UNIVERSITY MANAGEMENT SYSTEM

SUBMITTED TO- Dr. Santosh Singh Rathore

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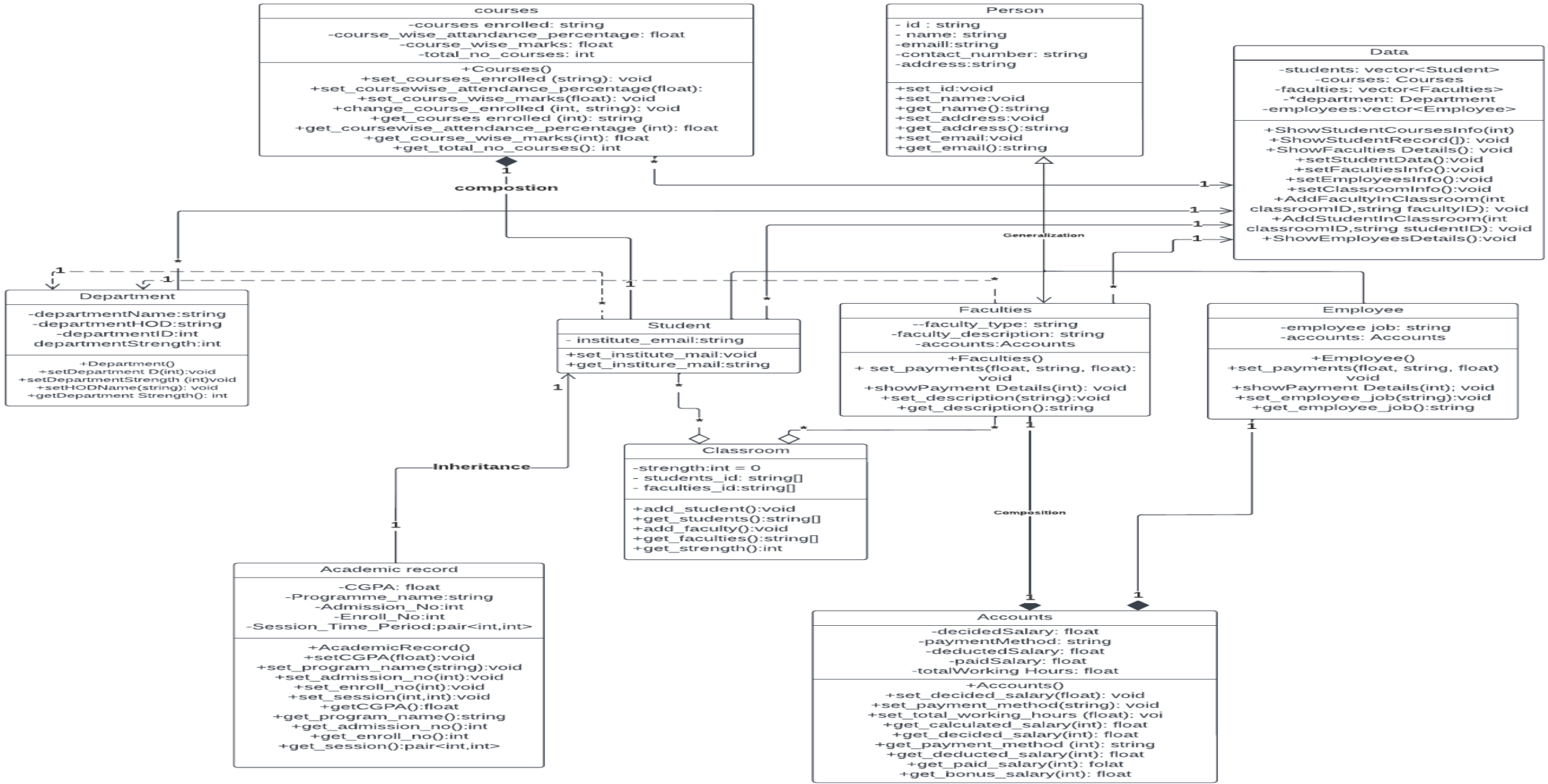
UML CLASS DIAGRAM:-



Explanation:-

We are building a University Management System, in which we have functionalities for:-

1. **Add** a new student in the university
2. **Show** the details of all students
3. **Show** the Academic Record of all students
4. **Show** the Courses opted by a particular student
5. **Add** a new faculty in the university
6. **Show** the details of all faculties in university
7. **Show** the details of accounts of all faculties
8. **Add** a new employee in the university
9. **Show** the details of all employees in university
10. **Show** the details of accounts of a particular employee
12. **Show** all the department in the university.
13. **Add** a new classroom in the university
14. **Add** a new student in a classroom.
15. **Add** a new faculty in a classroom.
16. **Show** all the classrooms in the university.

