OOP with C++

Lab work - 04

Lab Date - 08th Feb 2021

Name - Rishabh

Regno. - 201800631

Semester - 4th

GitHub - https://github.com/rishabh-live/oop-w-cpp-4-sem/tree/main/Labs

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> 1) Write a C++ Program to for matrix operation using switch-case. (a) add two matrix (b) subtract two matrix (c) multiply two matrix (d) transpose of a matrix

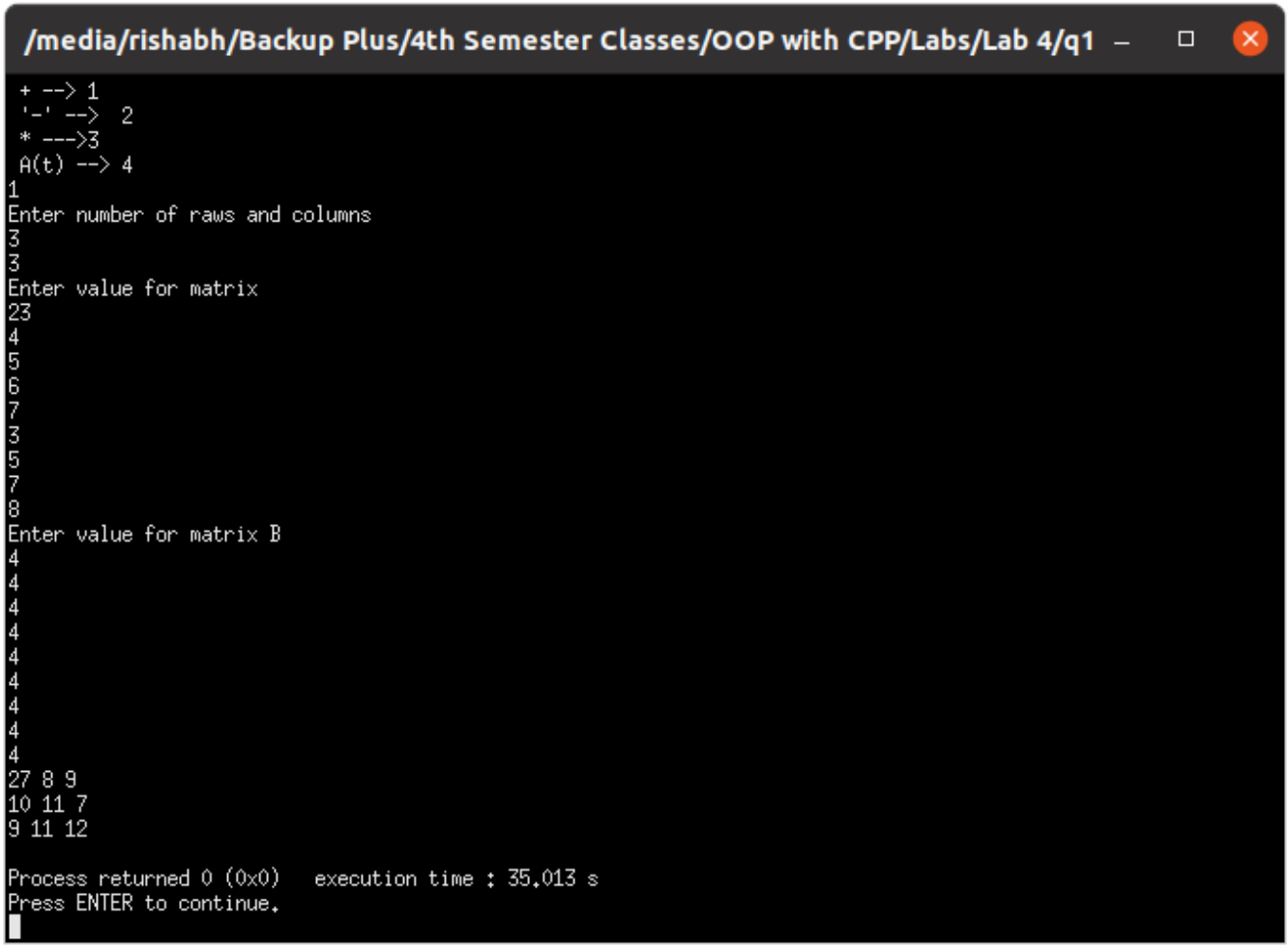
Source Code

```
// Write a C++ Program to for matrix operation using
// switch-case.
// (a) add two matrix
// (b) subtract two matrix
// (c) multiply two matrix
// (d) transpose of a matrix

#include<iostream>

    using namespace std;

     int main()
    {
      int m,n;



      int A[10][10],B[10][10],SUM[10][10],Sub[20][20],mlt[20][20],Trans[20]
[20],choice;

      cout<<"Enter which operation you want to perform \n + --> 1 \n '-' --
>  2 \n * --->3 \n A(t) --> 4 \n";
      cin>>choice;
      cout<<"Enter number of raws and columns"<<endl;
      cin>>m>>n;


         cout<<"Enter value for matrix ";
      for (int i=0;i<m;i++)
```

