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23115118 (EE-5)

1.Write SGPA of 30 students.

main.cpp

Run

```cpp
#include <iostream>
using namespace std;
class SGPA{
    int roll_number;
    int credits[5]={3,3,3,2,2};
    int grades[5];
    public:
    void input_grades(){
        cout<<"Enter roll number: ";
        cin>>roll_number;
        cout<<"Enter grades: ";
        for(int i=0;i<5;i++){
            cin>>grades[i];
        }
    }
    void display(){
        cout<<"Your roll numbeer is: "<<roll_number<<endl;
       float totalgrades=0;
    float totalcredit=0;
        for(int i=0;i<5;i++){
```

main.cpp

Run

```
        float totalgrades=0;
19      float totalcredit=0;
20          for(int i=0;i<5;i++){
21              totalgrades+=grades[i]*credits[i];
22              totalcredit+=credits[i];
23          }
24          cout<<"Your SGPA is: "<<totalgrades/totalcredit<<endl
                ;
25          cout<<endl;
26      }
27  };
28  int main()
29  {
30      SGPA student[30];
31     for(int i=0;i<30;i++){
32         student[i].input_grades();
33         student[i].display();
34     }
35     return 0;
36  }
```

Output

Clear

```
/tmp/uEO7WOosjD.o
Enter roll number: 1
Enter grades: 3 4 5 6 7
Your roll numbeer is: 1
Your SGPA is: 4.76923

Enter roll number: 2
Enter grades: 6 7 8 9 6
Your roll numbeer is: 2
Your SGPA is: 7.15385

Enter roll number: 3
Enter grades: 5 6 6 7 4
Your roll numbeer is: 3
Your SGPA is: 5.61538

Enter roll number: 4
Enter grades: 3 3 3 3 3
Your roll numbeer is: 4
Your SGPA is: 3
```

2.Write info of all academic units.