For this we have a :-

1. Person class:-

- Person class is in Person.h header file.
- This is a parent class to Student, Faculties and Employees class as every person has the common characteristics and actions of a Person instance.
- Data Members are:-
  - - id : string
  - - name: string
  - -emaill:string
  - -contact_number: string
  - -address:string

All these data members are in private scope.

- Member functions are the usual setters and getters for these data members in public scope.
- There is a Generalization from Student,Faculties and Employees to Person class.

2.Department:-

- Department class is in Department.h header file.
- Department class has a dependency to Student and Faculties class, there can't exist a Department with 0 student or 0 Faculty in it.
- Department hence is a abstract class in this sense.
- Data Members are:-
  - string departmentName;
  - string departmentHOD;
  - string departmentID; //ID of the department
  - int departmentStrength;

All data members are in private scope.

3. Academic Record:-

- AcademicRecord is being inherited by Student class.
- Every student has a unique Academic Record, no Academic Record can be same of two different students
- Data Members are:-
  - string programme_name; //Like B.TECH CSE
  - int admission_no;
  - int enroll_no;
  - pair<int,int> session_time_period; //duration of program like (2020-2024)
  - float CGPA;
  - int total_credits;

4. Courses :-

- Courses contain the information regarding the courses picked by a unique student in the university

5. Student:-

- Student class is in Student.h header file.
- The parent class of Student class are Academic Record,Person and Department.
- Student class has a composition to Courses class, as every student has some select courses opted by him.
- The Addition Data Member:-
  - Institute_Mail: string
  - A :Course class

6. Accounts

- Accounts is in Accounts.h header file.
- Accounts contain all infomation regarding salary,payment method for a employee/faculty of the University.
- Data Members:-
  - float decidedSalary;
  - string paymentMethod;
  - float deductedSalary;
  - float bonusSalary;
  - float paidSalary;//to be calculated from other data members
  - float totalWorkingHours;

7. Faculties:-

- Faculties class is for storing all the characteristics and functionalities regarding various function managing faculties in a university.
- Faculties has a composition to Accounts, as every has unique account details associated to them.
- Data Members:-
  - string faculty_type;
  - string faculty_description;
  - Accounts accounts;
- All data members are in private scope.

8. Employee

- Employee class is for storing all the characteristics and functionalities regarding various function managing employees in a university.
- Employee has a composition to Accounts, as every has unique account details associated to them.
- Data Members:-
  - string employee_job;
  - Accounts accounts;
- All data members are in private scope.

9. Classroom

- This class contains information of a unique class in the university
- Data Members:-
  - int strength; //total num of students
  - vector<string> students_id; //list of ID of students in the class
  - vector<string> faculties_id;//list of ID of faculties in the class
  - int classroom_id; //used as unique identifier for a classroom

These data members are in private scope.

10. Display

- This is the central class for our management system, which contains most of the functionality for University Management System.
- Data Members:-
  - vector<Student> students;
  - Courses courses; //this data members is extra
  - vector<Faculties> faculties;
  - vector<Employee> employees;
  - vector<Classroom> classrooms;

Above data members are in private scope.

  - int total_students = 0;
  - int total_faculties = 0;

These data members are in public scope.

- The member functions are:-
  - **//setter**
    - void setStudentData();
    - void setStudentAcademicRecord(Student *temp,int counter, string program_name, int admission_no, int enroll_no,
    - int begin_year, int end_year, float CGPA, int credits);
    - void setFacultiesInfo();
    - void setEmployeesInfo();
    - void setClassroomInfo();
    - //getter
    - //showd the record of all students

void ShowStudentsRecord();

void ShowStudentCoursesInfo(int n); //n is the index number

void ShowStudentsAcademicRecord();

void ShowFacultiesDetails();//view the details of the all faculties except account detail

void ShowFacultiesAccountDetails();//view the account details of all faculties

void ShowEmployeesDetails();

void ShowEmployeesAccountDetails();

void ShowClassroomDetails(); //view the details of all classrooms

void AddStudentInClassroom(int classroomID,string studentID);

void AddFacultyInClassroom(int classroomID,string facltyID);

NOTE:-Every class has its own explicity defined default constructor.

