.";
}
```

```
Enter string 1 :
COMPUTER
Enter string 2 :
COMPUTER
Yes, the two strings entered by you are equal.
-----
Process exited after 18.36 seconds with return value 0
Press any key to continue . . . _
```

```

Enter string 1 :
abcdef
Enter string 2 :
abcdefg
No, the two strings entered by you are not equal.
-----
Process exited after 6.834 seconds with return value 0
Press any key to continue . . .

```

Q-3

Write a program to check a string is palindrome or not.

[PROGRAMMING and OUTPUT]

```

//DEV C++
//Program to check whether a string is palindrome or not.
#include<iostream>
#include<stdio.h>
using namespace std;
int main()
{
    char a[15],b[15];
    int i,k,temp,cnt=0,flag=0;
    cout<<"Enter the string : \n";
    gets(a);
    for(i=0;a[i]!='\0';++i)
        ++cnt;
    for(i=0;i<cnt;++i)
        b[i]=a[i];
    b[cnt]='\0';
    for(i=0,k=cnt-1;i<cnt/2;++i,--k)
    {
        temp=a[i];
        a[i]=a[k];
        a[k]=temp;
    }
    cout<<"Reverse of the string is : \n"<<a;
    for(i=0;a[i]!='\0';++i)
    {
        if(a[i]!=b[i])
        {
            flag=1;
            break;
        }
    }
    if(flag==1)
        cout<<"\nNo, the string you have entered is not pallindrome.";
    else
        cout<<"\nYes, the string you have entered is pallindrome.";
}

```

```
Enter string 1 :  
abcdef  
Enter string 2 :  
abcdefg  
No, the two strings entered by you are not equal.  
-----  
Process exited after 6.834 seconds with return value 0  
Press any key to continue . . .
```

```
Enter the string :  
SCIENCE  
Reverse of the string is :  
ECNEICS  
No, the string you have entered is not pallindrome.  
-----  
Process exited after 12.61 seconds with return value 0  
Press any key to continue . . .
```

```
Enter the string :  
Methodology  
Reverse of the string is :  
ygolodohtem  
No, the string you have entered is not pallindrome.  
-----  
Process exited after 23.56 seconds with return value 0  
Press any key to continue . . .
```


Q-4

Write a program to find a substring within a string. If found display its starting position.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to find a substring within a string. If found display its starting position.
#include<iostream>
#include<stdio.h>
#include<process.h>
using namespace std;
int main()
{
    char a[30],b[10];
    int i,j,k,sublen=0,flag=0;
    cout<<"Enter the main string : ";
    gets(a);
    cout<<"Enter the sub string : ";
    gets(b);
    for(i=0;b[i]!='\0';++i)
        ++sublen;
    for(i=0;a[i]!='\0';++i)
    {
        k=i,j=0;
        for( ;a[k]==b[j]&& j<sublen; )
        {
            ++k;
            ++j;
        }
        if(j==sublen)
        {
            cout<<"Yes, we get the substring you entered.";
            cout<<"\nAnd it is at the position "<<i+1<<" of the string.";
            flag=1;
            exit(0);
        }
    }
    if(flag==0)
        cout<<"Sorry, the substring you have entered doesn't exist."; }
```

```
Enter the main string : DILWALE DULHNIYA LE JAYENGE
Enter the sub string : NIYA
Yes, we get the substring you entered.
And it is at the position 13 of the string.
-----
Process exited after 41.33 seconds with return value 0
Press any key to continue . . .
```

```

Enter the main string : OM SHANTI OM
Enter the sub string : SHAKTI
Sorry, the substring you have entered doesn't exist.
-----
Process exited after 14.67 seconds with return value 0
Press any key to continue . . . █

```

Q-5

Write a program to reverse a string.

[PROGRAMMING and OUTPUT]

```

//DEV C++
//Program to reverse a string in a memory.
#include<iostream>
#include<stdio.h>
using namespace std;
int main()
{
    char a[30],i,j,n=0,temp;
    cout<<"Enter the string : ";
    gets(a);
    for(i=0;a[i]!='\0';++i)
        ++n;
    for(i=0,j=n-1;i<n/2;++i,--j)
    {
        temp=a[i];
        a[i]=a[j];
        a[j]=temp;
    }
    cout<<"Desired modified string is : "<<a;
}

```

```

Enter the string : Bjarne Stroustrup
Desired modified string is : purtsuort$ enrajB
-----
Process exited after 68.44 seconds with return value 0
Press any key to continue . . . █

```

Q-6

Write a program to print out all rotations of a particular string.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to print all rotations of a particular string.
#include<iostream>
#include<stdio.h>
using namespace std;
int main()
{
    char a[30];
    int i,i2,i3,cnt,temp;
    cout<<"Enter the string : ";
    gets(a);
    for(i=0,cnt=0;a[i]!='\0';++i)
        ++cnt;
    for(i2=0;i2<cnt;++i2)
    {
        temp=a[0];
        for(i3=0;i3<cnt;++i3)
            a[i3]=a[i3+1];
        //When i3=cnt-1, a[i3] will store '\0', but next line will cure it.
        a[cnt-1]=temp;
        cout<<"Arrangement no. "<<i2+1<<" is "<<a<<endl;
    }
}
```

```
Enter the string : ABCDE
Arrangement no. 1 is BCDEA
Arrangement no. 2 is CDEAB
Arrangement no. 3 is DEABC
Arrangement no. 4 is EABCD
Arrangement no. 5 is ABCDE
```

```
-----
Process exited after 4.905 seconds with return value 0
Press any key to continue . . .
```

Q-7

Write a program to modify a string with increasing ASCII code.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to modify a string with increasing ASCII code.
#include<iostream>
#include<stdio.h>
using namespace std;
int main()
{
    char a[30];
    int i,i2,n=0,temp;
    cout<<"Enter the string : ";
    gets(a);
    for(i=0;a[i]!='\0';++i)
        ++n;
    for(i=0;i<n-1;++i)
        for(i2=0;i2<n-1-i;++i2)
            {
                if(a[i2]>a[i2+1])
                {
                    temp=a[i2];
                    a[i2]=a[i2+1];
                    a[i2+1]=temp;
                }
            }
    cout<<"Modified string is : "<<a;
    cout<<"\nCharacter with maximum ASCII code is : "<<a[n-1];
    cout<<"\nCharacter with minimum ASCII code is : "<<a[0];
}
```

```
Enter the string : aBcDe
Modified string is : BDace
Character with maximum ASCII code is : e
Character with minimum ASCII code is : B
-----
Process exited after 18.35 seconds with return value 0
Press any key to continue . . . _
```

```
Enter the string : ARYAVAT
Modified string is : AAARTUY
Character with maximum ASCII code is : Y
Character with minimum ASCII code is : A
-----
Process exited after 24.94 seconds with return value 0
Press any key to continue . . . _
```

Q-8

Write a program to copy only digits from string 1 to string 2.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to copy only digits from string 1 to string 2.
#include<iostream>
#include<stdio.h>
using namespace std;
int main()
{
    char a[30],a2[30];
    int i,i2;
    cout<<"Enter the string : ";
    gets(a);
    for(i=0,i2=0;a[i]!='\0';++i)
        {
            if(a[i]>='0'&&a[i]<='9')
                {
                    a2[i2]=a[i];
                    ++i2;
                }
        }
    a2[i2]='\0';
    cout<<"String with digits from your array is : "<<a2;
}
```

Enter the string : A1B2C3D4E5

String with digits from your array is : 12345

Process exited after 15.45 seconds with return value 0

Press any key to continue . . . █

Enter the string : 1!2@3#4\$5%6^7&8*9(0)

String with digits from your array is : 1234567890

Process exited after 14.05 seconds with return value 0

Press any key to continue . . .

Q-9

Write a program to perform a right shift.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to perform a right shift.
#include<iostream>
#include<stdio.h>
using namespace std;
int main()
{
    char a[30];
    int i,temp,cnt=0;
    cout<<"Enter the string : ";
    gets(a);
    for(i=0;a[i]!='\0';++i)
        ++cnt;
    temp=a[cnt-1];
    for(i=cnt-1;i>0;--i)
        a[i]=a[i-1];
    a[0]=temp;
    cout<<"Desired modified string is : "<<a;    }
```

```
Enter the string : ABCDE
Desired modified string is : EABCD
-----
Process exited after 7.964 seconds with return value 0
Press any key to continue . . .
```

```
Enter the string : 12345
Desired modified string is : 51234
-----
Process exited after 2.055 seconds with return value 0
Press any key to continue . . .
```