main.cpp

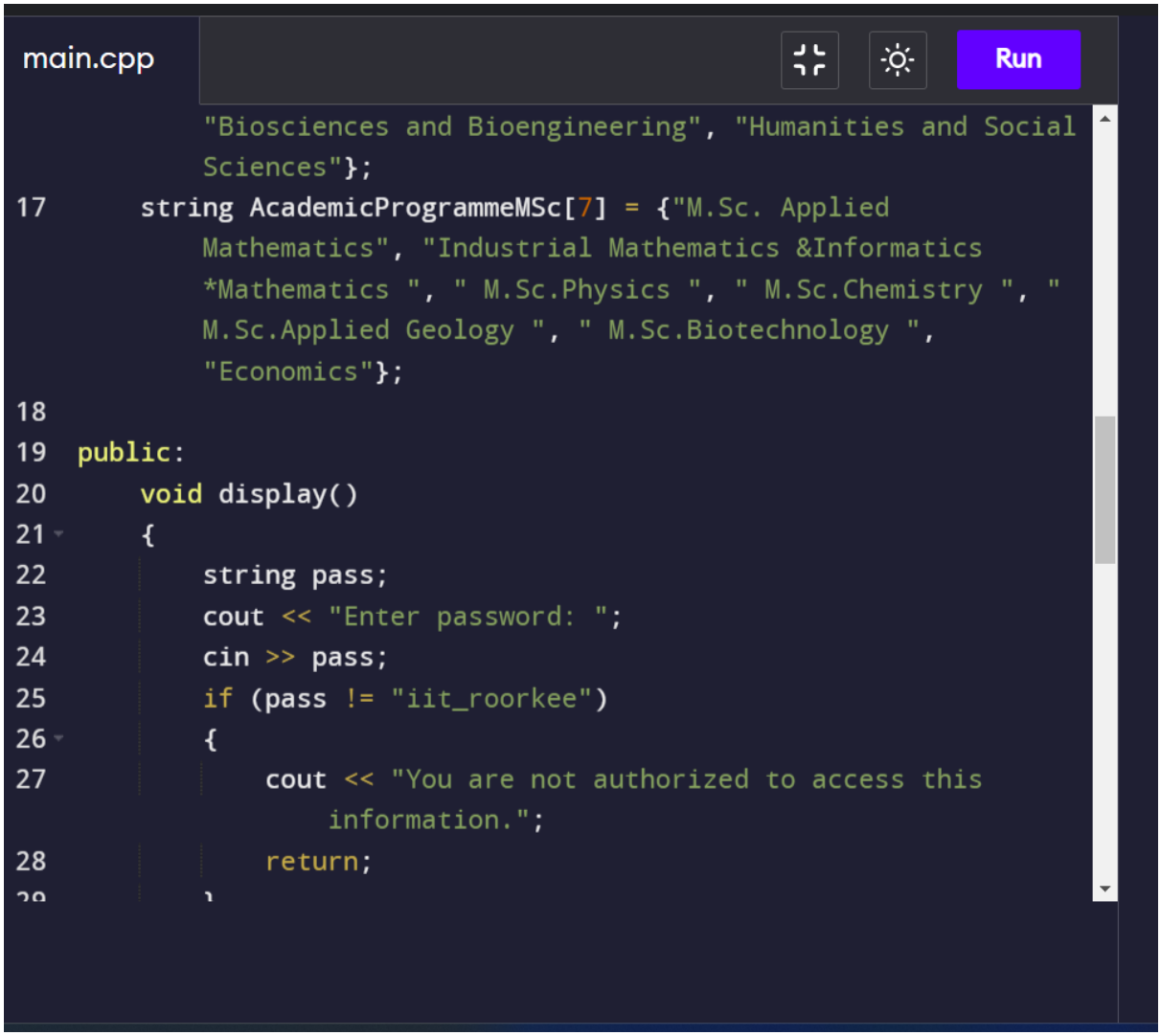
Run

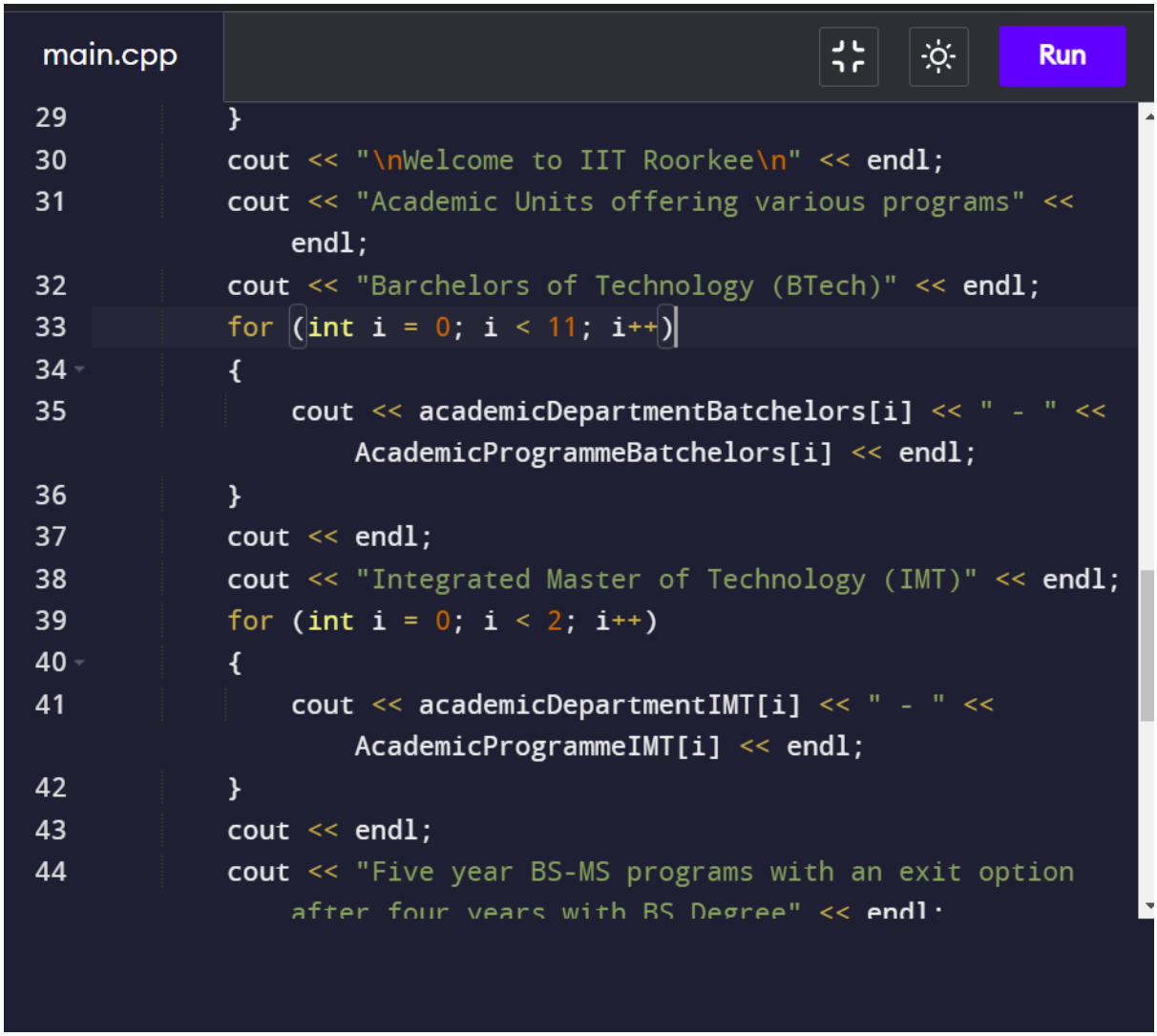
```
#include <iostream>
#include <string>
using namespace std;
class IITR
{
private:
    string academicDepartmentBatchelors[11] = {"Biosciences and
        Bioengineering", "Chemical Engineering", "Civil
        Engineering", "Electrical Engineering", "Electronics &
        Communcation Engineering", "Computer Science and
        Engineering", "Mechanical & Industrial Engineering",
        "Mechanical & Industrial Engineering", "Mehta Family
        School for Data Science and Artificial Intelligence",
        "Metallurgical & Materials Engineering", "Physics"};
    string AcademicProgrammeBatchelors[11] = {"B.Tech.
        Biosciences and Bioengineering", "B. Tech. Chemical
        Engineering", "B. Tech Civil Engineering", "B. Tech.
        Electrical Engineering", "B. Tech. Electronics &
        Communication Engineering", "B. Tech. Computer Science &
```