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


              cin>>A[i][j];

          }

          cout<<"Enter value for matrix B \n";
           for (int i=0;i<m;i++)
          for (int j=0;j<n;j++){


              cin>>B[i][j];

          }

        switch(choice){
            case 1 :
                        for (int i=0;i<m;i++)
                             for (int j=0;j<n;j++){
                                      SUM[i][j]= A[i][j]+B[i][j];

                             }
                         for (int i=0;i<m;i++)

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


                                     cout << SUM[i][j] << " \n"[j == n-1];
                             }

                        break;
            case 2:
                         for (int i=0;i<m;i++)
                             for (int j=0;j<n;j++){
                                      Sub[i][j]= A[i][j]-B[i][j];

                             }
                             for (int i=0;i<m;i++)
                             for (int j=0;j<n;j++){
                                     cout << Sub[i][j] << " \n"[j == n-1];

                             }
                          break;

           case 3:       for (int i=0;i<m;i++)
                             for (int j=0;j<n;j++){
                                      mlt[i][j]= 0;
                             }
                             for (int i=0;i<m;i++)
                             for (int j=0;j<n;j++)
                              for(int k=0;k<m;k++){
                                mlt[i][j]+=A[i][k] * B[k][j];
```

```
                            }
                            for (int i=0;i<m;i++)
                            for (int j=0;j<n;j++)
                             {
                                    cout << mlt[i][j] << " \n"[j == n-1];

                            }
                          break;
        case 4:             for (int i=0;i<m;i++)
                            for (int j=0;j<n;j++){
                                     Trans[j][i]= A[i][j];

                            }
                            for (int i=0;i<m;i++)
                            for (int j=0;j<n;j++){
                                    cout<< Trans[i][j] << " \n"[j == n-1];









                            }
                            break;
        default:
           cout<< "Please choose given task only \n";

