1.Write a C++ program to print the given number in reverse order. Use functions with return type and without return type for reversing the number

```
#include<iostream>
using namespace std;
int rev(int a)
{
	int rem,rev=0;
	while(a!=0)
	{
		rem=a%10;
		rev=rev*10+rem;
		a/=10;
	}
	return rev;
}
int main()
{
	int n;
	cout<<"\nenter the number to reverse : ";
	cin>>n;
	cout<<”\nreversed number : ”<<rev(n);
	return 0;
}
```

Output:

```
enter the number to reverse : 1231
reversed number : 1321
```

Reverse a number without return type :

```
#include<iostream>
using namespace std;
void rev(int a)
{
	int rem,rev=0;
	while(a!=0)
	{
		rem=a%10;
		rev=rev*10+rem;
		a/=10;
	}
	Cout<<”\n reversed number : ”<<rev;
}
int main()
{
	int n;
	cout<<"\nenter the number to reverse : ";
	cin>>n;
	rev(n);
	return 0;
}
```

Output:

enter the number to reverse : 1231

reversed number : 1321

2.Write a program in C++ to calculate the area of circle, rectangle, square and triangle using function overloading.

```
#include<iostream>
```

```
using namespace std;
void area(float r)
{
	cout<<"\narea of circle : "<<3.14*r*r;
}
void area(int a)
{
	cout<<"\narea of square : "<<a*a;
}
void area(float l,float b)
{
	cout<<"\narea of rectangle : "<<l*b;
}
void area(int b1,int h)
{
	cout<<"\narea of triangle : "<<0.5*b1*h;
}
int main()
{
	float r=2.1,l=2.2,b=3.4;
	area(r);
	area(4);
	area(l,b);
	area(5,3);
	return 0;
}
```

Output:

area of circle : 13.8474

area of square : 16

area of rectangle : 7.48

area of triangle : 7.5

3.Write a C++ program to perform different arithmetic operation such as addition,subtraction, division, modulus and multiplication using inline function.

```
#include<iostream>
using namespace std;
inline void add(int a,int b)
{
	cout<<"\naddition : "<<a+b;
}

inline void sub(int a,int b)
{
	cout<<"\nsubtraction : "<<a-b;
}
inline void mul(int a,int b)
{
	cout<<"\nmultilpication : "<<a*b;
}
inline void div(int a,int b)
{
	cout<<"\ndivision : "<<a/b;
}
inline void mod(int a,int b)
```

```
{
        cout<<"\nmodulus : "<<a%b;
}
int main()
{
        int a,b;
        cout<<"\nenter the num 1 :";
        cin>>a;
        cout<<"\nenter the num 2 :";
        cin>>b;
        add(a,b);
        sub(a,b);
        mul(a,b);
        div(a,b);
        mod(a,b);
        return 0;
}
```

Output:

```
enter the num 1 :10
enter the num 2 :5
addition : 15
subtraction : 5
multilpication : 50
division : 2
modulus : 0
```

4.write a c++ program to swap two number using call by value mechanism.

```
#include<iostream>
using namespace std;
void swap(int a,int b){
	int c;
	c=a;
	a=b;
	b=c;
	cout<<a<<" "<<b;
}
int main()
{
	int p,q;
	cout<<"\nenter the num 1 : ";
	cin>>p;
	cout<<"\nenter the num 2 : ";
	cin>>q;
	swap(p,q);
	return 0;
}
```

5.create a class vector with sigle dimensional array and size as data members .use friend function to read and print the member values.

```
#include<iostream>
using namespace std;
class vector
{
	int x,a[100];
	public:
```

```
        vector(int n){
                x=n;
        }
        friend int vec(vector &obj1);
};
int vec(vector &obj1){
        int i,j;
        for(i=0;i<obj1.x;i++){
                cout<<"\nenter the element "<<i+1<<" in an array : ";
                cin>>obj1.a[i];
        }
        for(i=0;i<obj1.x;i++){
                cout<<obj1.a[i]<<" ";
        }
        return 0;
}
int main()
{
        int n1,a1;
        cout<<"\nenter the no of elements in an array : ";
        cin>>n1;
        vector v1(n1);
        a1=vec(v1);
        return 0;
}
```

7. write a program to find wheather the person is eligible for vote or not.and if that particular person is not eligible , then print how many years left to be eligible .

```
#include<iostream>
using namespace std;
int main()
{
	int age;
	cout<<"\nenter your age : ";
	cin>>age;
	if(age>=18)
	cout<<"\nyou are eligible to vote!!!";
	else if(age<18)
	cout<<"\nyou are allowed to vote after "<<18-age;
}
```

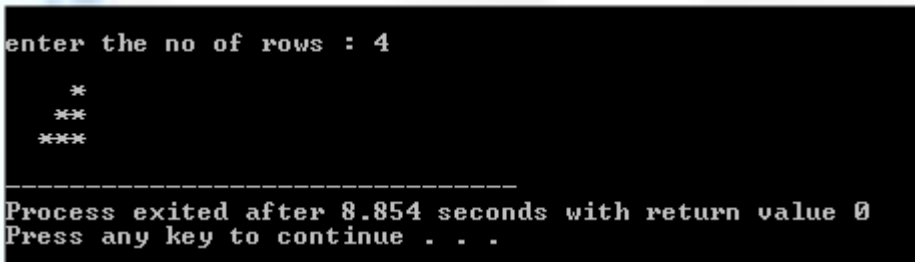
Output:

```
enter your age : 12
you are allowed to vote after 6
```

7. write a program to print right triangle star pattern

```
#include<iostream>
using namespace std;
int main()
{
	int i,j,r,k;
	cout<<"\nenter the no of rows : ";
	cin>>r;
	for(i=0;i<r;i++){
```

```
            for(j=r;j>=i;j--){
                    cout<<" ";
            }
            for(k=0;k<i;k++){
                    cout<<"*";
            }
            cout<<"\n";
        }
        return 0;
}
```



8.write a program to convert decimal to binary and octal ?

```
#include<iostream>
using namespace std;
void conversion(int n,intoper)
{
        int c,rem,i=0,a[10];
        while(n>=1){
                rem=n%oper;
                a[i]=rem;
                n/=oper;
                i++;
        }
```

```
        if(oper==2){
                cout<<"\nbinary number : ";
                goto f;
        }
        else{
                cout<<"\noctal number : ";
                goto f;
        }

        f: for(c=i-1;c>=0;c--){
                cout<<a[c];
        }
}
int main()
{
        int a;
        cout<<"\nenter the decimal number : ";
        cin>>a;
        conversion(a,2);
        conversion(a,8);
        return 0;

}
```

Output:

```
enter the decimal number : 20
```

binary number : 10100

octal number : 24

9. Write a program using function to calculate the simple interest. Suppose the customer is a senior citizen. He is being offered 12 percent rate of interest; for all other customers, the ROI is 10 percent.

```
#include<iostream>
using namespace std;
void si(int a,intb,int c)
{
	cout<<"\ninterest : "<<(a*b*c)/100;
}
int main()
{
	int p,n,r,s;
	cout<<"\nenter the principle amt : ";
	cin>>p;
	cout<<"\nenter the no of years : ";
	cin>>n;
	cout<<"\nare you senior citizen \n1.yes \n2.no \nenter your choice : ";
	cin>>s;
	if(s==1)
	si(p,n,12);
	else
	si(p,n,10);

}
```

output:enter the principle amt : 200000

enter the no of years : 3

are you senior citizen

1.yes

2.no

enter your choice : 2

interest : 60000

10. Write a program to print hollow square and full square symbol pattern? Get the different symbol for hollow square and full square as input from the user.

```
#include<iostream>
using namespace std;
int main()
{
	int r,i,j,k;
	char sym ;
	cout<<"\nenter the no of rows : ";
	cin>>r;
	cout<<"\nenter the symbol to show : ";
	cin>>sym;
	cout<<"\n";
	for(i=0;i<r;i++){
		for(j=0;j<r;j++){
			if(i==0 || i==r-1){
				cout<<sym<<" ";
```

```
                    }
                    else if(i>0 &&i<r-1){
                        if(j==0 || j==r-1){
                            cout<<sym<<" ";
                        }
                        else
                        cout<<"  ";
                    }
                }
                cout<<"\n";
        }
}
```

Output :

enter the no of rows : 10

enter the symbol to show : #

```
# # # # # # # # # #
#                   #
#                   #
#                   #
#                   #
#                   #
#                   #
#                   #
#                   #
# # # # # # # # # #
```

Program to print full square :

```
#include<iostream>
using namespace std;
int main()
{
	int r,i,j,k;
	char sym ;
	cout<<"\nenter the no of rows : ";
	cin>>r;
	cout<<"\nenter the symbol to show : ";
	cin>>sym;
	for(i=0;i<r;i++){
		for(j=0;j<r;j++){
			cout<<sym<<" ";
		}
		cout<<"\n ";
	}
	return 0;
}
```

12. Write a program to enter the marks of a student in four subjects. Then calculate the total and aggregate, display the grade obtained by the student. If the student scores an aggregate greater than 75%, then the grade is Distinction. If aggregate is 60>= and <75, then the grade is First Division. If aggregate is 50 >= and <60, then the grade is Second Division. If aggregate is 40>= and <50, then the grade is Third Division. Else the grade is Fail.

```
#include <iostream>
using namespace std;


int main(){
```

```
floata,b,c,d,tot;
   float agg;

cout<<"Enter the marks in python ";
cin>>a;
cout<<"Enter the marks in c programming:";
cin>>b;

cout<<"Enter the marks in Mathematics:";
cin>>c;
cout<<"Enter the marks in Physics:";
cin>>d;
tot=a+b+c+d;
cout<<"TOTAL : " << tot;
cout<<"\n";
agg=tot/4;
cout<<"AGGREGATE : " <<agg;
cout<<"\n";
   if (agg>=75){
cout<<"DISTINCTION";
   }
   else if (agg>=60 &&agg<75){
cout<<"FIRST DIVISION";
   }
   else if (agg>= 50 &&agg<60){
cout<<"SECOND DIVISION";
```

```
    }
    else if (agg>= 40 &&agg<50){
cout<<"THIRD DIVISION";
    }

    else if (agg< 40){
cout<<"FAIL";
    }
    else {
cout<<"invalid input";
    }
    return 0;
}
```

Output:

```
Enter the marks in python 90
Enter the marks in c programming:89
Enter the marks in Mathematics:45
Enter the marks in Physics:76
TOTAL : 300
AGGREGATE : 75
DISTINCTION
```

13. Write a program for matrix addition?

```
#include <iostream>
using namespace std;

int main()
```

```
{
   int  a[10][10],b[10][10], c[10][10] ,row, col,i,j;

cout<<"Enter the number of rows : ";
cin>>row;
cout<<"Enter the number of column : ";
cin>>col;
cout<<"enter A matrix element : ";
   for ( i = 0;i<row;i++ ) {
     for ( j = 0;j <col;j++ ) {
cin>>a[i][j];
     }
   }
cout<<"enter B matrix element : ";
   for ( i = 0;i<row;i++ ) {
     for ( j = 0;j<col;j++ ) {
cin>>b[i][j];
     }
   }

cout<<"ADDITION OF MATRIX A&B : \n";
   for ( i = 0;i<row;i++ ) {
      for ( j = 0;j<col;j++ ) {
        c[i][j]=a[i][j]+b[i][j];
cout<<c[i][j];
cout<<" ";
```

```
    }
cout<<"\n";
  }

  return 0;
}
```

Output:

```
Enter the number of rows : 2
Enter the number of column : 2
enter A matrix element : 1
2
3
4
enter B matrix element : 1
2
3
4
ADDITION OF MATRIX A&B :
2 4
6 8
```

14. Write a program for matrix multiplication?

```
#include <iostream>
using namespace std;
int main() {
   int x[5][5],y[5][5],z[5][5],row,col,i,j,k;
cout<<"enter the number of row=";
```

```
cin>>row;
cout<<"enter the number of column=";
cin>>col;
cout<<"enter A matrix element=\n";
   for(i=0;i<row;i++)
   {
      for(j=0;j<col;j++)
      {
cin>>x[i][j];
       }
   }
cout<<"enter B matrix element=\n";
   for(i=0;i<row;i++)
   {
     for(j=0;j<col;j++)
      {
cin>>y[i][j];
      }
   }
cout<<"multiply of the matrix A & B=\n";
   for(i=0;i<row;i++)
   {
      for(j=0;j<col;j++)
      {
                              z[i][j]=0;
          for(k=0;k<col;k++)
```

```
        {
         z[i][j]+=x[i][k]*y[k][j];
        }
   }
}

   for(i=0;i<row;i++)
   {
      for(j=0;j<col;j++)
      {
cout<<z[i][j];
cout<<" ";
      }
cout<<"\n";
   }
   return 0;
}
```

Output:

enter the number of row=2

enter the number of column=2

enter A matrix element=

1

2

3

4

enter B matrix element=

1

2

3

4

multiply of the matrix A & B=

7 10

15 22

15. Program to remove duplicates from the sorted array

```
#include<iostream>
using namespace std;
int main ()
{
   int A[10], B[10], n, i, j, k = 0;
cout<< "Enter the no of elements in an array  : ";
cin>> n;
   for (i = 0; i< n; i++){
         cout<< "Enter elements of array : ";
cin>> A[i];
   }
   for (i = 0; i< n; i++)
   {
      for (j = 0; j < k; j++)
      {
         if (A[i] == B[j])
            break;
```

```
        }
        if (j == k)
        {
            B[k] = A[i];
            k++;
        }
    }
cout<< "Repeated elements after deletion : ";
    for (i = 0; i< k; i++)
cout<< B[i] << " ";
    return 0;
}
```

Output:

```
Enter the no of elements in an array  : 5
Enter elements of array : 8
Enter elements of array : 7
Enter elements of array : 8
Enter elements of array : 5
Enter elements of array : 3
Repeated elements after deletion : 8 7 5 3
--------------------------------
```