Output:-

```
vivekup3424@vivekup3424-Inspiron-15-3567:/media/vivekup3424/New Volume/
University Management System
Click the options to do desired results:
1.Add a new student in the university
2.Show the details of all students
3.Show the Academic Record of all students
4.Show the Courses opted by a particular student
5.Add a new faculty in the university
6.Show the details of all faculties in university
7.Show the details of accounts of all faculties
8.Add a new employee in the university
9.Show the details of all employees in university
10.Show the details of accounts of a particular employee
11?.Add a new department in the university
12?.Show all the department in the university
13.Add a new classroom in the university
14.Add a new student in a classroom
15.Add a new faculty in a classroom
16.Show all the classrooms in the university
17.Enter to exit program.
----------------------------------------
1
Enter the number of students: 3
For student 1
Enter the following:
ID: ABC123
Name: VIVEK_UPADHYAY
EMail: viveku920@gmail.com
Contact Number: 6260863371
Address: Room-019,BH-1,IIITM_CAMPUS,IIITM_Gwalior
Institute EMail: bcs_2021071@iiitm.ac.in

--------------COURSES---------------
Enter the Course Details:
Enter the number of courses: 4
Enter the following for each course 1 :
Course Name: OOPS
Marks: 56
```

Output:-

```
Marks: 56
Attendance Percentage: 86
Enter the following for each course 2 :
Course Name: DAA
Marks: 68
Attendance Percentage: 86
Enter the following for each course 3 :
Course Name: OS
Marks: 88
Attendance Percentage: 76
Enter the following for each course 4 :
Course Name: COA
Marks: 66
Attendance Percentage: 69

-------------ACADEMIC RECORD--------------
Enter the Academic Record Details:
Program_name: B.Tech
Admission Number: 12345
Erollment Number: 71
Course Begin Year: 2021
Course End Year: 2025
Credits: 140
CGPA: 8.9
For student 2
Enter the following:
ID: ABC124
Name: Harsh_Jha
EMail: harshJha12@gmail.com
Contact Number: 9162678553
Address: Room-260,BH-1,IIITM_CAMPUS,IIITM_Gwalior
Institute EMail: bcs_2021078.iiitm.ac.in

-------------COURSES--------------
Enter the Course Details:
Enter the number of courses: 4
```

Output:-

```
Enter the following for each course 1 :
Course Name: OOPS
Marks: 76
Attendance Percentage: 89
Enter the following for each course 2 :
Course Name: DAA
Marks: 79
Attendance Percentage: 99
Enter the following for each course 3 :
Course Name: OS
Marks: 95
Attendance Percentage: 96
Enter the following for each course 4 :
Course Name: COA
Marks: 86
Attendance Percentage: 45

--------------ACADEMIC RECORD--------------
Enter the Academic Record Details:
Program_name: B.Tech
Admission Number: 456578
Erollment Number: 78
Course Begin Year: 2021
Course End Year: 2025
Credits: 149
CGPA: 9.7
For student 3
Enter the following:
ID: ABC125
Name: Anup Singh
EMail: Contact Number: 6202907787
Address: Room-234,BH-1,IIIM_CAMPUS
Institute EMail: bcs_2021016.iiitm.ac.in

--------------COURSES--------------
Enter the Course Details:
Enter the number of courses: 4
Enter the following for each course 1 :
```

Output:-

```
-------------COURSES--------------
Enter the Course Details:
Enter the number of courses: 4
Enter the following for each course 1 :
Course Name: OOPS
Marks: 66
Attendance Percentage: 79
Enter the following for each course 2 :
Course Name: DAA
Marks: 79
Attendance Percentage: 6
Enter the following for each course 3 :
Course Name: COA
Marks: 56
Attendance Percentage: 91
Enter the following for each course 4 :
Course Name: OS
Marks: 76
Attendance Percentage: 86

-------------ACADEMIC RECORD--------------
Enter the Academic Record Details:
Program_name: B.Tech_CSE
Admission Number: 45678
Erollment Number: 16
Course Begin Year: 2021
Course End Year: 2025
Credits: 140
CGPA: 8.5
Enter 'y' to continue or Enter 'n' to exit the program.
y
University Management System
Click the options to do desired results:
1.Add a new student in the university
2.Show the details of all students
3.Show the Academic Record of all students
4.Show the Courses opted by a particular student
5.Add a new faculty in the university
```