            }

      return 0; // end the main function

    }
```

Output



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2) Write a C++ Program to Sort the Array in an Ascending Order

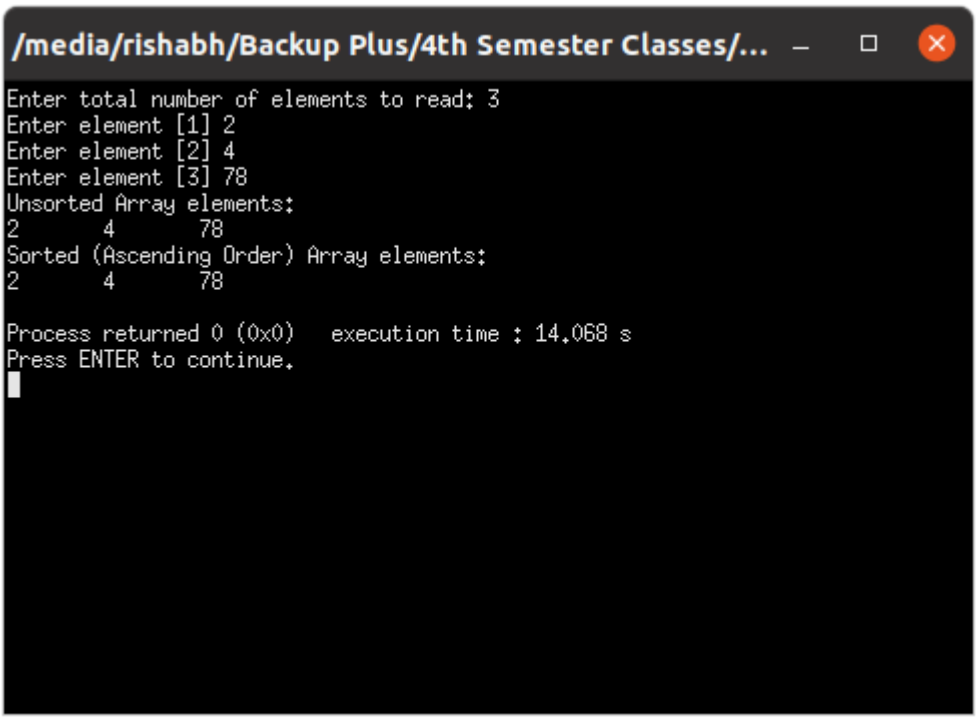
Source Code

```
// Write a C++ Program to Sort the Array in an
// Ascending Order

#include <iostream>
using namespace std;

#define MAX 100

class ArrayAsse{
    private:
        int arr[MAX];
        int n,i,j;
        int temp;
    public:
        int readElements();
        void arrangeArray();

};

int ArrayAsse::readElements(){
```

```
    cout<<"Enter total number of elements to read: ";
    cin>>n;
    if(n<0 || n>MAX)
    {
        cout<<"Input valid range!!!"<<endl;
        return -1;
    }


    for(i=0;i<n;i++)
    {
        cout<<"Enter element ["<<i+1<<"] ";
        cin>>arr[i];
    }


    cout<<"Unsorted Array elements:"<<endl;
    for(i=0;i<n;i++)
        cout<<arr[i]<<"\t";
    cout<<endl;

    return 0;
}

void ArrayAsse::arrangeArray(){
    for(i=0;i<n;i++)
    {
        for(j=i+1;j<n;j++)
        {
            if(arr[i]>arr[j])
            {
                temp  =arr[i];
                arr[i]=arr[j];
                arr[j]=temp;
            }
        }
    }


    cout<<"Sorted (Ascending Order) Array elements:"<<endl;
    for(i=0;i<n;i++)
        cout<<arr[i]<<"\t";
    cout<<endl;
}


int main(){

    ArrayAsse aa;
    aa.readElements();
    aa.arrangeArray();
```

```
    return 0;
}
```

Output



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3) Write a C++ Program to print the array index and array element using pointer

Source Code

```
// Write a C++ Program to print the array index and
// array element using pointer

#include <iostream>

using namespace std;


class ArrayPointers{
    private:
        int data[5];
    public:
        void enterElements(){
               cout << "Enter elements: " << endl;

                for(int i = 0; i < 5; ++i){
                    cin >> data[i];
                }