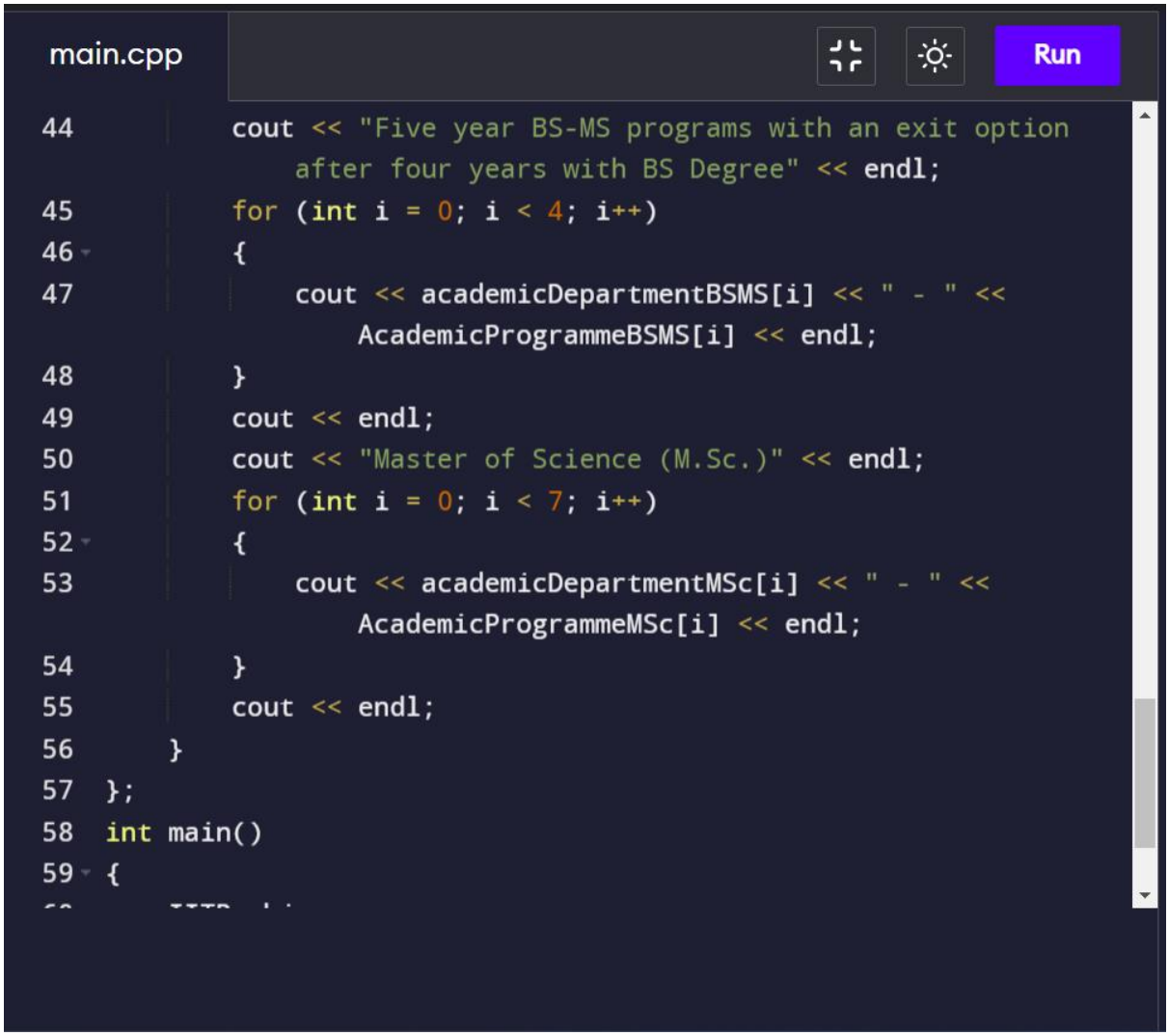
main.cpp

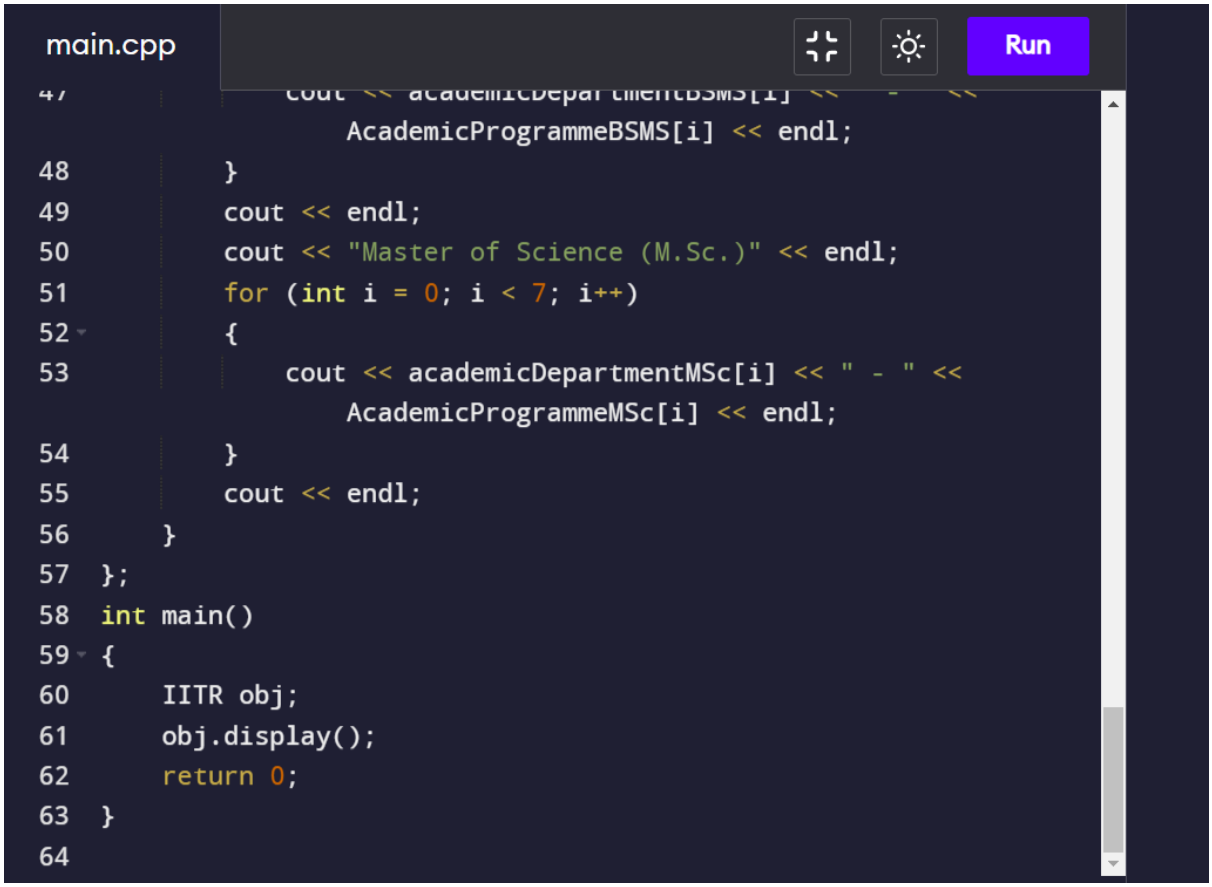
Run

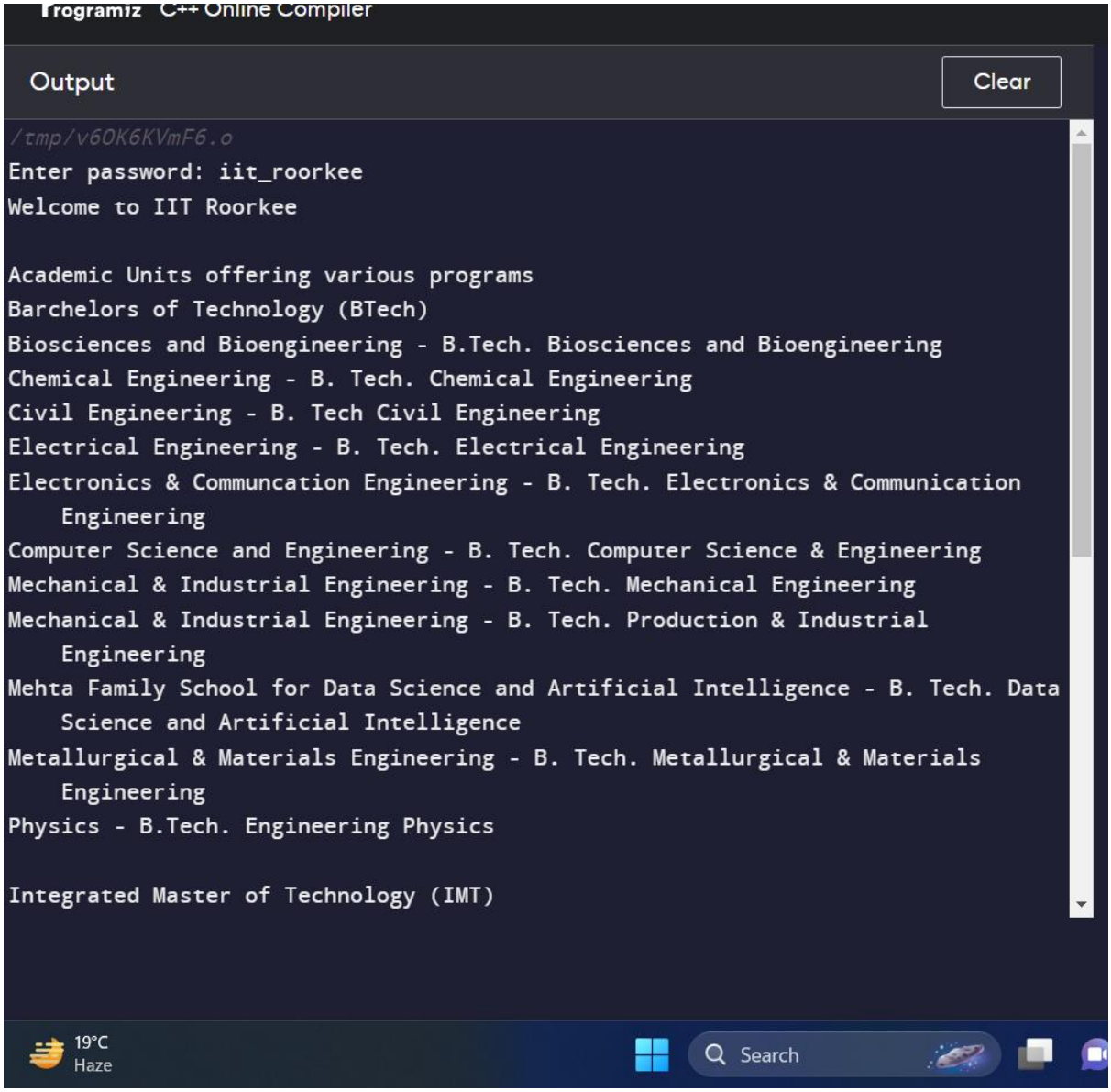
```
        Engineering", "B. Tech. Mechanical Engineering", "B.
        Tech. Production & Industrial Engineering", "B. Tech.
        Data Science and Artificial Intelligence", "B. Tech.
        Metallurgical & Materials Engineering", "B.Tech.
        Engineering Physics"};
 9
10      string academicDepartmentIMT[2] = {"Earth Sciences", "Earth
            Sciences"};
11      string AcademicProgrammeIMT[2] = {"M.Tech. (Geophysical
            Technology)", "M.Tech. (Geological Technology)"};
12
13      string academicDepartmentBSMS[4] = {"Mathematics", "Physics"
            , "Chemistry", "Economics"};
14      string AcademicProgrammeBSMS[5] = {"BS-MS (Mathematics and
            Computing)", "BS-MS Physics", "  BS-MS (Chemical
            Sciences)", "BS-MS Economics"};
15
16      string academicDepartmentMSc[7] = {"Mathematics",
            "Mathematics", "Physics", "Chemistry", "Earth Sciences",
```