Output:-

```
University Management System
Click the options to do desired results:
1.Add a new student in the university
2.Show the details of all students
3.Show the Academic Record of all students
4.Show the Courses opted by a particular student
5.Add a new faculty in the university
6.Show the details of all faculties in university
7.Show the details of accounts of all faculties
8.Add a new employee in the university
9.Show the details of all employees in university
10.Show the details of accounts of a particular employee
11?.Add a new department in the university
12?.Show all the department in the university
13.Add a new classroom in the university
14.Add a new student in a classroom
15.Add a new faculty in a classroom
16.Show all the classrooms in the university
17.Enter to exit program.
-----------------------------------------
2
ID      Name            Email           Contact_Number          Address         Insti_EMail
ABC123 VIVEK_UPADHYAY viveku920@gmail.com 6260863371 Room-019,BH-1,IIITM_CAMPUS,IIITM_Gwaliorbcs_2021071@iiitm.ac.in
ABC124 Harsh_Jha harshJha12@gmail.com 9162678553 Room-260,BH-1,IIITM_CAMPUS,IIITM_Gwaliorbcs_2021078.iiitm.ac.in
ABC125 Anup Singh 6202907787 Room-234,BH-1,IIIM_CAMPUSbcs_2021016.iiitm.ac.in
Enter 'y' to continue or Enter 'n' to exit the program.
```

Output:-

```
vivekup3424@vivekup3424-Inspiron-15-3567:/media/vivekup3424/New Volume/IIITM Gwalior/S
ce
University Management System
Click the options to do desired results:
1.Add a new student in the university
2.Show the details of all students
3.Show the Academic Record of all students
4.Show the Courses opted by a particular student
5.Add a new faculty in the university
6.Show the details of all faculties in university
7.Show the details of accounts of all faculties
8.Add a new employee in the university
9.Show the details of all employees in university
10.Show the details of accounts of a particular employee
12.Show all the department in the university
13.Add a new classroom in the university
14.Add a new student in a classroom
15.Add a new faculty in a classroom
16.Show all the classrooms in the university
17.Enter to exit program.
-----------------------------------------
5
Enter the number of faculties: 2
For faculty 1 Enter the following:
ID: CD11
Name: Jagmohan_Sharma
EMail: JMS123@gmail.com
Contact Number 4567894261
Address: IIITM_Campus,IIITM_Gwalior
Faculty Type: Lecturer
Faculty Description: Teaches_Compiler_Design

-------------ACCOUNTS--------------
Enter Accounts details:
Decided_Salary  Payment_Method  Total_Working_Hours
```

Output:-

```
--------------ACCOUNTS--------------
Enter Accounts details:
Decided_Salary  Payment_Method  Total_Working_Hours
Decided_Salary: 60000
Payment_Method: NEFT
Total_Working_Hours: 800
For faculty 2 Enter the following:
ID: DB11
Name: Satish_Kumar
EMail: diamondGamer@gmail.com
Contact Number 9586758542
Address: IIITM_Campus,IIITM_Gwalior
Faculty Type: Associate_Professor
Faculty Description: Teaches_DBMS

--------------ACCOUNTS--------------
Enter Accounts details:
Decided_Salary  Payment_Method  Total_Working_Hours
Decided_Salary: 40000
Payment_Method: Online_Banking
Total_Working_Hours: 1200
Enter 'y' to continue or Enter 'n' to exit the program.
y
University Management System
Click the options to do desired results:
1.Add a new student in the university
2.Show the details of all students
3.Show the Academic Record of all students
4.Show the Courses opted by a particular student
5.Add a new faculty in the university
6.Show the details of all faculties in university
7.Show the details of accounts of all faculties
8.Add a new employee in the university
9.Show the details of all employees in university
```

Output:-

```
8.Add a new employee in the university
9.Show the details of all employees in university
10.Show the details of accounts of a particular employee
12.Show all the department in the university
13.Add a new classroom in the university
14.Add a new student in a classroom
15.Add a new faculty in a classroom
16.Show all the classrooms in the university
17.Enter to exit program.
-----------------------------------------
6


------------FACULTIES DETAIL-------------
ID  Name  EMail  Contact-Number  Address        Faculty-Type  Faculty-Desc
CD11  Jagmohan_Sharma  JMS123@gmail.com 4567894261  IIITM_Campus,IIITM_Gwalior  Lecturer  Teaches_Compiler_Design
DB11  Satish_Kumar  diamondGamer@gmail.com 9586758542  IIITM_Campus,IIITM_Gwalior  Associate_Professor  Teaches_DBMS
Enter 'y' to continue or Enter 'n' to exit the program.
n
vivekup3424@vivekup3424-Inspiron-15-3567:/media/vivekup3424/New Volume/IIITM Gwalior/Sem 3/oops/OOPS-Project$
```

Output:-

```
vivekup3424@vivekup3424-Inspiron-15-3567:/media/vivekup3424/New Volume/IIITM
s/OOPS-Project$ ./Source
University Management System
Click the options to do desired results:
1.Add a new student in the university
2.Show the details of all students
3.Show the Academic Record of all students
4.Show the Courses opted by a particular student
5.Add a new faculty in the university
6.Show the details of all faculties in university
7.Show the details of accounts of all faculties
8.Add a new employee in the university
9.Show the details of all employees in university
10.Show the details of accounts of a particular employee
12.Show all the department in the university
13.Add a new classroom in the university
14.Add a new student in a classroom
15.Add a new faculty in a classroom
16.Show all the classrooms in the university
17.Enter to exit program.
-----------------------------------------
13

--------------CLASSROOMS---------------
Enter the number of classes in university: 1
For classroom 1 enter the id of classroom: 6006
Enter the number of students in classroom: 5
Enter the id of student inside classroom:
ABC123 ABC122 ABC124 BCS111 BCS100
Enter the number of teachers in classroom: 2
Enter the id of teacher inside classroom:
CD11 DB11
Enter 'y' to continue or Enter 'n' to exit the program.
y
```

Output:-

```
Enter 'y' to continue or Enter 'n' to exit the program.
y
University Management System
Click the options to do desired results:
1.Add a new student in the university
2.Show the details of all students
3.Show the Academic Record of all students
4.Show the Courses opted by a particular student
5.Add a new faculty in the university
6.Show the details of all faculties in university
7.Show the details of accounts of all faculties
8.Add a new employee in the university
9.Show the details of all employees in university
10.Show the details of accounts of a particular employee
12.Show all the department in the university
13.Add a new classroom in the university
14.Add a new student in a classroom
15.Add a new faculty in a classroom
16.Show all the classrooms in the university
17.Enter to exit program.
----------------------------------------------
16
For classroom with id: 6006
No of students: 5
ID of students in classroom are:
Students' IDs are:
ABC123  ABC122  ABC124  BCS111  BCS100
ID of teachers in classroom are:
Faculties' IDs are:
CD11    DB11
Enter 'y' to continue or Enter 'n' to exit the program.
y
University Management System
Click the options to do desired results:
1.Add a new student in the university
```

Output:-

```
Enter the ID of student to be added in classroom: CFG156
Enter 'y' to continue or Enter 'n' to exit the program.
y
University Management System
Click the options to do desired results:
1.Add a new student in the university
2.Show the details of all students
3.Show the Academic Record of all students
4.Show the Courses opted by a particular student
5.Add a new faculty in the university
6.Show the details of all faculties in university
7.Show the details of accounts of all faculties
8.Add a new employee in the university
9.Show the details of all employees in university
10.Show the details of accounts of a particular employee
12.Show all the department in the university
13.Add a new classroom in the university
14.Add a new student in a classroom
15.Add a new faculty in a classroom
16.Show all the classrooms in the university
17.Enter to exit program.
--------------------------------------------------
16
For classroom with id: 6006
No of students: 6
ID of students in classroom are:
Students' IDs are:
ABC123  ABC122  ABC124  BCS111  BCS100  CFG156
ID of teachers in classroom are:
Faculties' IDs are:
CD11    DB11
Enter 'y' to continue or Enter 'n' to exit the program.
n
vivekup3424@vivekup3424-Inspiron-15-3567:/media/vivekup3424/New Volume/IIITM
```