        }
        void printElements(){
```

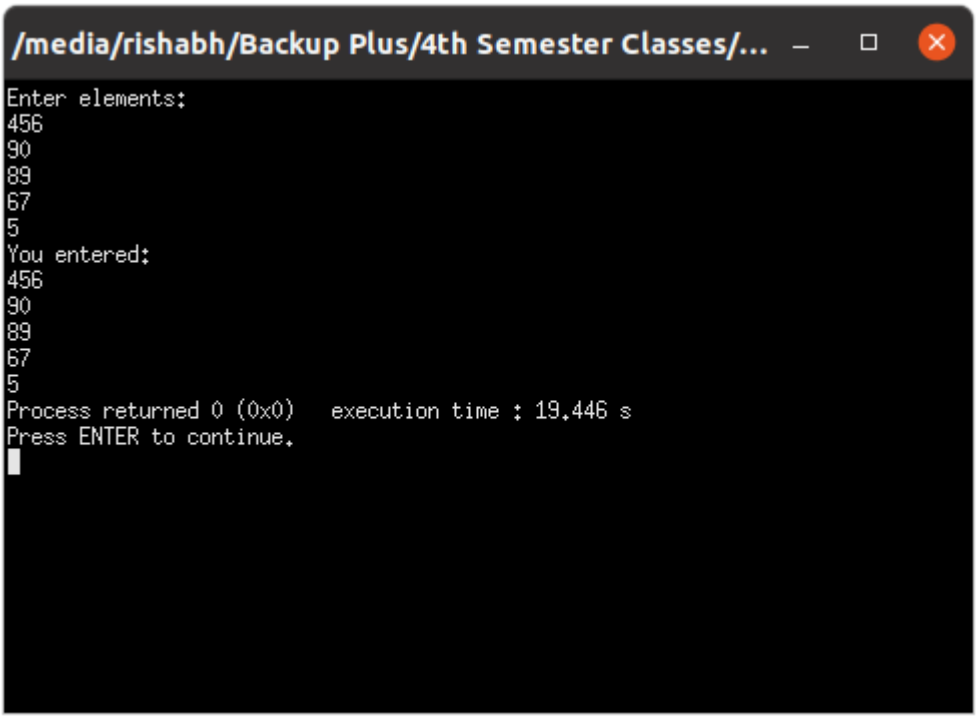
```
            cout << "You entered: ";
            for(int i = 0; i < 5; ++i){
                cout << endl << *(data + i);
            }
        }
};


int main(){

    ArrayPointers ap;
    ap.enterElements();
    ap.printElements();

    return 0;
}
```

Output



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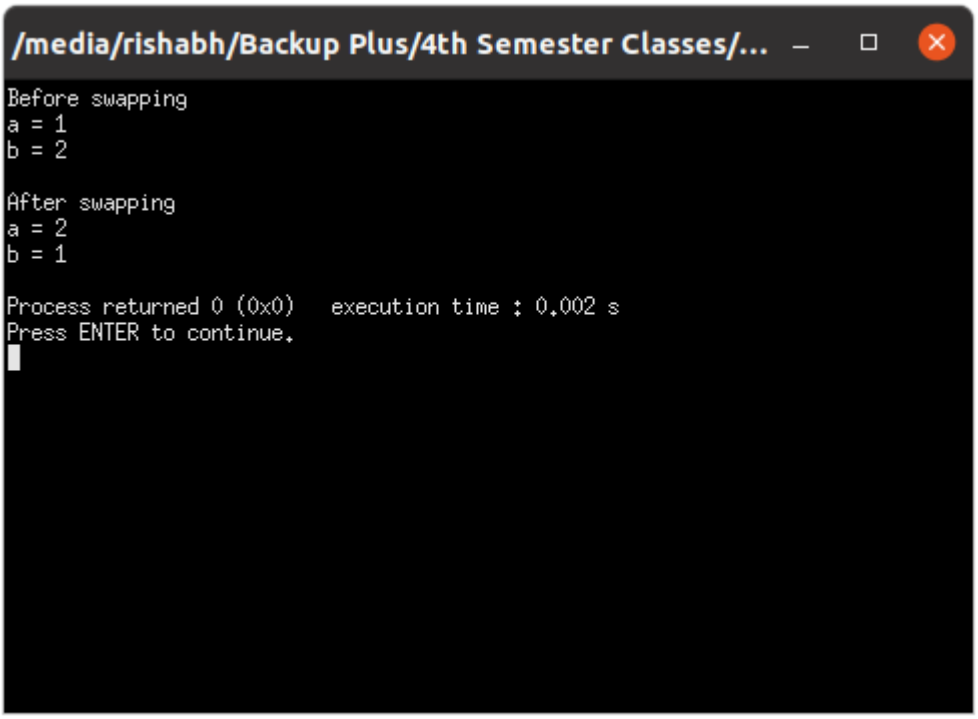
4) Write a C++ Program to swap two numbers using call by pointer variables

Source Code