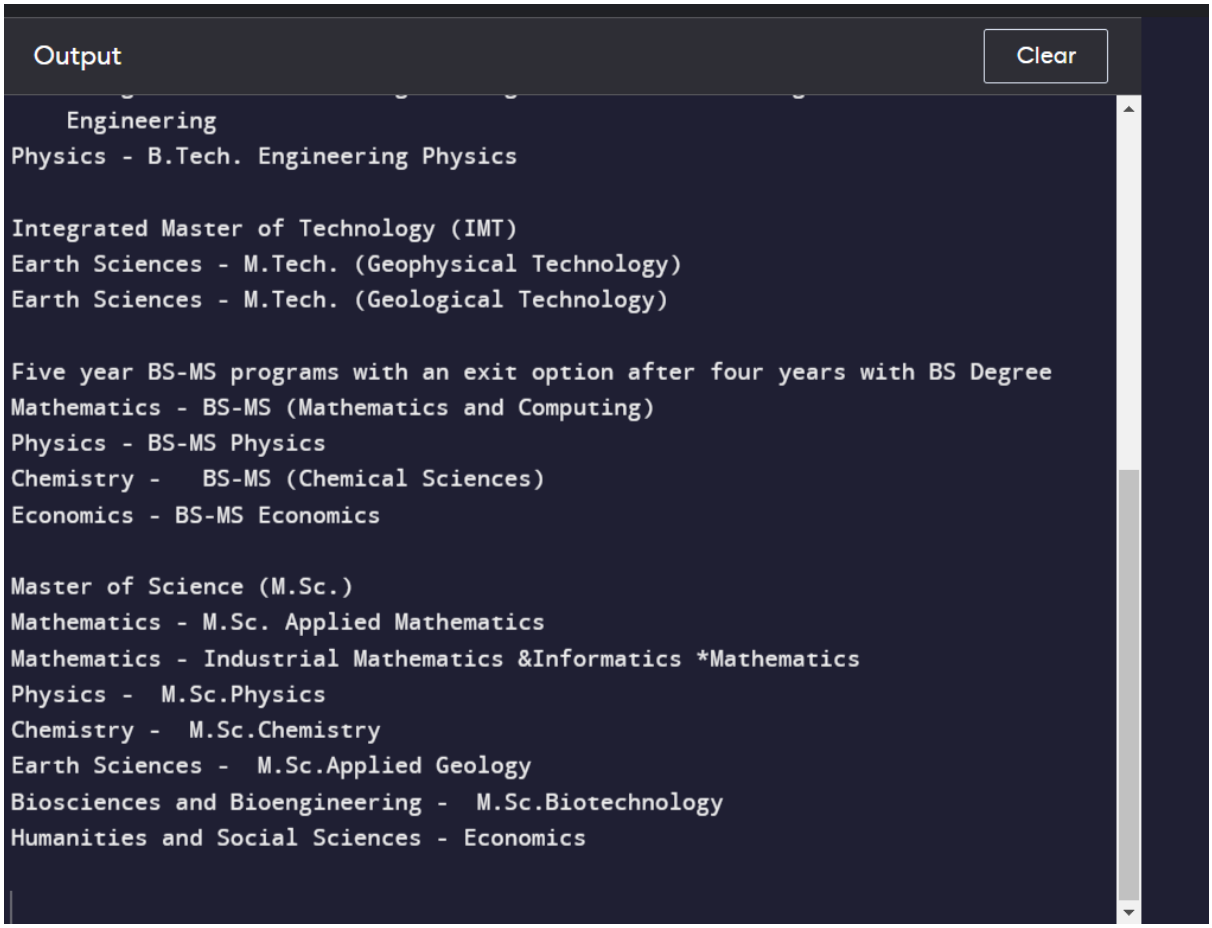

main.cpp
Run
"Biosciences and Bioengineering", "Humanities and Social Sciences"};
string AcademicProgrammeMSc[7] = {"M.Sc. Applied Mathematics", "Industrial Mathematics &Informatics *Mathematics ", " M.Sc.Physics ", " M.Sc.Chemistry ", " M.Sc.Applied Geology ", " M.Sc.Biotechnology ", "Economics"};
public:
void display()
{
string pass;
cout << "Enter password: ";
cin >> pass;
if (pass != "iit_roorkee")
{
cout << "You are not authorized to access this information.";
return;


main.cpp
Run
29 }
30 cout << "\nWelcome to IIT Roorkee\n" << endl;
31 cout << "Academic Units offering various programs" << endl;
32 cout << "Barchelors of Technology (BTech)" << endl;
33 for (int i = 0; i < 11; i++)
34 {
35 cout << academicDepartmentBatchelors[i] << " - " << AcademicProgrammeBatchelors[i] << endl;
36 }
37 cout << endl;
38 cout << "Integrated Master of Technology (IMT)" << endl;
39 for (int i = 0; i < 2; i++)
40 {
41 cout << academicDepartmentIMT[i] << " - " << AcademicProgrammeIMT[i] << endl;
42 }
43 cout << endl;
44 cout << "Five year BS-MS programs with an exit option after four years with BS Degree" << endl;


main.cpp
Run
cout << "Five year BS-MS programs with an exit option after four years with BS Degree" << endl;
for (int i = 0; i < 4; i++)
{
cout << academicDepartmentBSMS[i] << " - " << AcademicProgrammeBSMS[i] << endl;
}
cout << endl;
cout << "Master of Science (M.Sc.)" << endl;
for (int i = 0; i < 7; i++)
{
cout << academicDepartmentMSc[i] << " - " << AcademicProgrammeMSc[i] << endl;
}
cout << endl;
}
};
int main()
{


main.cpp
Run
AcademicProgrammeBSMS[i] << endl;
}
cout << endl;
cout << "Master of Science (M.Sc.)" << endl;
for (int i = 0; i < 7; i++)
{
cout << academicDepartmentMSc[i] << " - " <<
AcademicProgrammeMSc[i] << endl;
}
cout << endl;
}
};
int main()
{
IITR obj;
obj.display();
return 0;
}


Programiz C++ Online Compiler
Output
Clear
/tmp/v6OK6KVmF6.o
Enter password: iit_roorkee
Welcome to IIT Roorkee
Academic Units offering various programs
Barchelors of Technology (BTech)
Biosciences and Bioengineering - B.Tech. Biosciences and Bioengineering
Chemical Engineering - B. Tech. Chemical Engineering
Civil Engineering - B. Tech Civil Engineering
Electrical Engineering - B. Tech. Electrical Engineering
Electronics & Communcation Engineering - B. Tech. Electronics & Communication Engineering
Computer Science and Engineering - B. Tech. Computer Science & Engineering
Mechanical & Industrial Engineering - B. Tech. Mechanical Engineering
Mechanical & Industrial Engineering - B. Tech. Production & Industrial Engineering
Mehta Family School for Data Science and Artificial Intelligence - B. Tech. Data Science and Artificial Intelligence
Metallurgical & Materials Engineering - B. Tech. Metallurgical & Materials Engineering
Physics - B.Tech. Engineering Physics
Integrated Master of Technology (IMT)
19°C
Haze
Search


Output
Clear
Engineering
Physics - B.Tech. Engineering Physics
Integrated Master of Technology (IMT)
Earth Sciences - M.Tech. (Geophysical Technology)
Earth Sciences - M.Tech. (Geological Technology)
Five year BS-MS programs with an exit option after four years with BS Degree
Mathematics - BS-MS (Mathematics and Computing)
Physics - BS-MS Physics
Chemistry - BS-MS (Chemical Sciences)
Economics - BS-MS Economics
Master of Science (M.Sc.)
Mathematics - M.Sc. Applied Mathematics
Mathematics - Industrial Mathematics &Informatics *Mathematics
Physics - M.Sc.Physics
Chemistry - M.Sc.Chemistry
Earth Sciences - M.Sc.Applied Geology
Biosciences and Bioengineering - M.Sc.Biotechnology
Humanities and Social Sciences - Economics

3.Multiply two matrices.

main.cpp

Run

```cpp
#include <iostream>
using namespace std;
int main(){
    int row1;
    int row2;
    int coloumn1;
    int coloumn2;
    cout<<"Matrix 1: "<<endl;
    cout<<"No. of rows: ";
    cin>>row1;
    cout<<"No. of coloumns: ";
    cin>>coloumn1;
    cout<<"Matrix 2: "<<endl;
    cout<<"No. of rows: ";
    cin>>row2;
    cout<<"No. of coloumns: ";
    cin>>coloumn2;
    if(coloumn1!=row2){
        cout<<"error...";
    exit(0);
    }
    int mat1[row1][coloumn1];
    int mat2[row2][coloumn2];
```

main.cpp

Run

```
    for(int i=0;i<row1;i++){
        cout<<"Row "<<i+1<<": ";
        for(int j=0;j<coloumn1;j++){
            cin>>mat1[i][j];
        }
        cout<<endl;
    }
    cout<<"Matrix 2: "<<endl;
    for(int i=0;i<row2;i++){
        cout<<"Row "<<(i+1)<<": ";
        for(int j=0;j<coloumn2;j++){
            cin>>mat2[i][j];
        }
        cout<<endl;
    }
        cout<<"Matrix 1 * Matrix 2 = "<<endl;
        for(int i=0;i<row1;i++){
        for(int j=0;j<coloumn2;j++){
            cout<<mat1[i][j]*mat2[j][i]<<"   ";
        }
        cout<<endl;
    }
}
```

Output

Clear

```
/tmp/uE07W0osjD.o
Matrix 1:
No. of rows: 3
No. of coloumns: 3
Matrix 2:
No. of rows: 3
No. of coloumns: 3
Matrix 1:
Row 1: 1 0 0
Row 2: 0 1 0
Row 3: 0 0 1
Matrix 2:
Row 1: 1 0 0
Row 2: 0 1 0
Row 3: 0 0 1
Matrix 1 * Matrix 2 =
1   0   0
0   1   0
0   0   1
```

4. String in Alphabetic order.

main.cpp

Run

```cpp
#include <iostream>
#include <string>
#include <cstring>
using namespace std;
int main() {
    char str[100];
    cout << "Enter a string: ";
    cin.getline(str, 100);
    int n = strlen(str);
    char* p = str;
    char temp;
    for (int i = 0; i < n; i++) {
        for (int j = i + 1; j < n - 1; j++) {
            if (*(p + i) > *(p + j)) {
                temp = *(p + i);
                *(p + i) = *(p + j);
                *(p + j) = temp;
            }
        }
    }
    cout << "The string in alphabetical order: " << str;
    return 0;
}
```

Output

Clear

```
/tmp/BwvRea8Vix.o
Enter a string: Rana
The string in alphabetical order:  Raan
```

5.Reverse a string.

main.cpp

Run

```cpp
#include <iostream>
#include <cstring>

void reverseString(char* str) {
    int len = strlen(str);
    char* start = str;
    char* end = str + len - 1;
    while (start < end) {
        char temp = *start;
        *start = *end;
        *end = temp;
        start++;
        end--;
    }
}

int main() {
    const int maxLength = 100;
    char inputString[maxLength];
    std::cout << "Enter a string: ";
```

Output

Clear

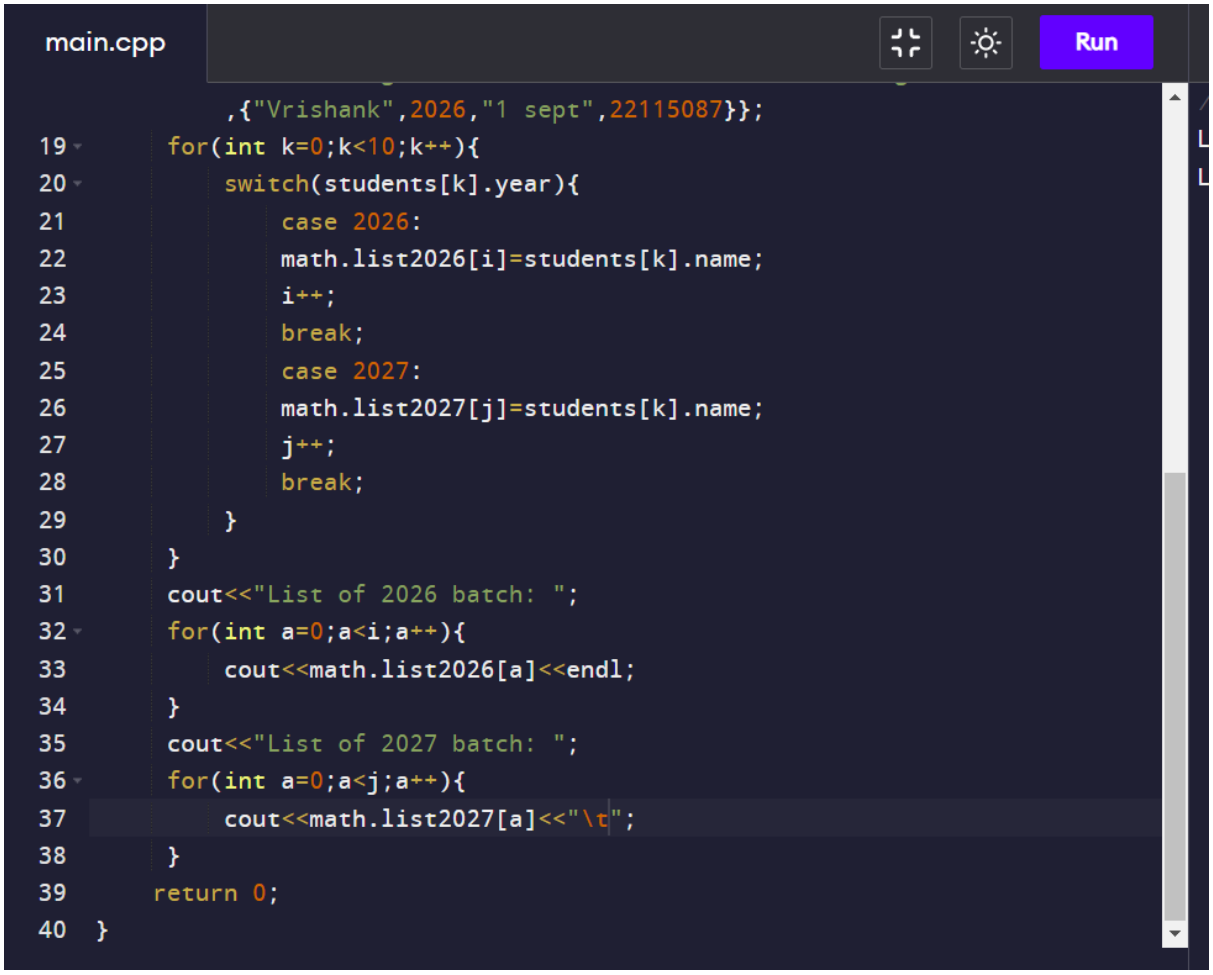
```
/tmp/0se1ypOmT4.o
Enter a string: Punit Rana
Reversed string: anaR tinuP
```

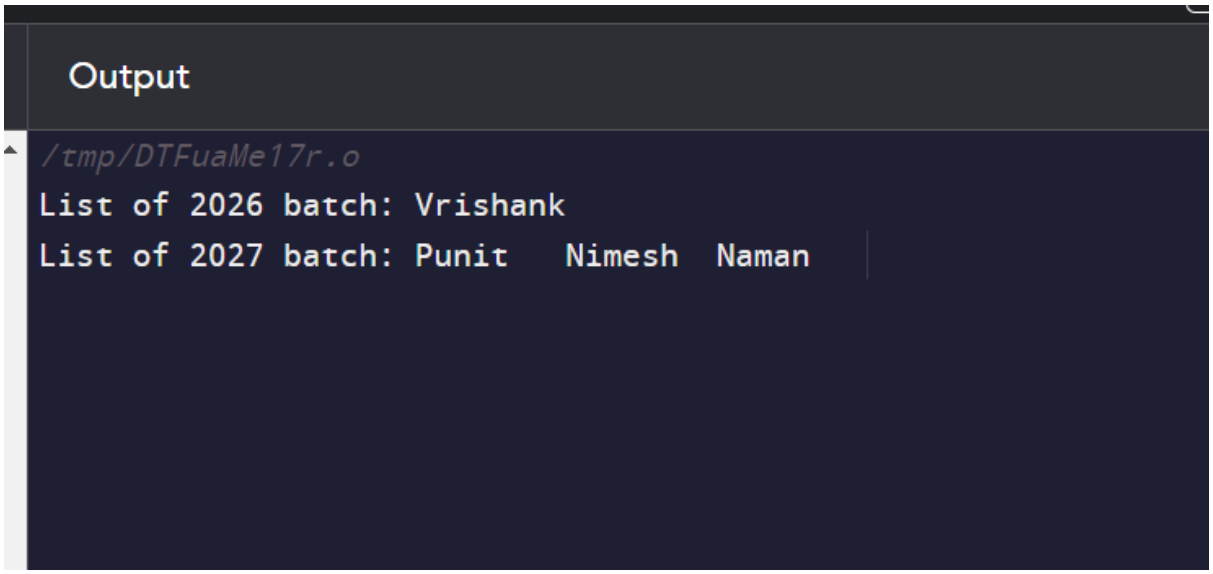
6.Group students of different years.

main.cpp

Run

```cpp
#include <iostream>
#include<string>
using namespace std;
struct Student{
    string name;
    int year;
    string date;
    int enrollment_no;
};
struct faculty{
    string list2027[10];
    string list2026[10];
};
int main() {
     faculty math;
     int i=0;
     int j=0;
     Student students[10]{{"Punit",2027,"1 august", 23115118},{"Nimesh"
         ,2027,"1 august", 23115096},{"Naman",2027,"! august",23115090}
         ,{"Vrishank",2026,"1 sept",22115087}};
     for(int k=0;k<10;k++){
         switch(students[k].year){
             case 2026:
```


main.cpp
Run
,{"Vrishank",2026,"1 sept",22115087}};
for(int k=0;k<10;k++){
switch(students[k].year){
case 2026:
math.list2026[i]=students[k].name;
i++;
break;
case 2027:
math.list2027[j]=students[k].name;
j++;
break;
}
}
cout<<"List of 2026 batch: ";
for(int a=0;a<i;a++){
cout<<math.list2026[a]<<endl;
}
cout<<"List of 2027 batch: ";
for(int a=0;a<j;a++){
cout<<math.list2027[a]<<"\t";
}
return 0;
}


Output
/tmp/DTFuaMe17r.o
List of 2026 batch: Vrishank
List of 2027 batch: Punit Nimesh Naman