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/*Ahan Bandyopadhyay  Roll No.:211210008 CSE Second Year OOPS 4th Semester*/

#include<iostream>
#include<bits/stdc++.h>

using namespace std;

//static variables to be used across the program
static int n;
static int num_sbj;
static int countf;

//date structure defined
typedef struct Date{
    int day;
    int month;
    int year;
}Date;

//Base class containing general info
class Geninfo{
    string name;
    int rollno;
    Date d;
    char gender;
    int year;
    string branch;

public:
    //setter function
    void setInfo(string nm, int rn, Date dt, char gnd, int yr, string brn)
    {
        name = nm;
        rollno = rn;
        d = dt;
        gender = gnd;
        year = yr;
        branch = brn;
    }

    //display all the general info
    void displayInfo()
    {
        cout << "Name: " << name << endl;
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        cout << "Roll no.: " << rollno << endl;
        cout << "Date of Birth: " << d.day << "/" << d.month << "/" << d.year << endl;
        cout << "Gender: " << gender << endl;
        cout << "Year of study: " << year << endl;
        cout << "Branch: " << branch << endl;
        cout << endl;
    }
};

//derived class
class Result:public Geninfo{
    int total = 0;

public:
    int *marks = new int[num_sbj];

    //input marks of each subject
    void getMarks(){
        for(int i = 0; i < num_sbj; i++)
        {
            cin >> marks[i];
        }
    }

    //display marks
    void displayMarks(){
        for(int i = 0; i < num_sbj; i++)
            cout << "Marks obtained in subject " << i+1 << " are " << marks[i] << endl;
        cout << endl;
    }

    //POLYMORPHISM OPERATOR OVERLOADING to calculate total marks of each student
    int operator+(){
        for(int i = 0; i < num_sbj; i++){
            total += marks[i];
        }

        return total;
    }
};

//function to find grades
void grading(int tmks){
    if(tmks > 90)
```

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        cout << "Grade: A+" << endl;
    else if(tmks <= 90 && tmks > 80)
        cout << "Grade: A" << endl;
    else if(tmks <= 80 && tmks > 70)
        cout << "Grade: B" << endl;
    else if(tmks <= 70 && tmks > 60)
        cout << "Grade: C" << endl;
    else if(tmks <= 60 && tmks > 50)
        cout << "Grade: D" << endl;
    else if(tmks <= 50 && tmks > 35)
        cout << "Grade: E" << endl;
    else if(tmks <= 35)
        cout << "Grade: F" << endl;
}

//function to find out who all failed
void fail(int tmks){
    if (tmks <= 35){
        cout << "Failed!" << endl;
        countf++;
    }
}

//function to display top 10% students
void tenprc(int *arr){
    int *temp = new int[n];

    for(int i = 0; i < n; i++)
        temp[i] = arr[i];

    sort(temp, temp + n);

    for(int i = n - 1; i >= n - ceil(0.1*n); i--){
        for(int j = 0; j < n; j++)
        {
            if(arr[j] == temp[i])
                cout << "Student " << j+1 << endl;
        }
    }
}

//main function block;
int main(){
   cout << "Welcome to Banergy Student Database" << endl;
```

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  cout << "\nEnter the number of students in the database: " << endl;
  cin >> n;

  //array of object of class Result created
  Result *students = new Result[n];

  //input all data
  for(int i = 0; i < n; i++)
  {
      string nm;
      int rn;
      Date dt;
      char gnd;
      int yr;
      string brn;

      cout << "\nEnter Name, Roll no., Date of Birth, Gender(M/F/O), Year of Study, Branch: " <<
endl;
      cin >> nm >> rn >> dt.day >> dt.month >> dt.year >> gnd >> yr >> brn;

      students[i].setInfo(nm, rn, dt, gnd, yr, brn);
      cout << endl;
  }

   cout << "\nEntered database: " << endl;
   for(int i = 0; i < n; i++)
   {
      cout << "Student " << i+1 << ": " << endl;
      students[i].displayInfo();
   }

   cout << "\nEnter the no. of subjects: " << endl;
   cin >> num_sbj;

   cout << "\nEnter the marks obtained in " << num_sbj << " subjects: " << endl;
   for(int i = 0; i < n; i++)
   {
      cout << "\nStudent " << i+1 << endl;
      students[i].getMarks();
   }

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

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        cout << "\nMarks obtained by student " << i+1 << endl;
        students[i].displayMarks();
    }

    int *sum = new int[n];
    for(int i = 0; i < n; i++)
    {
        cout << "\nTotal marks obtained by student " << i+1 << ": ";
        sum[i] = +students[i];
        cout << sum[i] << "\t";

        grading(sum[i]/num_sbj);
        fail(sum[i]/num_sbj);
    }

    cout << "\nNo. of students failed: " << countf << endl;

    cout << "\nTop 10% students are: " << endl;
    tenprc(sum);

    return 0;
}
```
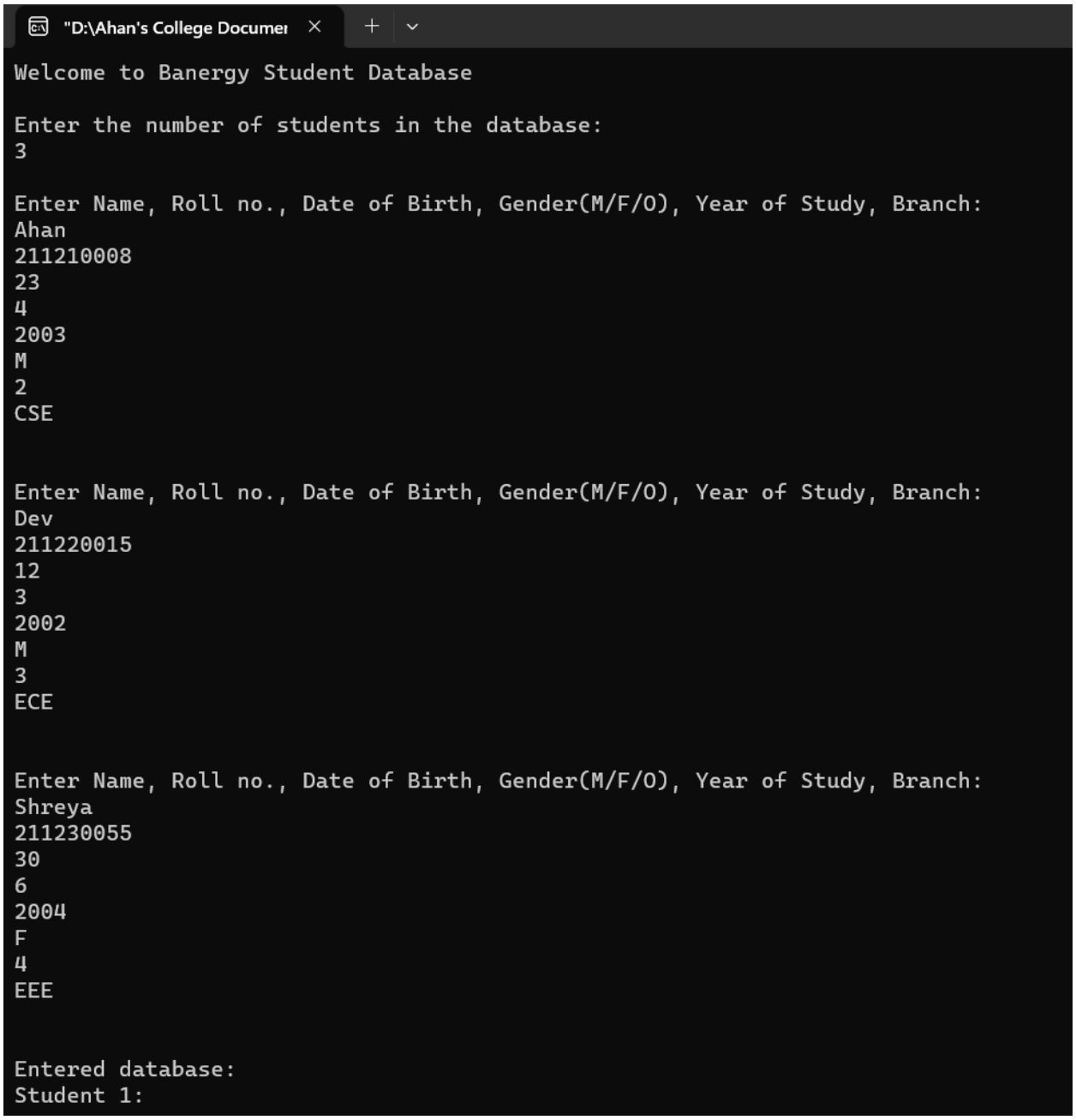
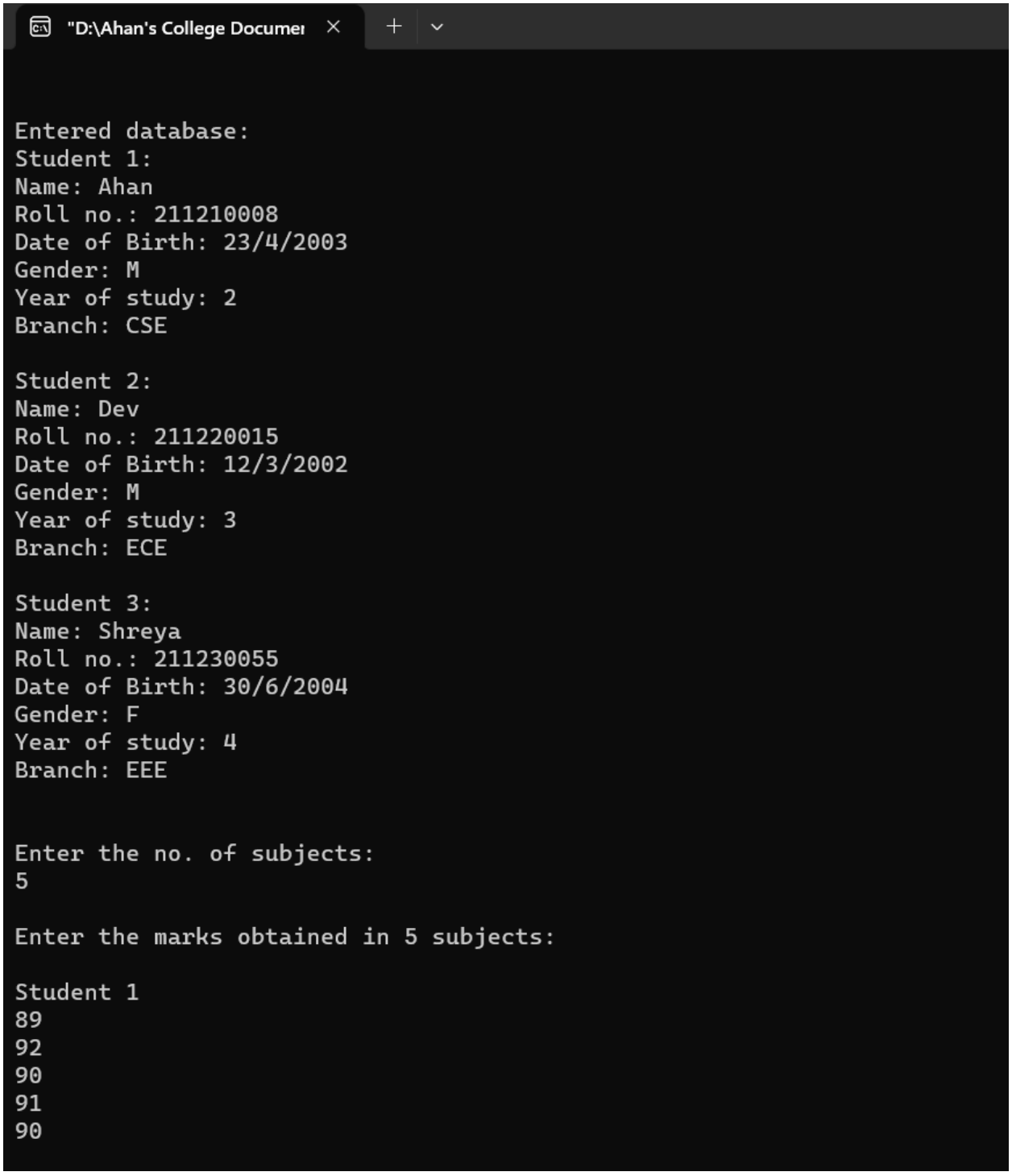
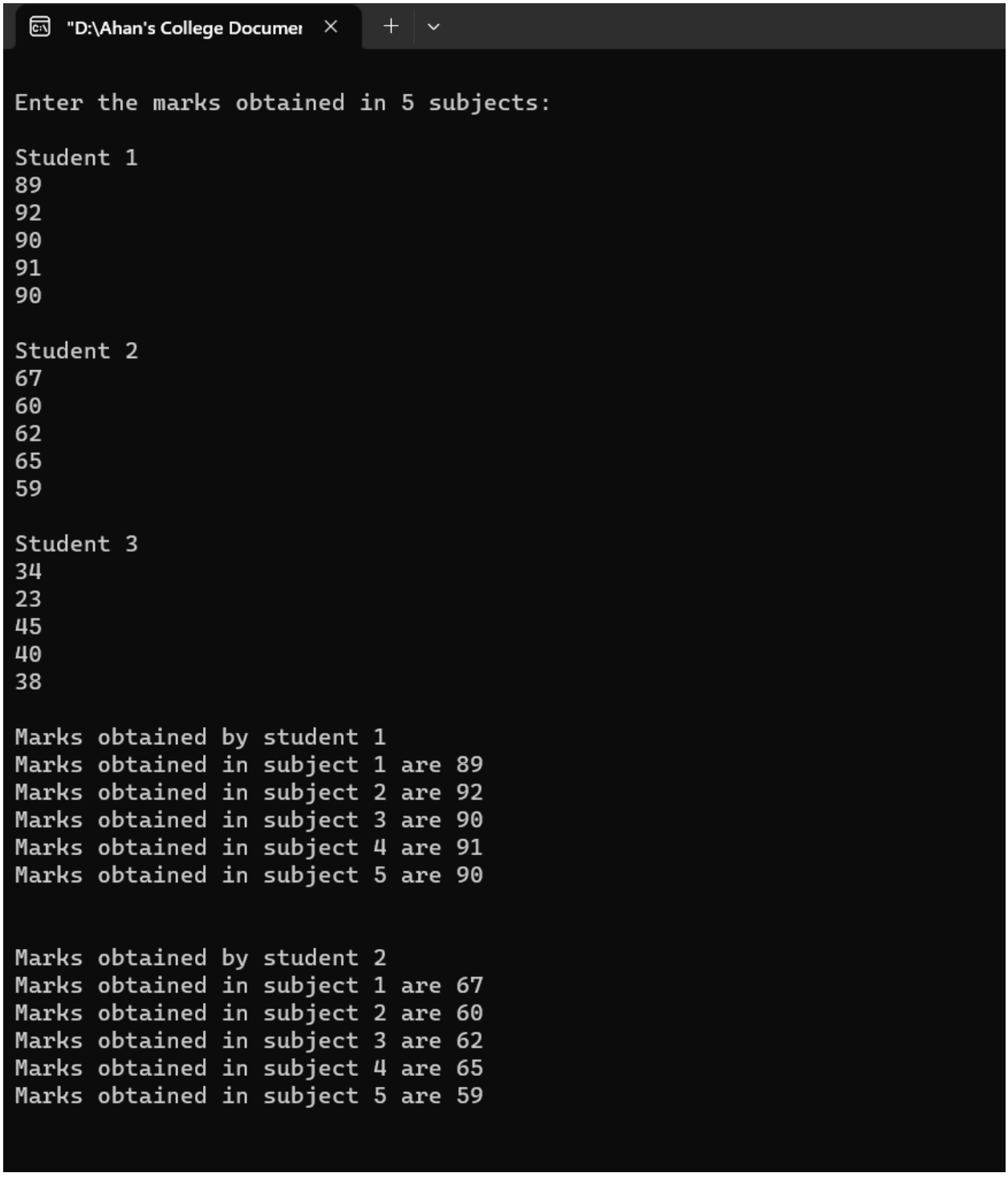
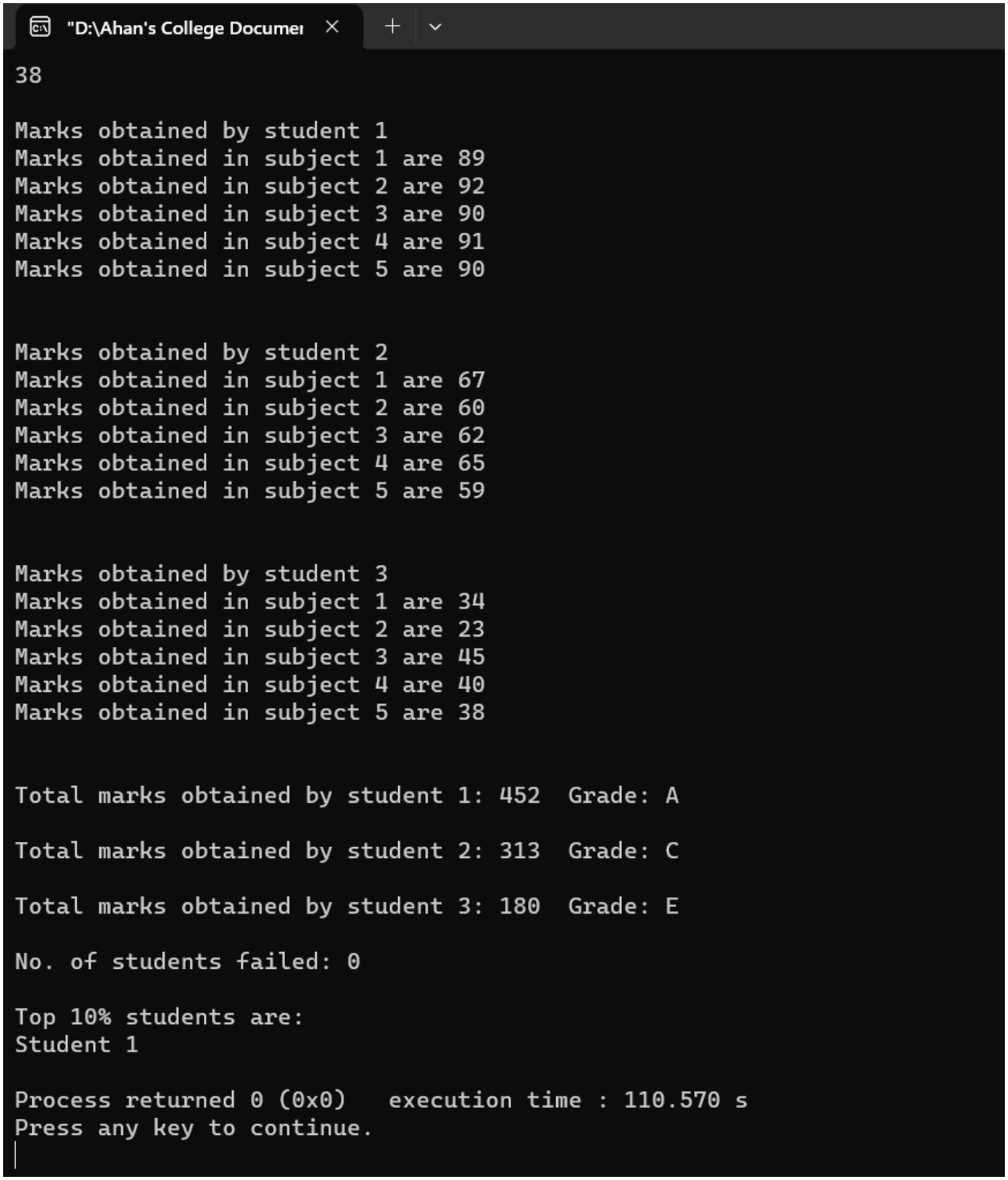


"D:\Ahan's College Docume
Welcome to Banergy Student Database
Enter the number of students in the database:
3
Enter Name, Roll no., Date of Birth, Gender(M/F/O), Year of Study, Branch:
Ahan
211210008
23
4
2003
M
2
CSE
Enter Name, Roll no., Date of Birth, Gender(M/F/O), Year of Study, Branch:
Dev
211220015
12
3
2002
M
3
ECE
Enter Name, Roll no., Date of Birth, Gender(M/F/O), Year of Study, Branch:
Shreya
211230055
30
6
2004
F
4
EEE
Entered database:
Student 1:


"D:\Ahan's College Documer
Entered database:
Student 1:
Name: Ahan
Roll no.: 211210008
Date of Birth: 23/4/2003
Gender: M
Year of study: 2
Branch: CSE
Student 2:
Name: Dev
Roll no.: 211220015
Date of Birth: 12/3/2002
Gender: M
Year of study: 3
Branch: ECE
Student 3:
Name: Shreya
Roll no.: 211230055
Date of Birth: 30/6/2004
Gender: F
Year of study: 4
Branch: EEE
Enter the no. of subjects:
5
Enter the marks obtained in 5 subjects:
Student 1
89
92
90
91
90


"D:\Ahan's College Documer
Enter the marks obtained in 5 subjects:
Student 1
89
92
90
91
90
Student 2
67
60
62
65
59
Student 3
34
23
45
40
38
Marks obtained by student 1
Marks obtained in subject 1 are 89
Marks obtained in subject 2 are 92
Marks obtained in subject 3 are 90
Marks obtained in subject 4 are 91
Marks obtained in subject 5 are 90
Marks obtained by student 2
Marks obtained in subject 1 are 67
Marks obtained in subject 2 are 60
Marks obtained in subject 3 are 62
Marks obtained in subject 4 are 65
Marks obtained in subject 5 are 59


"D:\Ahan's College Documer
38
Marks obtained by student 1
Marks obtained in subject 1 are 89
Marks obtained in subject 2 are 92
Marks obtained in subject 3 are 90
Marks obtained in subject 4 are 91
Marks obtained in subject 5 are 90
Marks obtained by student 2
Marks obtained in subject 1 are 67
Marks obtained in subject 2 are 60
Marks obtained in subject 3 are 62
Marks obtained in subject 4 are 65
Marks obtained in subject 5 are 59
Marks obtained by student 3
Marks obtained in subject 1 are 34
Marks obtained in subject 2 are 23
Marks obtained in subject 3 are 45
Marks obtained in subject 4 are 40
Marks obtained in subject 5 are 38
Total marks obtained by student 1: 452 Grade: A
Total marks obtained by student 2: 313 Grade: C
Total marks obtained by student 3: 180 Grade: E
No. of students failed: 0
Top 10% students are:
Student 1
Process returned 0 (0x0) execution time : 110.570 s
Press any key to continue.