```
#include<iostream>


using namespace std;

class SwapPointers{
    private:
```

```
        int *a, *b, *temp;
    public:
        void takeInputs();
        void swapInputs();

};

void SwapPointers::takeInputs(){
    cout << "Enter value of a and b:";
    cin >> *a >> *b;
}

void SwapPointers::swapInputs(){
    temp = a;
    a = b;
    b = temp;
    cout << "\nAfter swaping\na=" << *a<< "\nb=" << *b << endl;
}

int main() {

    SwapPointers sp;

    sp.takeInputs();
    sp.swapInputs();



    return 0;
}
```

Output



> 5) Create a structure Student with data members name, roll_no & marks. Implement the functions getdata(), showdata() for input and display the details of a student. Using switch-case write a menu driven main function for the following tasks: (a) Take input for 5 students (b) Display all the student's information in details in tabular form. (c) Sort the student list w.r.t. roll_no and display all in tabular form. (d) Sort the student list w.r.t. marks and display all in tabular form. (e) Sort the student list w.r.t. name and display all in tabular form.

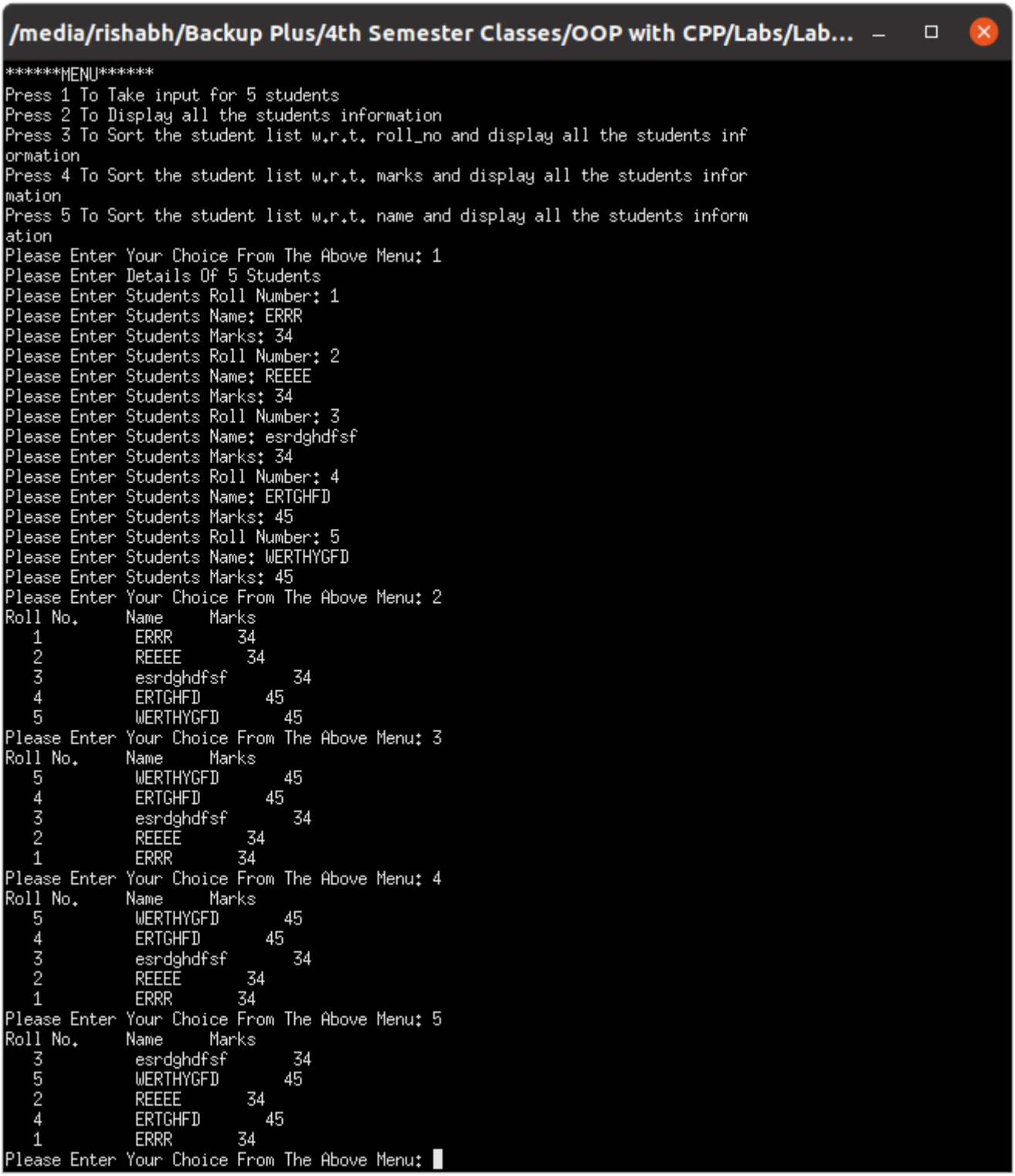
Source Code

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

struct student
{
    string name;
    int roll_no;
    int marks;
};
student Students[5];
student temp;

void getdata(student *stud)
{
    cout<<"Please Enter Students Roll Number: ";
    cin>>stud->roll_no;
    cout<<"Please Enter Students Name: ";
    cin>>stud->name;
    cout<<"Please Enter Students Marks: ";
    cin>>stud->marks;
}

void showdata(student stud)
{
    cout<<"   "<<stud.roll_no<<"          "<<""<<stud.name<<"       "<<""
<<stud.marks<<"      "<<endl;
}

int main()
{
    int n=6,choice=0;
    cout<<"******MENU******"<<endl;
    cout<<"Press 1 To Take input for 5 students"<<endl;
    cout<<"Press 2 To Display all the students information"<<endl;
    cout<<"Press 3 To Sort the student list w.r.t. roll_no and display all
the students information"<<endl;
    cout<<"Press 4 To Sort the student list w.r.t. marks and display all
the students information"<<endl;
    cout<<"Press 5 To Sort the student list w.r.t. name and display all the
students information"<<endl;
```

```
    while(choice<n)
    {
        cout<<"Please Enter Your Choice From The Above Menu: ";
        cin>>choice;
        switch (choice)
        {
        case 1:
            cout<<"Please Enter Details Of 5 Students"<<endl;
            for(int i=0;i<5;i++)
            {
                getdata(&Students[i]);
            }
            break;
        case 2:
            cout<<"Roll No."<<"     "<<"Name"<<"     "<<"Marks"<<"     "
<<endl;
            for(int i=0;i<5;i++)
            {
                showdata(Students[i]);
            }
            break;
        case 3:
            for(int i=0;i<5;i++)
            {