Q-10

Write a program to perform a left shift.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to perform a left shift.
#include<iostream>
#include<stdio.h>
using namespace std;
int main()
{
    char a[30];
    int i,temp;
    cout<<"Enter the string : ";
    gets(a);
    temp=a[0];
    for(i=0;a[i+1]!='\0';++i)
        a[i]=a[i+1];
    a[i]=temp;
    cout<<"Desired modified string is : "<<a;
}
```

```
Enter the string : ABCDE
Desired modified string is : BCDEA
-----
Process exited after 3.133 seconds with return value 0
Press any key to continue . . .
```

```
Enter the string : 12345
Desired modified string is : 23451
-----
Process exited after 2.074 seconds with return value 0
Press any key to continue . . . █
```

Q-11

Write a program to find frequency of occurring elements.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to find frequency of all the alphabets.
#include<iostream>
#include<stdio.h>
using namespace std;
int main()
{
    char a[30],i;
    int i2,cnt=0;
    cout<<"Enter the string : ";
    gets(a);
    for(i='a';i<='z';++i)
    {
        for(i2=0;a[i2]!='\0';++i2)
        {
            if(a[i2]==i||a[i2]==i-32)
                ++cnt;
        }
    }
    if(cnt>0)
    {
        cout<<"No. of "<<i<<"/"<<(char)(i-32)<<" are : "<<cnt<<endl;
        cnt=0;
    }
}
```

Enter the string : Fundamental

No. of a/A are : 2

No. of d/D are : 1

No. of e/E are : 1

No. of f/F are : 1

No. of l/L are : 1

No. of m/M are : 1

No. of n/N are : 2

No. of t/T are : 1

No. of u/U are : 1

Process exited after 8.65 seconds with return value 0

Press any key to continue . . . █

LAB PRACTICAL 9

Q-1

Write a program to swap first row with last row, second row with second last row and so on.

Also

Write a program to swap first column with last column, second column with second last column and so on.

|PROGRAMMING|

```
//DEV C++
//Program to swap first row with last row,second with second last and so on.
#include<iostream>
using namespace std;
int main()
{
    int a[15][15],i,i2,j,row,clm,temp;
    cout<<"|Enter the size of the 2D array|\n";
    cout<<"Enter size of row : ";
    cin>>row;
    cout<<"Enter size of the column : ";
    cin>>clm;
    cout<<"Enter the array elements : \n";
    for(i=0;i<row;++i)
        for(j=0;j<clm;++j)
            cin>>a[i][j];
    cout<<"Array at first : \n";
    for(i=0;i<row;++i)
    {
        for(j=0;j<clm;++j)
            cout<<a[i][j]<<"\t";
        cout<<endl;
    }
    i2=row-1;
    for(i=0;i<row/2;++i,--i2)
        for(j=0;j<clm;++j)
        {
            temp=a[i][j];
            a[i][j]=a[i2][j];
            a[i2][j]=temp;
        }
    cout<<"Desired modified array is : \n";
    for(i=0;i<row;++i)
    {
        for(j=0;j<clm;++j)
            cout<<a[i][j]<<"\t";
        cout<<endl;
    }
}
```

|PROGRAMMING|

```
//DEV C++
//Program to swap first column with last column,second with second last and so on.
#include<iostream>
using namespace std;
int main()
{
    int a[15][15],i,j,j2,row,clm,temp;
    cout<<"|Enter the size of the 2D array|\n";
    cout<<"Enter the size of the row : ";
    cin>>row;
    cout<<"Enter the size of the column : ";
    cin>>clm;
    cout<<"Enter the array elements : \n";
    for(i=0;i<row;++i)
        for(j=0;j<clm;++j)
            cin>>a[i][j];
    cout<<"Array at first : \n";
    for(i=0;i<row;++i)
    {
        for(j=0;j<clm;++j)
            cout<<a[i][j]<<"\t";
        cout<<endl;
    }
    j2=clm-1;
    for(j=0;j<clm/2;++j,--j2)
        for(i=0;i<row;++i)
        {
            temp=a[i][j];
            a[i][j]=a[i][j2];
            a[i][j2]=temp;
        }
    cout<<"Desired modified array is : \n";
    for(i=0;i<row;++i)
    {
        for(j=0;j<clm;++j)
            cout<<a[i][j]<<"\t";
        cout<<endl;
    }
}
```

|OUTPUTS ARE RESPECTIVELY ON THE NEXT PAGE|

```
|Enter the size of the 2D array|
Enter size of row : 5
Enter size of the column : 4
Enter the array elements :
```

```
Array at first :
```

```
56      78      92      34
56      98      11      23
45      76      43      22
66      98      99      55
32      11      58      32
```

```
Desired modified array is :
```

```
32      11      58      32
66      98      99      55
45      76      43      22
56      98      11      23
56      78      92      34
```

```
-----
Process exited after 24.33 seconds
Press any key to continue . . .
```

I

```
|Enter the size of the 2D array|
Enter the size of the row : 5
Enter the size of the column : 4
Enter the array elements :
```

```
Array at first :
```

```
56      78      92      34
56      98      11      23
45      76      43      22
66      98      99      55
32      11      58      32
```

```
Desired modified array is :
```

```
34      92      78      56
23      11      98      56
22      43      76      45
55      99      98      66
32      58      11      32
```

```
-----
Process exited after 93.57 seconds
Press any key to continue . . .
```

II

Q-2

Write a program to take elements in 2D array and print it with some format.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to accept a 2D array and print it with some different format.
#include<iostream>
int main()
{
    int a[15][15],i,j,n;
    cout<<"Enter the size of the side of the square matrix : ";
    cin>>n;
    cout<<"Enter the elements of the square matrix : \n";
    for(i=0;i<n;++i)
        for(j=0;j<n;++j)
            cin>>a[i][j];
    cout<<"Array at first : \n";
    for(i=0;i<n;++i)
    {
        for(j=0;j<n;++j)
            cout<<a[i][j]<<"\t";
        cout<<endl;
    }
    cout<<"Desired modified array : \n";
    for(i=0;i<n;++i)
    {
        for(j=0;j<n;++j)
        {
            if(i<=j)
                cout<<a[i][j];
            cout<<"\t";
        }
        cout<<endl;
    }
}
```

Enter the size of the side of the square matrix : 5

Enter the elements of the square matrix :

•
•
•

Array at first :

2	3	1	5	0
7	1	5	3	1
2	5	7	8	1
0	1	5	0	1
3	4	9	1	5

Desired modified array :

2	3	1	5	0
	1	5	3	1
		7	8	1
			0	1
				5

Process exited after 38.66 seconds with return value 0

Press any key to continue . . .

Q-3

Write a program to display row wise and column wise sum separately.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to display row-wise and column-wise sum seperately.
#include<iostream>
using namespace std;
int main()
{
    int a[15][15],i,j,row,clm,sum_r,sum_c;
    cout<<"Enter the size of the row : ";
    cin>>row;
    cout<<"Enter the size of the column : ";
    cin>>clm;
    cout<<"Enter the elements :\n";
    for(i=0;i<row;++i)
        for(j=0;j<clm;++j)
            cin>>a[i][j];
    cout<<"Array entered by you : \n";
    for(i=0;i<row;++i)
    {
        for(j=0;j<clm;++j)
            cout<<a[i][j]<<"\t";
        cout<<endl;
    }
    for(i=0;i<row;++i)
    {
        sum_r=0;
        for(j=0;j<clm;++j)
            sum_r+=a[i][j];
        cout<<"Sum of row "<<i+1<<" is : "<<sum_r<<endl;
    }
    for(j=0;j<clm;++j)
    {
        sum_c=0;
        for(i=0;i<row;++i)
            sum_c+=a[i][j];
        cout<<"Sum of column "<<j+1<<" is : "<<sum_c<<endl;
    }
}
```

Enter the size of the row : 4
Enter the size of the column : 3
Enter the elements :

•
•
•

Array entered by you :

5	6	7
8	9	2
3	4	5
6	7	8

Sum of row 1 is : 18
Sum of row 2 is : 19
Sum of row 3 is : 12
Sum of row 4 is : 21
Sum of column 1 is : 22
Sum of column 2 is : 26
Sum of column 3 is : 22

Process exited after 11.35 seconds
Press any key to continue . . .

Enter the size of the row : 4
Enter the size of the column : 3
Enter the elements :

•
•
•

Array entered by you :

23	45	86
98	12	55
44	87	56
24	55	12

Sum of row 1 is : 154
Sum of row 2 is : 165
Sum of row 3 is : 187
Sum of row 4 is : 91
Sum of column 1 is : 189
Sum of column 2 is : 199
Sum of column 3 is : 209

Process exited after 38.92 seconds
Press any key to continue . . .

Q-4

Write a program to display elements of middle row and column.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to display middle row and middle column.
#include<iostream>
int main()
{
    int a[15][15],i,j,n,mid;
    cout<<"Enter the size of the side : ";
    cin>>n;
    cout<<"Enter the elements : \n";
    for(i=0;i<n;++i)
        for(j=0;j<n;++j)
            cin>>a[i][j];
    cout<<"Array entered by you : \n";
    for(i=0;i<n;++i)
    {
        for(j=0;j<n;++j)
            cout<<a[i][j]<<"\t";
        cout<<endl;
    }
    mid=n/2;
    cout<<"Middle row is : \n";
    for(i=0;i<n;++i)
        cout<<a[mid][i]<<"\t";
    cout<<"\nMiddle column is : \n";
    for(i=0;i<n;++i)
        cout<<a[i][mid]<<"\t";
}
```

Enter the size of the side : 5

Enter the elements :

•
•
•

Array entered by you :

45	34	67	89	35
21	34	74	31	73
83	97	33	77	13
35	79	9	33	76
34	77	12	22	74

Middle row is :

83	97	33	77	13
----	----	----	----	----

Middle column is :

67	74	33	9	12
----	----	----	---	----

Process exited after 224.1 seconds with return value 0

Press any key to continue . . . █

LAB PRACTICAL 10

Q-1

Write a function to calculate the factorial value of any integer as an argument. Write main function to calculate $P(n,r)$ and $C(n,r)$ using factorial function.

|PROGRAMMING|

```
//DEV C++
//Program to calculate P(n,r) and C(n,r) using function.
#include<iostream>
using namespace std;
int fact(int);
int main()
{
    int n,r,result;
    cout<<"Enter the value of 'n' : ";
    cin>>n;
    cout<<"Enter the value of 'r' : ";
    cin>>r;
    result=fact(n)/fact(n-r);
    cout<<"P(n,r) of the given data is : "<<result;
    result/=fact(r);
    cout<<"\nC(n,r) of the given data is : "<<result;
}
int fact(int num)
{
    int i,fact=1;
    for(i=1;i<=num;++i)
        fact*=i;
    return fact;
}
```

```
Enter the value of 'n' : 5
Enter the value of 'r' : 3
P(n,r) of the given data is : 60
C(n,r) of the given data is : 10
-----
Process exited after 29.93 seconds with return value 0
Press any key to continue . . .
```


Q-2

Write a function that receives two numbers as an argument and display all prime numbers between these two numbers. Call this function from main().

|PROGRAMMING|

```
//DEV C++
//Program to take 2 numbers and display all prime number b/w them using function.
#include<iostream>
using namespace std;
void n_prime(int,int);
int main()
{
    int n1,n2;
    cout<<"Enter the starting point : ";
    cin>>n1;
    cout<<"Enter the ending point : ";
    cin>>n2;
    n_prime(n1,n2);
}
void n_prime(int n1,int n2)
{
    int i,i2,nf=0;
    cout<<"|Below are the prime numbers b/w these numbers|\n";
    for(i=n1+1;i<n2;++i)
    {
        for(i2=i;i2>=2;i2--)
            if(i%i2==0)
                ++nf;
        if(nf==2)
            cout<<i<<"_";
        nf=0;
    }
}
```

```
Enter the starting point : 5
Enter the ending point : 50
|Below are the prime numbers b/w these numbers|
7_11_13_17_19_23_29_31_37_41_43_47_
-----
Process exited after 2.998 seconds with return value 0
Press any key to continue . . .
```

Q-3

Write a function called power that takes two arguments, a double value for n and an int value for p, and return the result as double value. Use default argument of 2 for p, so that if this argument is omitted the number will be squared. Write the main function that gets value from the user to test power function.

|PROGRAMMING|

```
//DEV C++
//Program to make power function.
#include<iostream>
using namespace std;
double power(double,int p=2);
int main()
{
    double num,res;
    int p;
    char ch;
    cout<<"Enter the number : ";
    cin>>num;
    cout<<"Do you want to enter the power[(Y/y)/(N/n)] : ";
    cin>>ch;
    if(ch=='Y' || ch=='y')
    {
        cout<<"Enter the power : ";
        cin>>p;
        res=power(num,p);
    }
    else
        res=power(num);
    cout<<"Expected result is : "<<res;
}
double power(double num,int p)
{
    int i;
    double pro=1;
    for(i=1;i<=p;++i)
        pro*=num;
    return pro;
}
```

```
Enter the number : 5
Do you want to enter the power[(Y/y)/(N/n)] : y
Enter the power : 4
Expected result is : 625
-----
Process exited after 13.57 seconds with return value 0
Press any key to continue . . . █
```

```
Enter the number : 5
Do you want to enter the power[(Y/y)/(N/n)] : n
Expected result is : 25
-----
Process exited after 2.184 seconds with return value 0
Press any key to continue . . . █
```

Q-4

Write a menu driven program to perform arithmetic operations.

|PROGRAMMING|

```
#include<iostream>
float add(float,float);      float sub(float,float);      float mult(float,float);
float divi(float,float);     int rem(int,int);      void menu();
int main()
{   float n1,n2;             char ch1,ch2;
    cout<<"Enter number 1 : ";      cin>>n1;
    cout<<"Enter number 2 : ";      cin>>n2;                                menu();
    again:
        cout<<"\nChoose from the above options : ";      cin>>ch1;
        switch(ch1)
        { case '+':cout<<"Addition of the two numbers is : "<<add(n1,n2);
            break;
          case '-':cout<<"Subtraction of the two numbers is : "<<sub(n1,n2);
            break;
          case '*':cout<<"Multiplication of the two numbers is : "<<mult(n1,n2);
            break;
          case '/':cout<<"Division of the two numbers is : "<<divi(n1,n2);
            break;
          case '%':cout<<"Remainder of the two numbers is : "<<rem(n1,n2);
            break;
          default :cout<<"|INVALID INPUT|";
        }
    cout<<"\nDo you want to run the program again(Y/y or N/n) : ";      cin>>ch2;
    if(ch2=='Y' || ch2=='y')
        goto again;
}

float add(float n1,float n2)
{   float x=n1+n2;
    return x;
}

float sub(float n1,float n2)
{   float x=n1-n2;
    return x;
}

float mult(float n1,float n2)
{   float x=n1*n2;
    return x;
}

float divi(float n1,float n2)
{   float x=n1/n2;
    return x;
}

int rem(int n1,int n2)
{   int x=n1%n2;
    return x;
}

void menu()
{   cout<<"|Options for the operation|\n";
    cout<<"+'Addition.\n";
    cout<<"-'Subtraction.\n";
    cout<<"'*Multiplication.\n";
    cout<<"/'Division.\n";
    cout<<"%'Remainder.\n";
}
```

```
Enter number 1 : 6
Enter number 2 : 5
|Options for the operation|
'|'+Addition.
'|'-Subtraction.
'|'*Multiplication.
'|'/Division.
'|'%Remainder.

Choose from the above options : +
Addition of the two numbers is : 11
Do you want to run the program again(Y/y or N/n) : y

Choose from the above options : *
Multiplication of the two numbers is : 30
Do you want to run the program again(Y/y or N/n) : y

Choose from the above options : %
Remainder of the two numbers is : 1
Do you want to run the program again(Y/y or N/n) : n

-----
Process exited after 39.46 seconds with return value 0
Press any key to continue . . .
```

ASSIGNMENT ON ARRAY AND FUNCTION

1.

Write a program to swap two equi-sized integer array.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to swap two equi-sized integer array.
#include<iostream>
using namespace std;
void swap_array(int[],int[],int);
int main()
{
    int a[15],b[15],i,n;
    cout<<"Enter the size of the arrays : ";
    cin>>n;
    cout<<"Enter elements of array 1 : \n";
    for(i=0;i<n;++i)
        cin>>a[i];
    cout<<"Enter elements of array 2 : \n";
    for(i=0;i<n;++i)
        cin>>b[i];
    cout<<"Array before swapping : \n";
    cout<<"Array 1 : \n";
    for(i=0;i<n;++i)
        cout<<a[i]<<"\t";
    cout<<"\nArray 2 : \n";
    for(i=0;i<n;++i)
        cout<<b[i]<<"\t";
    swap_array(a,b,n);
    cout<<"\nArray after swapping : \n";
    cout<<"Array 1 : \n";
    for(i=0;i<n;++i)
        cout<<a[i]<<"\t";
    cout<<"\nArray 2 : \n";
    for(i=0;i<n;++i)
        cout<<b[i]<<"\t";
}
void swap_array(int a[],int b[],int n)
{
    int i,temp;
    for(i=0;i<n;++i)
    {
        temp=a[i];
        a[i]=b[i];
        b[i]=temp;
    }
}
```

```
Enter the size of the arrays : 3
Enter elements of array 1 :
3
6
7
Enter elements of array 2 :
2
9
8
Array before swapping :
Array 1 :
3      6      7
Array 2 :
2      9      8
Array after swapping :
Array 1 :
2      9      8
Array 2 :
3      6      7
-----
Process exited after 12.51 seconds with return value 0
Press any key to continue . . . █
```

10

WAP to modify the contents of array. Multiples of 10 get swapped with element at next location in the array.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to swap multiples of 10 with next element in 1D array using function.
#include<iostream>
using namespace std;
void swap2change(int[],int);
int main()
{
    int a[15],i,n;
    cout<<"Enter the size of the array : ";
    cin>>n;
    cout<<"Enter the array elements : \n";
    for(i=0;i<n;++i)
        cin>>a[i];
    swap2change(a,n);
    cout<<"Desired modified array is : \n";
    for(i=0;i<n;++i)
        cout<<a[i]<<"\t";
}
void swap2change(int a[],int n)
{
    int i,temp;
    for(i=0;i<n-1; )
        {
            if(a[i]%10==0)
            {
                temp=a[i];
                a[i]=a[i+1];
                a[i+1]=temp;
                i+=2;
            }
            else
                ++i;
        }
}
```

Enter the size of the array : 5

Enter the array elements :

10

3

4

50

20

Desired modified array is :

3 10 4 20 50

Process exited after 25.46 seconds with return value 0

Press any key to continue . . . _

WAP to exchange first half side elements with the second half side elements in a 1-D array.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to exchange first half side elements with the second half side elements in a
1-D array using function.
#include<iostream>
using namespace std;
void swaphalf(int[],int);
int main()
{
    int a[15],n,i;
    cout<<"Enter the size of the 1D array : ";
    cin>>n;
    cout<<"Enter the array elements : \n";
    for(i=0;i<n;++i)
        cin>>a[i];
    cout<<"Array at first : \n";
    for(i=0;i<n;++i)
        cout<<a[i]<<"\t";
    swaphalf(a,n);
    cout<<"\nDesired modified array : \n";
    for(i=0;i<n;++i)
        cout<<a[i]<<"\t";
}
void swaphalf(int a[],int n)
{
    int i,j,temp;
    if(n%2!=0)
        j=n/2+1;
    else
        j=n/2;
    for(i=0;i<n/2;++i,++j)
    {
        temp=a[i];
        a[i]=a[j];
        a[j]=temp;
    }
}
```

```
Enter the size of the 1D array : 9
Enter the array elements :
*
*
*
Array at first :
3      4      7      6      1      2      9      8      7
Desired modified array :
2      9      8      7      1      3      4      7      6
-----
Process exited after 23.05 seconds with return value 0
Press any key to continue . . . _
```


WAP to shift all odd elements towards left and even to right without changing order of numbers.

PROGRAMMING and OUTPUT

```
//DEV C++
#include<iostream>
void shift(int[],int);
int main()
{
    int a[15],n,i;
    cout<<"Enter the size of the of the array : ";
    cin>>n;
    cout<<"Enter the array elements : \n";
    for(i=0;i<n;++i)
        cin>>a[i];
    cout<<"Array at first : \n";
    for(i=0;i<n;++i)
        cout<<a[i]<<"\t";
    shift(a,n);
    cout<<"\nDesired modified array : \n";
    for(i=0;i<n;++i)
        cout<<a[i]<<"\t";
}
void shift(int a[],int n)
{
    int i,j,k=0,temp,b[15];
    for(i=0;i<n;++i)
        b[i]=a[i];
    for(i=0;i<n;++i)
        if(b[i]%2!=0)
        {
            a[k]=b[i];
            ++k;
        }
    for(i=0;i<n;++i)
        if(b[i]%2==0)
        {
            a[k]=b[i];
            ++k;
        }
}
```

Enter the size of the of the array : 5

Enter the array elements :

•
•
•

Array at first :

3 4 5 6 7

Desired modified array :

3 5 7 4 6

Process exited after 6.993 seconds with return value 0

Press any key to continue . . . _

Given two arrays A and B. Array 'A' contains all the elements of 'B' but one more element extra. Write a c++ program to find out the extra element in Array A.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Array 'A' contains all the elements of 'B' but one more element extra. Program to
find out the extra element in Array A.
#include<iostream>
#include<conio.h>
using namespace std;
int extra(int[],int[],int,int);
int main()
{
    int a[15],b[15],n1,n2,i,ext;
    cout<<"|Here, you have to enter size of array 1.|\n"
        <<"|Size of array 2 will be 1 more than that.|\n"
        <<"|Enter the array 1 elements then.|\n"
        <<"|Enter all those elements of array 1 with 1 extra element.|\n"
        <<"|Order can be different.|\n"<<"|Press any key to continue.|\n\n";
    getch();
    cout<<"Enter the size of array 1 : ";
    cin>>n1;
    n2=n1+1;
    cout<<"Enter the elements of array 1 :\n";
    for(i=0;i<n1;++i)
        cin>>a[i];
    cout<<"Enter the elements of array 2 :\n";
    for(i=0;i<n2;++i)
        cin>>b[i];
    ext=extra(a,b,n1,n2);
    cout<<"Extra element is : "<<ext;
}
int extra(int a[],int b[],int n1,int n2)
{
    int i,j,flag;
    for(i=0;i<n2;++i)
    {
        for(j=0;j<n1;++j)
            if(b[i]==a[j])
                flag=1;
        if(flag==0)
            return b[i];
        flag=0;
    }
}
```

```
|Here, you have to enter size of array 1.|
|Size of array 2 will be 1 more than that.|
|Enter the array 1 elements then.|
|Enter all those elements of array 1 with 1 extra element.|
|Order can be different.|
|Press any key to continue.|
```

```
Enter the size of array 1 : 5
```

```
Enter the elements of array 1 :
```

```
•
•
•
```

```
Enter the elements of array 2 :
```

```
•
•
•
```

```
Extra element is : 1
```

```
-----
Process exited after 110 seconds with return value 0
```

```
Press any key to continue . . . _
```

6.

WAP to print only prime numbers from a 1-D array of size n entered by the user.

[PROGRAMMING and OUTPUT]

```
//DEV C++
#include<iostream>
void print_prime(int[],int);
int main()
{
    int a[15],i,n;
    cout<<"Enter the size of the array : ";
    cin>>n;
    cout<<"Enter the array elements : \n";
    for(i=0;i<n;++i)
        cin>>a[i];
    cout<<"Array at first : \n";
    for(i=0;i<n;++i)
        cout<<a[i]<<"\t";
    print_prime(a,n);
}
void print_prime(int a[],int n)
{
    int i,i2,nf;
    cout<<"\nPrime numbers from array are : \n";
    for(i=0;i<n;++i)
    {
        nf=0;
        for(i2=1;i2<=a[i];++i2)
            if(a[i]%i2==0)
                ++nf;
        if(nf==2)
            cout<<a[i]<<"_";
    }
}
```

```

Enter the size of the array : 6
Enter the array elements :
*
*
*
Array at first :
33      56      77      2      5      53
Prime numbers from array are :
2      5      53
-----
Process exited after 22.32 seconds with return value 0
Press any key to continue . . .

```

7.

WAP to copy the last 3 elements of array B after first 3 elements of array A and store it in the third array C.

PROGRAMMING and OUTPUT

```

//DEV C++
#include<iostream>
int main()
{
    int a[15],b[15],c[6],n1,n2,i,k;
    cout<<"Enter the size of array 1 : ";
    cin>>n1;
    cout<<"Enter the size of array 2 : ";
    cin>>n2;
    cout<<"Enter array 1 elements : \n";
    for(i=0;i<n1;++i)
        cin>>a[i];
    cout<<"Enter array 2 elements : \n";
    for(i=0;i<n2;++i)
        cin>>b[i];
    for(i=0;i<3;++i)
        c[i]=a[i];
    k=i;
    for(i=n2-3;i<n2;++i,++k)
        c[k]=b[i];
    cout<<"Elements of array 1 are : \n";
    for(i=0;i<n1;++i)
        cout<<a[i]<<"\t";
    cout<<"\nElements of array 2 are : \n";
    for(i=0;i<n2;++i)
        cout<<b[i]<<"\t";
    cout<<"\nDesired elements of array 3 are : \n";
    for(i=0;i<6;++i)
        cout<<c[i]<<"\t";
}

```

```

Enter the size of array 1 : 6
Enter the size of array 2 : 8
Enter array 1 elements :
.
.
.
Enter array 2 elements :
.
.
.
Elements of array 1 are :
3      4      5      7      9      2
Elements of array 2 are :
4      8      5      9      2      1      6      9
Desired elements of array 3 are :
3      4      5      1      6      9
-----
Process exited after 27.29 seconds with return value 0
Press any key to continue . . .

```

8.
Write a program to check whether a string is a palindrome or not using function. Return value.

[PROGRAMMING and OUTPUT]

```

#include<iostream>
#include<stdio.h>
#include<string.h>
int palin(char[],char[]);
int main()
{
    char a[15],b[15];
    cout<<"Enter the string : ";
    for(i=0;a[i]!='\0';++i)
        ++cnt;
    for(i=0,k=0;a[i]!='\0';++i,++k)
        b[k]=a[i];
    for(i=0,k=cnt-1;i<cnt/2;++i,--k)
        a[i]=a[k];
    flag=palin(a,b);
    if(flag==1)
        cout<<"Yes, string entered is palindrome.";
    else
        cout<<"No, string entered is not palindrome.";
}
int palin(char a[],char b[])
{
    int i;
    for(i=0;a[i]!='\0';++i)
        if(a[i]!=b[i])
            return 0;
    return 1;
}

```

```
Enter the string : malayalam
Yes, string entered is palindrome.
-----
Process exited after 18.56 seconds with return value 0
Press any key to continue . . .
```

9.

Write a program to compare 2 strings whether they are exactly equal or not.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to compare 2 strings whether they are equal or not using function.
#include<iostream>
#include<stdio.h>
using namespace std;
int compare(char[],char[],int,int);
int main()
{
    char a[15],b[15];
    int i,cnt1,cnt2,flag=0;
    cnt1=cnt2=0;
    cout<<"Enter string 1 : ";
    gets(a);
    cout<<"Enter string 2 : ";
    gets(b);
    for(i=0;a[i]!='\0';++i)
        ++cnt1;
    for(i=0;b[i]!='\0';++i)
        ++cnt2;
    flag=compare(a,b,cnt1,cnt2);
    if(flag==1)
        cout<<"Two strings are equal.";
    else
        cout<<"Two strings are not equal.";
}
compare(char a[],char b[],int n1,int n2)
{
    int i;
    if(n1!=n2)
        return 0;
    for(i=0;a[i]!='\0';++i)
        if(a[i]!=b[i])
            return 0;
    return 1;
}
```

```

Enter string 1 : sfs
Enter string 2 : dsfs
Two strings are not equal.
-----
Process exited after 1.321 seconds
Press any key to continue . . .

```

```

Enter string 1 : sfs
Enter string 2 : sfs
Two strings are equal.
-----
Process exited after 4.101 seconds
Press any key to continue . . .

```

10.
Write a program to find a substring in a string. If found, display its starting position.

PROGRAMMING and OUTPUT

```

//DEV C++
//Program to find a substring within a string using function.
#include<iostream>
#include<stdio.h>
#include<string.h>
using namespace std;
void substr(char[],char[],int);
int main()
{
    char a[30],b[10];
    int i,sublen;
    cout<<"Enter the main string : ";
    gets(a);
    cout<<"Enter the substring : ";
    gets(b);
    sublen=strlen(b);
    substr(a,b,sublen);
}
void substr(char a[],char b[],int n)
{
    int i,j,k,flag=0;
    for(i=0;a[i]!='\0';++i)
    {
        k=i,j=0;
        for( ;a[k]==b[j]&& j<n; )
        {
            ++k;
            ++j;
        }
        if(j==n)
        {
            flag=1;
            break;
        }
    }
    if(flag==1)
    {
        cout<<"Yes, we get the substring you have entered.";
        cout<<"\nAnd it is at the position "<<i+1<<" of the string.";
    }
    else
        cout<<"Sorry, the substring you have entered doesn't exist.";
}

```

```

Enter the main string : hello WORLD !
Enter the substring : OR
Yes, we get the substring you have entered.
And it is at the position 8 of the string.
-----
Process exited after 49.62 seconds with return value 0
Press any key to continue . . .

```

11.

WAP to remove a particular character from a string.

[PROGRAMMING and OUTPUT]

```

//DEV C++
#include<iostream>
#include<stdio.h>
#include<string.h>
void remove(char[],char);
int main()
{
    char a[15],x;
    cout<<"Enter the string : ";
    gets(a);
    cout<<"Enter the character you want to remove : ";
    cin>>x;
    remove(a,x);
    cout<<"Desired modified string is : "<<a;
}
void remove(char a[],char x)
{
    int i,k,n;
    n=strlen(a);
    for(i=0;i<n; )
    {
        if(a[i]==x)
        {
            for(k=i;k<n;++k)
                a[k]=a[k+1];
            --n;
        }
        else
            ++i;
    }
}

```

```

Enter the string : thiruvananthapuram
Enter the character you want to remove : a
Desired modified string is : thiruvnnthpurm
-----
Process exited after 34.19 seconds with return value 0
Press any key to continue . . .

```


WAP to remove duplicates from a string.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to delete duplicate elements from a string.
#include<iostream>
#include<stdio.h>
#include<string.h>
using namespace std;
void del_dup(char[],int);
int main()
{
    char a[10],i,n;
    cout<<"Enter the string : ";
    gets(a);
    n=strlen(a);
    del_dup(a,n);
}
void del_dup(char a[],int n)
{
    int i,j,k,flag=0;
    for(i=0;i<n;++i)
        for(j=i+1;j<n;++j)
            if(a[i]==a[j])
            {
                n=n-1;
                for(k=j;k<n;++k)
                    a[k]=a[k+1];
                flag=1;
                --j;
            }
    a[n]='\0';
    if(flag==0)
        cout<<"Array is without any duplicates.";
    else
        cout<<"Desired modified string is : "<<a;
}
```

```
Enter the string : uncopyrightable
Array is without any duplicates.
-----
Process exited after 20.43 seconds
Press any key to continue . . .
```

```
Enter the string : gaafdadf
Desired modified string is : gafdf
-----
Process exited after 19.79 seconds
Press any key to continue . . .
```

Write a program using functions to check whether a number that is passed as parameter to the function is an Armstrong number or not.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to check whether a no. is armstrong or not using function.
#include<iostream>
using namespace std;
void isarmstrong(int);
int main()
{
    int num;
    cout<<"Enter the number to be checked : ";
    cin>>num;
    isarmstrong(num);
}
void isarmstrong(int num)
{
    int n,r,sum=0;
    n=num;
    while(n!=0)
    {
        r=n%10;
        n=n/10;
        sum+=r*r*r;
    }
    if(sum==num)
        cout<<"The number entered by you is armstrong.";
    else
        cout<<"The number entered by you is not armstrong.";
```

```
Enter the number to be checked : 654
The number entered by you is not armstrong.
-----
Process exited after 5.997 seconds with return value 0
Press any key to continue . . .
```

```
Enter the number to be checked : 153
The number entered by you is armstrong.
-----
Process exited after 2.811 seconds with return value 0
Press any key to continue . . .
```

WAP using functions to find the sum of alternate elements of a 2D array.
The function returns the value of sum.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to sum of alternate elements of an 2D array.
#include<iostream>
using namespace std;
int sum_alt(int[][10],int,int);
int main()
{
    int a[10][10],row,clm,i,j,sum;
    cout<<"Enter the size of the row : ";
    cin>>row;
    cout<<"Enter the size of the column : ";
    cin>>clm;
    cout<<"Enter the array elements : \n";
    for(i=0;i<row;++i)
        for(j=0;j<clm;++j)
            cin>>a[i][j];
    cout<<"\nArray entered by you : \n";
    for(i=0;i<row;++i)
    {
        for(j=0;j<clm;++j)
            cout<<a[i][j]<<"\t";
        cout<<endl;
    }
    sum=sum_alt(a,row,clm);
    cout<<"Sum of alternate elements is : "<<sum;
}
int sum_alt(int a[][10],int row,int clm)
{
    int i,j,k=0,b[35],sz,sum=0;
    sz=row*clm;
    for(i=0;i<row;++i)
        for(j=0;j<clm;++j)
        {
            b[k]=a[i][j];
            ++k;
        }
    for(i=0;i<sz;i+=2)
        sum+=b[i];
    return sum;
}
```

```

Enter the size of the row : 6
Enter the size of the column : 3
Enter the array elements :
*
*
*
Array entered by you :
4      6      8
7      2      3
6      5      9
8      3      5
6      2      7
6      4      3
Sum of alternate elements is : 49
-----
Process exited after 21.05 seconds with return value 0
Press any key to continue . . .

```

15.

WAP to find transpose of a 2-D array.

PROGRAMMING and OUTPUT

```

#include<iostream>
void transpose(int[][10],int,int);           int i,j;
int main()
{
    int a[10][10],row,clm;
    cout<<"Enter the size of the row : ";      cin>>row;
    cout<<"Enter the size of the column : ";    cin>>clm;
    cout<<"Enter the array elements : \n";
    for(i=0;i<row;++i)
        for(j=0;j<clm;++j)
            cin>>a[i][j];
    cout<<"Array entered by you : \n";
    for(i=0;i<row;++i)
        {
            for(j=0;j<clm;++j)
                cout<<a[i][j]<<"\t";
            cout<<endl;
        }
    transpose(a,row,clm);
}
void transpose(int a[][10],int row,int clm)
{
    cout<<endl;
    int b[10][10];
    for(i=0;i<clm;++i)
        for(j=0;j<row;++j)
            b[i][j]=a[j][i];
    cout<<"\nArray after transpose is : \n";
    for(i=0;i<clm;++i)
        {
            for(j=0;j<row;++j)
                cout<<b[i][j]<<"\t";
            cout<<endl;
        }
}

```

Enter the size of the row : 5
Enter the size of the column : 4
Enter the array elements :

•
•
•

Array entered by you :

3	4	4	5
6	7	8	2
4	5	7	8
8	6	4	3
1	2	3	4

Array after transpose is :

3	6	4	8	1
4	7	5	6	2
4	8	7	4	3
5	2	8	3	4

Process exited after 17.34 seconds with return value 0
Press any key to continue . . .

WAP using functions that accept a string from the user in main() and then prints all the rotations of the string. Also return the number of rotations produced from the function.

PROGRAMMING and OUTPUT

```
//DEV C++
//Program to print out all rotations of a string using function.
#include<iostream>
#include<stdio.h>
#include<string.h>
using namespace std;
void rotation(char[],int);
int main()
{
    char a[10];
    int cnt=0;
    cout<<"Enter the string : ";
    gets(a);
    cnt=strlen(a);
    rotation(a,cnt);
}
void rotation(char a[],int n)
{
    int i,i2,temp;
    for(i=0;a[i]!='\0';++i)
    {
        temp=a[0];
        for(i2=0;a[i2]!='\0';++i2)
            a[i2]=a[i2+1];
        a[n-1]=temp;
        cout<<"Arrangement number "<<i+1<<" is "
        <<a<<endl;
    }
}
```

```
Enter the string : tokyo
Arrangement number 1 is okyot
Arrangement number 2 is kyoto
Arrangement number 3 is yotok
Arrangement number 4 is otoky
Arrangement number 5 is tokyo
```

```
-----
Process exited after 2.332 seconds with return value 0
Press any key to continue . . .
```

WAP using functions to remove the occurrence of a particular character from the given string.

void remove_char (char str [] , char x) where str is the given string and x is the character to be removed.

PROGRAMMING and OUTPUT

```
//DEV C++
//Program to remove particular character in a string using function.
#include<iostream>
#include<stdio.h>
#include<string.h>
using namespace std;
void remove(char[],char);
int main()
{
    char a[15],x;
    cout<<"Enter the string : ";
    gets(a);
    cout<<"Enter the character you want to remove : ";
    cin>>x;
    remove(a,x);
    cout<<"Desired modified string is : "<<a;
}
void remove(char a[],char x)
{
    int i,k,n;
    n=strlen(a);
    for(i=0;i<n; )
    {
        if(a[i]==x)
        {
            for(k=i;k<n;++k)
                a[k]=a[k+1];
            --n;
        }
        else
            ++i;
    }
}
```

Enter the string : hello

Enter the character you want to remove : l

Desired modified string is : heo

Process exited after 3.838 seconds with return value 0

Press any key to continue . . .

Create an array ALL[] from array EVEN[] and ODD[]. Even locations of array ALL[] accepts elements from array EVEN[] and odd locations of ALL[] accept elements from array ODD[].

PROGRAMMING and OUTPUT

```
//DEV C++
//Program to create array all[] from arrays even[] and odd[] with even at even and
odd at odd places.
#include<iostream>
using namespace std;
void make(int[],int[],int[],int,int);
int main()
{
    int all[35],even[15],odd[15],i,n1,n2;
    cout<<"Enter the size of array even[] : ";
    cin>>n1;
    cout<<"Enter the array elements of even[] : \n";
    for(i=0;i<n1;++i)
        cin>>even[i];
    cout<<"Enter the size of array odd[] : \n";
    cout<<"|Size of odd[] should be less than or equal to size of even[]| : ";
    cin>>n2;
    cout<<"Enter the array elements of odd[] : \n";
    for(i=0;i<n2;++i)
        cin>>odd[i];

    cout<<"Elements of array even[] : \n";
    for(i=0;i<n1;++i)
        cout<<even[i]<<"\t";
    cout<<"\nElements of array odd[] : \n";
    for(i=0;i<n2;++i)
        cout<<odd[i]<<"\t";

    make(all,even,odd,n1,n2);

    cout<<"\nDesired format of array all[] : \n";
    for(i=0;i<(n1+n2);++i)
        cout<<all[i]<<"\t";
}

void make(int all[],int even[],int odd[],int n1,int n2)
{
    int i,k;
    for(i=0,k=0;i<(n1+n2);i+=2,++k)
        all[i]=even[k];
    for(i=1,k=0;i<(n1+n2);i+=2,++k)
        all[i]=odd[k];
}
```



```

Enter the size of array even[] : 5
Enter the array elements of even[] :
*
*
*
Enter the size of array odd[] :
|Size of odd[] should be less than or equal to size of even[]| : 4
Enter the array elements of odd[] :
*
*
*
Elements of array even[] :
4      6      7      8      3
Elements of array odd[] :
3      5      7      6
Desired format of array all[] :
4      3      6      5      7      7      8      6      3
-----
Process exited after 50.71 seconds with return value 0
Press any key to continue . . .

```

```

Enter the size of array even[] : 5
Enter the array elements of even[] :
*
*
*
Enter the size of array odd[] :
|Size of odd[] should be less than or equal to size of even[]| : 5
Enter the array elements of odd[] :
*
*
*
Elements of array even[] :
3      6      8      3      9
Elements of array odd[] :
4      3      7      8      4
Desired format of array all[] :
3      4      6      3      8      7      3      8      9      4
-----
Process exited after 26.17 seconds with return value 0
Press any key to continue . . .

```

19.
WAP to transfer the contents of array ALL[] to 2 different arrays EVEN[] and ODD[]. The ODD[] array receives elements from odd locations of ALL[] and EVEN[] array receives from even locations of ALL[].

|PROGRAMMING and OUTPUT|

```
//DEV C++
/*Program to transfer content of array all[] to two different arrays even[] and odd[].
even[] accepts from even and odd[] from odd location.*/
#include<iostream>
using namespace std;
void make(int[],int[],int[],int);
int main()
{
    int all[35],even[15],odd[15],i,n,n1,n2;
    cout<<"Enter the size of array all[] : ";
    cin>>n;
    if(n%2==0)
        n1=n2=n/2;
    else
    {
        n1=n/2+1;
        n2=n/2;
    }
    cout<<"Enter the array elements of all[] : \n";
    for(i=0;i<n;++i)
        cin>>all[i];

    cout<<"Array elements of all[] are : \n";
    for(i=0;i<n;++i)
        cout<<all[i]<<"\t";

    make(all,even,odd,n);

    cout<<"\nArray elements of even[] are : \n";
    for(i=0;i<n1;++i)
        cout<<even[i]<<"\t";

    cout<<"\nArray elements of odd[] are : \n";
    for(i=0;i<n2;++i)
        cout<<odd[i]<<"\t";
}

void make(int all[],int even[],int odd[],int n)
{
    int i,k1,k2;
    for(i=0,k1=0;i<n;i+=2,++k1)
        even[k1]=all[i];
    for(i=1,k2=0;i<n;i+=2,++k2)
        odd[k2]=all[i];
}
```

```
Enter the size of array all[] : 7
Enter the array elements of all[] :
*
*
*
Array elements of all[] are :
5      4      7      8      6      5      3
Array elements of even[] are :
5      7      6      3
Array elements of odd[] are :
4      8      5
-----
Process exited after 6.701 seconds with return value 0
Press any key to continue . . . _
```

```
Enter the size of array all[] : 6
Enter the array elements of all[] :
*
*
*
Array elements of all[] are :
4      6      7      4      3      7
Array elements of even[] are :
4      7      3
Array elements of odd[] are :
6      4      7
-----
Process exited after 16.52 seconds with return value 0
Press any key to continue . . .
```

20.
Write a program to find the alphabet that appears maximum times in the string.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to display frequency of all alphabets and display the alphabet(s) that
appear max. no. of times.
#include<iostream>
#include<stdio.h>
using namespace std;
void count(char str[]);
int main()
{
    char str[50];
    cout<<"Enter the string : ";
    gets(str);
    count(str);
}
void count(char str[])
{
    int fre[26]={0},i,j,max,cnt;
    for(j=0;j<26;++j)
    {
        cnt=0;
        for(i=0;str[i]!='\0';++i)
            if(str[i]==j+65||str[i]==j+65+32)
                ++cnt;
        if(cnt>0)
        {
            cout<<char(j+65)<<"/"<<char(j+65+32)
                <<" occurs "<<cnt<<" times."<<endl;
            fre[j]=cnt;
        }
    }
    cout<<endl;
    max=fre[0];
    for(i=0;i<26;++i)
        if(fre[i]>max)
            max=fre[i];
    for(i=0;i<26;++i)
        if(fre[i]==max)
            cout<<char(i+65)<<"/"<<char(i+65+32)<<" _ ";
    cout<<"occurs maximum number of times.";
}
```

```
Enter the string : Minimum
I/i occurs 2 times.
M/m occurs 3 times.
N/n occurs 1 times.
U/u occurs 1 times.
```

```
M/m _ occurs maximum number of times.
```

```
-----
Process exited after 3.329 seconds with return value 0
Press any key to continue . . .
```

21.
Write a program to find the character that appears maximum times in the string.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to display frequency of all elements and display the character(s) that
appear max. no. of times.
#include<iostream>
#include<stdio.h>
using namespace std;
void count(char str[]);
int main()
{
    char str[50];
    cout<<"Enter the string : ";
    gets(str);
    count(str);
}
void count(char str[])
{
    int cnt[256]={0},i,max;
    for(i=0;str[i]!='\0';++i)
        ++cnt[str[i]];
    for(i=0;i<256;++i)
        if(cnt[i]>0)
            cout<<char(i)<<" occurs "<<cnt[i]<<" times."<<endl;
    cout<<endl;
    max=0;
    for(i=0;i<256;++i)
        if(cnt[i]>max)
            max=cnt[i];
    for(i=0;i<256;++i)
        if(cnt[i]==max)
            cout<<char(i)<<" _ ";
    cout<<"occurs maximum number of times.";
}
```

```
Enter the string : @minimum@
@ occurs 2 times.
i occurs 2 times.
m occurs 3 times.
n occurs 1 times.
u occurs 1 times.
```

```
m _ occurs maximum number of times.
```

```
-----
Process exited after 10.09 seconds with return value 0
Press any key to continue . . .
```

LAB PRACTICAL 11

Q-1

Write a program to add two values of time.

[PROGRAMMING and OUTPUT]

```
//DEV C++
#include<iostream>
struct time
{    int hr,mn,ss;    };
void input(time&);
void output(time);
time addtime(time,time);
int main()
{    time t1,t2,t3;
    cout<<"Enter the time 1(hr,mn,ss) : \n";
    cout<<"Enter the time 2(hr,mn,ss) : \n";
    t3=addtime(t1,t2);
    cout<<"Time 1 : ";
    cout<<"\nTime 2 : ";
    cout<<"\nTime 3 : ";
}
void input(time& t)
{    cin>>t.hr>>t.mn>>t.ss;    }
void output(time t)
{    cout<<t.hr<<"hrs "
        <<t.mn<<"min "
        <<t.ss<<"ss.";    }
time addtime(time z1,time z2)
{    int x;
    time t3;
    t3.ss=(z1.ss+z2.ss)%60;
    x=(z1.ss+z2.ss)/60;
    t3.mn=(z1.mn+z2.mn)%60+x;
    x=(z1.mn+z2.mn)/60;
    t3.hr=(z1.hr+z2.hr)+x;
    return t3;    }
```

Enter the time 1(hr,mn,ss) :

2

34

54

Enter the time 2(hr,mn,ss) :

3

55

12

Time 1 : 2hrs 34min 54ss.

Time 2 : 3hrs 55min 12ss.

Time 3 : 6hrs 30min 6ss.

Process exited after 20.58 seconds with return value 0

Press any key to continue . . . █

Q-2

Write a program to find whether a triangle is valid or not.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to find whether a triangle is valid or not using structures.
#include<iostream>
#include<math.h>
using namespace std;
struct pnt
{    int x,y;    };
void input(pnt&);
void output(pnt);
float dist(pnt,pnt);
int main()
{
    pnt p1,p2,p3;
    float a,b,c;
    cout<<"Enter the co-ordinates of point 1 : \n";
    input(p1);
    cout<<"Enter the co-ordinates of point 2 : \n";
    input(p2);
    cout<<"Enter the co-ordinates of point 3 : \n";
    input(p3);
    cout<<"Co-ordinates of Point 1 : ";
    output(p1);
    cout<<"\nCo-ordinates of Point 2 : ";
    output(p2);
    cout<<"\nCo-ordinates of Point 3 : ";
    output(p3);
    a=dist(p1,p2);
    b=dist(p2,p3);
    c=dist(p1,p3);
    if((a+b)>c&&(b+c)>a&&(a+c)>b)
        cout<<"\nThis is a valid triangle.";
    else
        cout<<"\nThis is not a valid triangle.";
}
void input(pnt& p)
{    cin>>p.x>>p.y;    }
void output(pnt p)
{    cout<<"("<<p.x<<","<<p.y<<")";    }
float dist(pnt z1,pnt z2)
{
    float d,m,n;
    m=pow((z2.x-z1.x),2);
    n=pow((z2.y-z1.y),2);
    d=sqrt(m+n);
    return d;
}
```

```
Enter the co-ordinates of point 1 :  
1  
1  
Enter the co-ordinates of point 2 :  
2  
2  
Enter the co-ordinates of point 3 :  
3  
3  
Co-ordinates of Point 1 : (1,1)  
Co-ordinates of Point 2 : (2,2)  
Co-ordinates of Point 3 : (3,3)  
This is not a valid triangle.  
-----  
Process exited after 12.59 seconds with return value 0  
Press any key to continue . . .
```

```
Enter the co-ordinates of point 1 :  
3  
4  
Enter the co-ordinates of point 2 :  
8  
7  
Enter the co-ordinates of point 3 :  
1  
5  
Co-ordinates of Point 1 : (3,4)  
Co-ordinates of Point 2 : (8,7)  
Co-ordinates of Point 3 : (1,5)  
This is a valid triangle.  
-----  
Process exited after 5.273 seconds with return value 0  
Press any key to continue . . . ■
```


Q-3

Write a program to calculate money made by ads.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to calculate money made by ads using structures.
#include<iostream>
using namespace std;
struct ads
{
    int num;
    float per;
    float mny;
};
float mny_mad(ads);
int main()
{
    float x;
    ads a;
    cout<<"Enter the number of ads shown : ";
    cin>>a.num;
    cout<<"Enter %age of people clicked on ad : ";
    cin>>a.per;
    cout<<"Enter the money you make per ad : ";
    cin>>a.mny;
    x=mny_mad(a);
    cout<<"Money made by you : "<<x;
}
float mny_mad(ads a)
{
    float x;
    x=((float)a.num*a.mny*a.per)/100;
    return x;
}
```

```
Enter the number of ads shown : 74
Enter %age of people clicked on ad : 67.9
Enter the money you make per ad : 32.4
Money made by you : 1627.97
-----
Process exited after 17.89 seconds with return value 0
Press any key to continue . . .
```

Q-4

Write a program to multiply two fraction with structures.

[PROGRAMMING and OUTPUT]

```
//DEV C++
//Program to multiply two fraction with structures.
#include<iostream>
using namespace std;
struct frac
{    int num,den;    };
void input(frac&);
float mltvide(frac,frac);
int main()
{    float x;
    frac f1,f2;
    cout<<"|Enter details of fraction 1|\n";
    input(f1);
    cout<<"|Enter details of fraction 2|\n";
    input(f2);
    x=mltvide(f1,f2);
    cout<<"Final result of the details : "<<x;    }
void input(frac& f)
{    cout<<"Numerator : ";
    cin>>f.num;
    cout<<"Denominator : ";
    cin>>f.den;    }
float mltvide(frac f1,frac f2)
{    int a,b;
    float r;
    a=f1.num*f2.num;
    b=f1.den*f2.den;
    r=(float)a/(float)b;
    return r;    }
```

```
|Enter details of fraction 1|
Numerator : 4
Denominator : 5
|Enter details of fraction 2|
Numerator : 3
Denominator : 7
Final result of the details : 0.342857
-----
Process exited after 4.976 seconds with return value 0
Press any key to continue . . .
```

Q-5

Write a program to store details of 3 students and display student with max. percentage and students failed in more than 1 subjects.

|PROGRAMMING|

```
//DEV C++
//Program to store details of 3 student and display student with max. %age and
person failed in more than 1 subjects.
#include<iostream>
#include<stdio.h>
using namespace std;
struct student
{
    int roll;
    char name[30];
    int mark[3];
    float per;
};
void input(student&);
void output(student);
int main()
{
    int i,j,loc,fail,sum;
    float max;
    student s[3];
    for(i=0;i<3;++i)
    {
        cout<<"Enter the details of student "<<i+1<<" : \n";
        input(s[i]);
    }
    for(i=0;i<3;++i)
    {
        sum=0;
        for(j=0;j<3;++j)
            sum+=s[i].mark[j];
        s[i].per=sum/3;
    }
    max=0;
    for(i=0;i<3;++i)
        if(s[i].per>max)
        {
            max=s[i].per;
            loc=i;
        }
    cout<<"\nDetail of the student with max. %age : \n";
    output(s[loc]);
    cout<<"\n\nDetail of student(s) failed in more than 1 subjects : \n";
    cout<<"|Failing criteria - Below 25 out of 100|\n";
    for(i=0;i<3;++i)
    {
        fail=0;
        for(j=0;j<3;++j)
```

```

                if(s[i].mark[j]<25)
                    ++fail;
                if(fail>1)
                {
                    output(s[i]);
                    cout<<"\n\n";
                }
            }
        }
    }
}

void input(student& s)
{
    int k;
    cout<<"Enter the roll no. : ";
    cin>>s.roll;
    cout<<"Enter the name : ";
    cin>>s.name;
    cout<<"Enter marks in 3 subjects : \n";
    for(k=0;k<3;++k)
    {
        cout<<"Subject "<<k+1<<" : ";
        cin>>s.mark[k];
    }
}

void output(student s)
{
    int k;
    cout<<"Roll no. : ";
    cout<<s.roll;
    cout<<"\nName : ";
    cout<<s.name;
    cout<<"\nMarks : ";
    for(k=0;k<3;++k)
    {
        cout<<"\nSubject "<<k+1<<" : ";
        cout<<s.mark[k];
    }
    cout<<"\n%age : ";
    cout<<s.per;
}

```

|OUTPUT IS ON THE NEXT PAGE|

```
Enter the details of student 1 :
Enter the roll no. : 1
Enter the name : panther
Enter marks in 3 subjects :
Subject 1 : 17
Subject 2 : 24
Subject 3 : 37
Enter the details of student 2 :
Enter the roll no. : 2
Enter the name : leopard
Enter marks in 3 subjects :
Subject 1 : 55
Subject 2 : 86
Subject 3 : 59
Enter the details of student 3 :
Enter the roll no. : 3
Enter the name : jaguar
Enter marks in 3 subjects :
Subject 1 : 77
Subject 2 : 87
Subject 3 : 76

Detail of the student with max. %age :
Roll no. : 3
Name : jaguar
Marks :
Subject 1 : 77
Subject 2 : 87
Subject 3 : 76
%age : 80

Detail of student(s) failed in more than 1 subjects :
|Failing criteria - Below 25 out of 100|
Roll no. : 1
Name : panther
Marks :
Subject 1 : 17
Subject 2 : 24
Subject 3 : 37
%age : 26

-----
Process exited after 47.99 seconds with return value 0
Press any key to continue . . . _
```