                for(int j=i+1;j<5;j++)
                {
                    if(Students[j].roll_no>Students[i].roll_no)
                    {
                        temp.roll_no=Students[i].roll_no;
                        temp.name=Students[i].name;
                        temp.marks=Students[i].marks;
                        Students[i].roll_no=Students[j].roll_no;
                        Students[i].name=Students[j].name;
                        Students[i].marks=Students[j].marks;
                        Students[j].roll_no=temp.roll_no;
                        Students[j].name=temp.name;
                        Students[j].marks=temp.marks;
                    }
                }
            }
            cout<<"Roll No."<<"     "<<"Name"<<"     "<<"Marks"<<"     "
<<endl;
            for(int i=0;i<5;i++)
            {
                showdata(Students[i]);
            }
            break;
        case 4:
            for(int i=0;i<5;i++)
            {
                for(int j=i+1;j<5;j++)
                {
                    if(Students[j].marks>Students[i].marks)
                    {
```

```
                        temp.roll_no=Students[i].roll_no;
                        temp.name=Students[i].name;
                        temp.marks=Students[i].marks;
                        Students[i].roll_no=Students[j].roll_no;>
                        Students[j].name=temp.name;
                        Students[j].marks=temp.marks;
                    }
                }
            }
            cout<<"Roll No."<<"     "<<"Name"<<"     "<<"Marks"<<"     "
<<endl;
            for(int i=0;i<5;i++)
            {
                showdata(Students[i]);
            }
            break;
        case 5:
            for(int i=0;i<5;i++)
            {
                for(int j=i;j<5;j++)
                {
                    if(Students[j].name>Students[i].name)
                    {
                        temp.roll_no=Students[i].roll_no;
                        temp.name=Students[i].name;
                        temp.marks=Students[i].marks;
                        Students[i].roll_no=Students[j].roll_no;
                        Students[i].name=Students[j].name;
                        Students[i].marks=Students[j].marks;
                        Students[j].roll_no=temp.roll_no;
                        Students[j].name=temp.name;
                        Students[j].marks=temp.marks;
                    }
                }
            }
            cout<<"Roll No."<<"     "<<"Name"<<"     "<<"Marks"<<"     "
<<endl;
            for(int i=0;i<5;i++)
            {
                showdata(Students[i]);
            }
            break;
        default:
            cout<<"Wrong Choice"<<endl;
            cout<<"Exiting......"<<endl;
            break;
        }
    }
    return 0;
}
```

Output


/media/rishabh/Backup Plus/4th Semester Classes/OOP with CPP/Labs/Lab...
******MENU******
Press 1 To Take input for 5 students
Press 2 To Display all the students information
Press 3 To Sort the student list w.r.t. roll_no and display all the students inf
ormation
Press 4 To Sort the student list w.r.t. marks and display all the students infor
mation
Press 5 To Sort the student list w.r.t. name and display all the students inform
ation
Please Enter Your Choice From The Above Menu: 1
Please Enter Details Of 5 Students
Please Enter Students Roll Number: 1
Please Enter Students Name: ERRR
Please Enter Students Marks: 34
Please Enter Students Roll Number: 2
Please Enter Students Name: REEEE
Please Enter Students Marks: 34
Please Enter Students Roll Number: 3
Please Enter Students Name: esrdghdfsf
Please Enter Students Marks: 34
Please Enter Students Roll Number: 4
Please Enter Students Name: ERTGHFD
Please Enter Students Marks: 45
Please Enter Students Roll Number: 5
Please Enter Students Name: WERTHYGFD
Please Enter Students Marks: 45
Please Enter Your Choice From The Above Menu: 2
Roll No. Name Marks
1 ERRR 34
2 REEEE 34
3 esrdghdfsf 34
4 ERTGHFD 45
5 WERTHYGFD 45
Please Enter Your Choice From The Above Menu: 3
Roll No. Name Marks
5 WERTHYGFD 45
4 ERTGHFD 45
3 esrdghdfsf 34
2 REEEE 34
1 ERRR 34
Please Enter Your Choice From The Above Menu: 4
Roll No. Name Marks
5 WERTHYGFD 45
4 ERTGHFD 45
3 esrdghdfsf 34
2 REEEE 34
1 ERRR 34
Please Enter Your Choice From The Above Menu: 5
Roll No. Name Marks
3 esrdghdfsf 34
5 WERTHYGFD 45
2 REEEE 34
4 ERTGHFD 45
1 ERRR 34
Please Enter Your Choice From The Above Menu: