



**BVRIT HYDERABAD**  
College of Engineering for Women



Department of CSE(AIML)

# CASE STUDY

## STUDENT INFORMATION SYSTEM

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# **STUDENTS INFORMATION SYSTEM**

## **Introduction:**

A Students Information System is a centralized platform designed to manage and streamline the administrative and academic functions of an educational institution. The system handles various aspects such as student enrolment, academic performance, attendance, and personal information. The main objective of this system is to provide an efficient way to store, retrieve, and manage student data, improving the overall educational experience for students, teachers, and administrators.

## **Requirement Analysis:**

### **Functional Requirements**

1. Student Management
  - Add, update, and delete student records.
  - View student profiles including personal details, academic history, and current status.
  - Manage student enrolments and course registrations.
2. Course Management
  - Add, update, and delete course details.
  - Assign instructors to courses.
  - Manage course schedules and syllabus.
3. Grade Management
  - Record and update student grades.
  - Generate academic transcripts.
  - Provide analytics on student performance.
4. Fee Management
  - Record and track student fee payments.
  - Generate fee receipts and payment history.
  - Send notifications for due payments.
5. User Management
  - Manage user roles and permissions (students, teachers, administrators).
  - Secure login and authentication mechanisms.

## **Non-Functional Requirements**

1. Performance
  - The system should handle concurrent access by multiple users efficiently.
  - Response time for database queries should be minimal.
2. Scalability
  - The system should be scalable to accommodate growing numbers of students and courses.
3. Security
  - Data encryption for sensitive information.
  - Regular backups to prevent data loss.
  - Role-based access control to ensure data privacy.
4. Usability
  - User-friendly interface for all types of users.
  - Comprehensive help documentation and support.
5. Reliability
  - High availability with minimal downtime.
  - Robust error-handling and recovery mechanisms.
6. Compliance
  - Adherence to relevant educational regulations and data protection laws.

## **UseCases:**

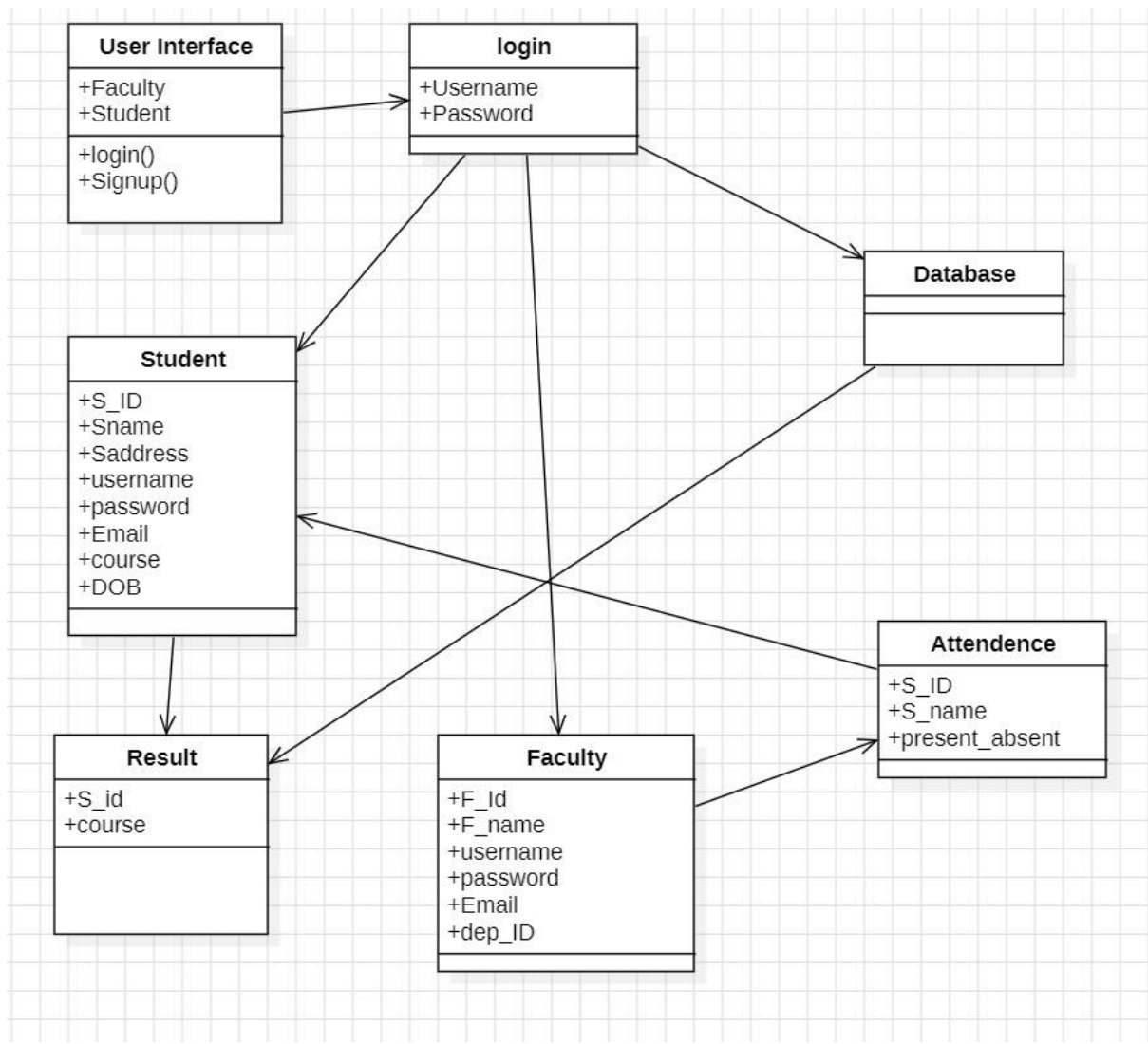
1. Add Student
  - Actor: Administrator
  - Description: Admin adds a new student to the system with personal, academic, and contact details.
2. Register for Course
  - Actor: Student
  - Description: Student registers for a new course through the system.
3. Record Attendance
  - Actor: Teacher
  - Description: Teacher records the attendance of students for a particular class.
4. Enter Grades
  - Actor: Teacher
  - Description: Teacher enters grades for students after an examination.
5. View Transcript
  - Actor: Student

- Description: Student views their academic transcript through the system.
6. Pay Fees
- Actor: Student
  - Description: Student or guardian pays the required fees online.

### **User Stories**

- As an administrator, I want to add and manage student records so that I can keep the student database up-to-date.
- As a student, I want to register for courses online so that I can enroll in classes without visiting the administration office.
- As a teacher, I want to record attendance easily so that I can track student presence in classes efficiently.
- As a teacher, I want to enter and update student grades so that students can receive their academic results promptly.
- As a student, I want to view my academic transcript anytime so that I can keep track of my academic progress.
- As a parent, I want to pay my child's school fees online so that I can conveniently manage financial transactions.

## Database Design:



## **Database Implementations:**

### **Creating table Students Info :**

CREATE TABLE Students\_Info (

Student\_id VARCHAR(15) PRIMARY KEY,

Name VARCHAR(50) NOT NULL,

DOB DATE NOT NULL,

Gender CHAR(1) NOT NULL CHECK (gender IN ('M', 'F')),

Address VARCHAR(255),

Phone\_No VARCHAR(15),

email VARCHAR(50) UNIQUE NOT NULL);

INSERT INTO Students\_Info (Student\_id, Name, DOB, Gender, Address,  
Phone\_No, email)

VALUES

('22DB1A5501', 'Aarav Sharma', '2000-01-15', 'M', '123 MG Road, Bengaluru,  
Karnataka, India', '9876543210', '22DB1A5501@gmail.com'),

('22DB1A5502', 'Aditi Patel', '1999-07-30', 'F', '456 SG Highway, Ahmedabad,  
Gujarat, India', '8765432109', '22DB1A5502@gmail.com'),

('22DB1A5503', 'Ananya Nair', '2001-05-20', 'F', '789 Brigade Road, Kochi,  
Kerala, India', '7654321098', '22DB1A5503@gmail.com'),

('22DB1A5504', 'Arjun Reddy', '1998-12-10', 'M', '101 Jubilee Hills, Hyderabad,  
Telangana, India', '6543210987', '22DB1A5504@gmail.com'),

('22DB1A5505', 'Divya Singh', '2000-11-05', 'F', '202 Civil Lines, Kanpur, Uttar  
Pradesh, India', '5432109876', '22DB1A5505@gmail.com'),

('22DB1A5506', 'Rohan Gupta', '1999-03-25', 'M', '303 Park Street, Kolkata,  
West Bengal, India', '4321098765', '22DB1A5506@gmail.com'),

('22DB1A5507', 'Isha Mehta', '2000-06-15', 'F', '404 Marine Drive, Mumbai,  
Maharashtra, India', '3210987654', '22DB1A5507@gmail.com'),

('22DB1A5508', 'Karan Jain', '1998-09-09', 'M', '505 Connaught Place, New  
Delhi, Delhi, India', '2109876543', '22DB1A5508@gmail.com'),

('22DB1A5509', 'Lakshmi Iyer', '2001-04-22', 'F', '606 Anna Nagar, Chennai, Tamil Nadu, India', '1098765432', '22DB1A5509@gmail.com'),

('22DB1A5510', 'Manish Malhotra', '1999-11-19', 'M', '707 Law College Road, Pune, Maharashtra, India', '9988776655', '22DB1A5510@gmail.com'),

('22DB1A5511', 'Nidhi Rao', '2000-02-12', 'F', '808 Banjara Hills, Hyderabad, Telangana, India', '8877665544', '22DB1A5511@gmail.com'),

('22DB1A5512', 'Pranav Desai', '1998-08-18', 'M', '909 Nehru Place, New Delhi, Delhi, India', '7766554433', '22DB1A5512@gmail.com'),

('22DB1A5513', 'Sneha Kulkarni', '2001-03-27', 'F', '1010 FC Road, Pune, Maharashtra, India', '6655443322', '22DB1A5513@gmail.com'),

('22DB1A5514', 'Tanmay Shah', '1999-05-14', 'M', '1111 Race Course Road, Ahmedabad, Gujarat, India', '5544332211', '22DB1A5514@gmail.com'),

('22DB1A5515', 'Vidya Sinha', '2000-10-30', 'F', '1212 MG Road, Indore, Madhya Pradesh, India', '4433221100', '22DB1A5515@gmail.com'),

('22DB1A5516', 'Yash Verma', '1998-07-21', 'M', '1313 Residency Road, Bengaluru, Karnataka, India', '3322110099', '22DB1A5516@gmail.com'),

('22DB1A5517', 'Zara Ali', '2001-08-08', 'F', '1414 Dalhousie Square, Kolkata, West Bengal, India', '2211009988', '22DB1A5517@gmail.com'),

('22DB1A5518', 'Aman Srivastava', '1999-01-25', 'M', '1515 Alkapuri, Vadodara, Gujarat, India', '1100998877', '22DB1A5518@gmail.com'),

('22DB1A5519', 'Bhavna Tripathi', '2000-03-18', 'F', '1616 Chowringhee, Kolkata, West Bengal, India', '9988776655', '22DB1A5519@gmail.com'),

('22DB1A5520', 'Chirag Aggarwal', '1998-06-29', 'M', '1717 Koramangala, Bengaluru, Karnataka, India', '8877665544', '22DB1A5520@gmail.com');



SELECT \* FROM Students\_Info;

**Output :**

Student_id	Name	DOB	Gender	Address	Phone_No	email
22DB1A5501	Aarav Sharma	2000-01-15	M	123 MG Road, Bengaluru, Karnataka, India	9876543210	22DB1A5501@gmail.com
22DB1A5502	Aditi Patel	1999-07-30	F	456 SG Highway, Ahmedabad, Gujarat, India	8765432109	22DB1A5502@gmail.com
22DB1A5503	Ananya Nair	2001-05-20	F	789 Brigade Road, Kochi, Kerala, India	7654321098	22DB1A5503@gmail.com
22DB1A5504	Arjun Reddy	1998-12-10	M	101 Jubilee Hills, Hyderabad, Telangana, India	6543210987	22DB1A5504@gmail.com
22DB1A5505	Divya Singh	2000-11-05	F	202 Civil Lines, Kanpur, Uttar Pradesh, India	5432109876	22DB1A5505@gmail.com
22DB1A5506	Rohan Gupta	1999-03-25	M	303 Park Street, Kolkata, West Bengal, India	4321098765	22DB1A5506@gmail.com
22DB1A5507	Isha Mehta	2000-06-15	F	404 Marine Drive, Mumbai, Maharashtra, India	3210987654	22DB1A5507@gmail.com
22DB1A5508	Karan Jain	1998-09-09	M	505 Connaught Place, New Delhi, Delhi, India	2109876543	22DB1A5508@gmail.com
22DB1A5509	Lakshmi Iyer	2001-04-22	F	606 Anna Nagar, Chennai, Tamil Nadu, India	1098765432	22DB1A5509@gmail.com
22DB1A5510	Manish Malhotra	1999-11-19	M	707 Law College Road, Pune, Maharashtra, India	9988776655	22DB1A5510@gmail.com
22DB1A5511	Nidhi Rao	2000-02-12	F	808 Banjara Hills, Hyderabad, Telangana, India	8877665544	22DB1A5511@gmail.com
22DB1A5512	Pranav Desai	1998-08-18	M	909 Nehru Place, New Delhi, Delhi, India	7766554433	22DB1A5512@gmail.com
22DB1A5513	Sneha Kulkarni	2001-03-27	F	1010 FC Road, Pune, Maharashtra, India	6655443322	22DB1A5513@gmail.com
22DB1A5514	Tanmay Shah	1999-05-14	M	1111 Race Course Road, Ahmedabad, Gujarat, India	5544332211	22DB1A5514@gmail.com
22DB1A5515	Vidya Sinha	2000-10-30	F	1212 MG Road, Indore, Madhya Pradesh, India	4433221100	22DB1A5515@gmail.com
22DB1A5516	Yash Verma	1998-07-21	M	1313 Residency Road, Bengaluru, Karnataka, India	3322110099	22DB1A5516@gmail.com
22DB1A5517	Zara Ali	2001-08-08	F	1414 Dalhousie Square, Kolkata, West Bengal, India	2211009988	22DB1A5517@gmail.com
22DB1A5518	Aman Srivastava	1999-01-25	M	1515 Alkapuri, Vadodara, Gujarat, India	1100998877	22DB1A5518@gmail.com
22DB1A5519	Bhavna Tripathi	2000-03-18	F	1616 Chowringhee, Kolkata, West Bengal, India	9988776655	22DB1A5519@gmail.com
22DB1A5520	Chirag Aggarwal	1998-06-29	M	1717 Koramangala, Bengaluru, Karnataka, India	8877665544	22DB1A5520@gmail.com

**Creating table Students\_Course :**

CREATE TABLE Students\_Course (

Student\_id VARCHAR(15) NOT NULL,

Course VARCHAR(50) NOT NULL,

Year\_Of\_Study INT NOT NULL,

FOREIGN KEY (Student\_id) REFERENCES Students\_Info(Student\_id));

INSERT INTO Students\_Course (Student\_id, Course, Year\_Of\_Study)  
VALUES

('22DB1A5501', 'Computer Science', 1),

('22DB1A5502', 'Mechanical Engineering', 2),

('22DB1A5503', 'Electrical Engineering', 1),

('22DB1A5504', 'Civil Engineering', 3),

('22DB1A5505', 'Biotechnology', 2),

('22DB1A5506', 'Information Technology', 1),

('22DB1A5507', 'Chemical Engineering', 3),

('22DB1A5508', 'Aerospace Engineering', 2),  
 ('22DB1A5509', 'Biomedical Engineering', 1),  
 ('22DB1A5510', 'Environmental Engineering', 3),  
 ('22DB1A5511', 'Computer Science', 2),  
 ('22DB1A5512', 'Mechanical Engineering', 3),  
 ('22DB1A5513', 'Electrical Engineering', 1),  
 ('22DB1A5514', 'Civil Engineering', 2),  
 ('22DB1A5515', 'Biotechnology', 3),  
 ('22DB1A5516', 'Information Technology', 1),  
 ('22DB1A5517', 'Chemical Engineering', 2),  
 ('22DB1A5518', 'Aerospace Engineering', 1),  
 ('22DB1A5519', 'Biomedical Engineering', 3),  
 ('22DB1A5520', 'Environmental Engineering', 2);

SELECT \* FROM Students\_Course;

**Output :**

Student_id	Course	Year_Of_Study
22DB1A5501	Computer Science	1
22DB1A5502	Mechanical Engineering	2
22DB1A5503	Electrical Engineering	1
22DB1A5504	Civil Engineering	3
22DB1A5505	Biotechnology	2
22DB1A5506	Information Technology	1
22DB1A5507	Chemical Engineering	3
22DB1A5508	Aerospace Engineering	2
22DB1A5509	Biomedical Engineering	1
22DB1A5510	Environmental Engineering	3
22DB1A5511	Computer Science	2
22DB1A5512	Mechanical Engineering	3
22DB1A5513	Electrical Engineering	1
22DB1A5514	Civil Engineering	2
22DB1A5515	Biotechnology	3
22DB1A5516	Information Technology	1
22DB1A5517	Chemical Engineering	2
22DB1A5518	Aerospace Engineering	1

22DB1A5519	Biomedical Engineering	3	
22DB1A5520	Environmental Engineering	2	
+-----+-----+-----+			

### **Creating table Students\_Grade:**

```
CREATE TABLE Students_Grade (
    Student_id VARCHAR(15) NOT NULL,
    Name VARCHAR(50) NOT NULL,
    CGPA DECIMAL(3, 2) NOT NULL CHECK (CGPA >= 0 AND CGPA <=
10),
    FOREIGN KEY (Student_id) REFERENCES Students_Info(Student_id));
```

```
INSERT INTO Students_Grade (Student_id, Name, CGPA) VALUES
```

```
('22DB1A5501', 'Aarav Sharma', 8.5),
('22DB1A5502', 'Aditi Patel', 9.2),
('22DB1A5503', 'Ananya Nair', 7.8),
('22DB1A5504', 'Arjun Reddy', 8.9),
('22DB1A5505', 'Divya Singh', 8.0),
('22DB1A5506', 'Rohan Gupta', 7.5),
('22DB1A5507', 'Isha Mehta', 9.1),
('22DB1A5508', 'Karan Jain', 8.7),
('22DB1A5509', 'Lakshmi Iyer', 7.2),
('22DB1A5510', 'Manish Malhotra', 8.4),
('22DB1A5511', 'Nidhi Rao', 9.3),
('22DB1A5512', 'Pranav Desai', 7.9),
('22DB1A5513', 'Sneha Kulkarni', 8.2),
('22DB1A5514', 'Tanmay Shah', 9.0),
('22DB1A5515', 'Vidya Sinha', 8.6),
('22DB1A5516', 'Yash Verma', 7.7),
```

('22DB1A5517', 'Zara Ali', 9.4),  
 ('22DB1A5518', 'Aman Srivastava', 8.8),  
 ('22DB1A5519', 'Bhavna Tripathi', 7.6),  
 ('22DB1A5520', 'Chirag Aggarwal', 8.3);

SELECT \* FROM Students\_Grade;

**Output :**

Student_id	Name	CGPA
22DB1A5501	Aarav Sharma	8.50
22DB1A5502	Aditi Patel	9.20
22DB1A5503	Ananya Nair	7.80
22DB1A5504	Arjun Reddy	8.90
22DB1A5505	Divya Singh	8.00
22DB1A5506	Rohan Gupta	7.50
22DB1A5507	Isha Mehta	9.10
22DB1A5508	Karan Jain	8.70
22DB1A5509	Lakshmi Iyer	7.20
22DB1A5510	Manish Malhotra	8.40
22DB1A5511	Nidhi Rao	9.30
22DB1A5512	Pranav Desai	7.90
22DB1A5513	Sneha Kulkarni	8.20
22DB1A5514	Tanmay Shah	9.00
22DB1A5515	Vidya Sinha	8.60
22DB1A5516	Yash Verma	7.70
22DB1A5517	Zara Ali	9.40
22DB1A5518	Aman Srivastava	8.80
22DB1A5519	Bhavna Tripathi	7.60
22DB1A5520	Chirag Aggarwal	8.30

## **Testing:**

### **1) Query to fetch students who are studying Computer Science:**

```
SELECT si.Student_id, si.Name, sc.Course
FROM Students_Info si
JOIN Students_Course sc ON si.Student_id = sc.Student_id
WHERE sc.Course = 'Computer Science';
```

Output:

Student_id	Name	Course
22DB1A5501	Aarav Sharma	Computer Science
22DB1A5511	Nidhi Rao	Computer Science

### **2) Query to fetch students enrolled in their first year of study:**

```
SELECT si.Student_id, si.Name, sc.Year_Of_Study
FROM Students_Info si
JOIN Students_Course sc ON si.Student_id = sc.Student_id
WHERE sc.Year_Of_Study = 1;
```

Output:

Student_id	Name	Year_Of_Study
22DB1A5501	Aarav Sharma	1
22DB1A5503	Ananya Nair	1
22DB1A5506	Rohan Gupta	1
22DB1A5509	Lakshmi Iyer	1
22DB1A5513	Sneha Kulkarni	1
22DB1A5516	Yash Verma	1
22DB1A5518	Aman Srivastava	1

### **3) Query to fetch students with CGPA greater than 8.5:**

```
SELECT sg.Student_id, si.Name, sg.CGPA
FROM Students_Grade sg
```

```
JOIN Students_Info si ON sg.Student_id = si.Student_id
WHERE sg.CGPA > 8.5;
Output:
```

Student_id	Name	CGPA
22DB1A5502	Aditi Patel	9.20
22DB1A5504	Arjun Reddy	8.90
22DB1A5507	Isha Mehta	9.10
22DB1A5508	Karan Jain	8.70
22DB1A5511	Nidhi Rao	9.30
22DB1A5514	Tanmay Shah	9.00
22DB1A5515	Vidya Sinha	8.60
22DB1A5517	Zara Ali	9.40
22DB1A5518	Aman Srivastava	8.80

#### 4) Query to fetch students' information along with their courses:

```
SELECT si.Student_id, si.Name, sc.Course, sc.Year_Of_Study
FROM Students_Info si
JOIN Students_Course sc ON si.Student_id = sc.Student_id;
```

Output:

Student_id	Name	Course	Year_Of_Study
22DB1A5501	Aarav Sharma	Computer Science	1
22DB1A5502	Aditi Patel	Mechanical Engineering	2
22DB1A5503	Ananya Nair	Electrical Engineering	1
22DB1A5504	Arjun Reddy	Civil Engineering	3
22DB1A5505	Divya Singh	Biotechnology	2
22DB1A5506	Rohan Gupta	Information Technology	1
22DB1A5507	Isha Mehta	Chemical Engineering	3
22DB1A5508	Karan Jain	Aerospace Engineering	2
22DB1A5509	Lakshmi Iyer	Biomedical Engineering	1
22DB1A5510	Manish Malhotra	Environmental Engineering	3
22DB1A5511	Nidhi Rao	Computer Science	2
22DB1A5512	Pranav Desai	Mechanical Engineering	3
22DB1A5513	Sneha Kulkarni	Electrical Engineering	1
22DB1A5514	Tanmay Shah	Civil Engineering	2
22DB1A5515	Vidya Sinha	Biotechnology	3
22DB1A5516	Yash Verma	Information Technology	1
22DB1A5517	Zara Ali	Chemical Engineering	2
22DB1A5518	Aman Srivastava	Aerospace Engineering	1
22DB1A5519	Bhavna Tripathi	Biomedical Engineering	3
22DB1A5520	Chirag Aggarwal	Environmental Engineering	2

### 5) Query to fetch students' information and their CGPA:

```
SELECT si.Student_id, si.Name, sg.CGPA
FROM Students_Info si
JOIN Students_Grade sg ON si.Student_id = sg.Student_id;
```

Output:

Student_id	Name	CGPA
22DB1A5501	Aarav Sharma	8.50
22DB1A5502	Aditi Patel	9.20
22DB1A5503	Ananya Nair	7.80
22DB1A5504	Arjun Reddy	8.90
22DB1A5505	Divya Singh	8.00
22DB1A5506	Rohan Gupta	7.50
22DB1A5507	Isha Mehta	9.10
22DB1A5508	Karan Jain	8.70
22DB1A5509	Lakshmi Iyer	7.20
22DB1A5510	Manish Malhotra	8.40
22DB1A5511	Nidhi Rao	9.30
22DB1A5512	Pranav Desai	7.90
22DB1A5513	Sneha Kulkarni	8.20
22DB1A5514	Tanmay Shah	9.00
22DB1A5515	Vidya Sinha	8.60
22DB1A5516	Yash Verma	7.70
22DB1A5517	Zara Ali	9.40
22DB1A5518	Aman Srivastava	8.80
22DB1A5519	Bhavna Tripathi	7.60
22DB1A5520	Chirag Aggarwal	8.30

### 6) Query to fetch students' information, courses, and CGPA (joining all three tables):

```
SELECT si.Student_id, si.Name, sc.Course, sc.Year_Of_Study, sg.CGPA
FROM Students_Info si
JOIN Students_Course sc ON si.Student_id = sc.Student_id
JOIN Students_Grade sg ON si.Student_id = sg.Student_id;
```

Output:

Student_id	Name	Course	Year_Of_Study	CGPA
22DB1A5501	Aarav Sharma	Computer Science	1	8.50
22DB1A5502	Aditi Patel	Mechanical Engineering	2	9.20
22DB1A5503	Ananya Nair	Electrical Engineering	1	7.80
22DB1A5504	Arjun Reddy	Civil Engineering	3	8.90
22DB1A5505	Divya Singh	Biotechnology	2	8.00
22DB1A5506	Rohan Gupta	Information Technology	1	7.50

22DB1A5507	Isha Mehta	Chemical Engineering		3	9.10	
22DB1A5508	Karan Jain	Aerospace Engineering		2	8.70	
22DB1A5509	Lakshmi Iyer	Biomedical Engineering		1	7.20	
22DB1A5510	Manish Malhotra	Environmental Engineering		3	8.40	
22DB1A5511	Nidhi Rao	Computer Science		2	9.30	
22DB1A5512	Pranav Desai	Mechanical Engineering		3	7.90	
22DB1A5513	Sneha Kulkarni	Electrical Engineering		1	8.20	
22DB1A5514	Tanmay Shah	Civil Engineering		2	9.00	
22DB1A5515	Vidya Sinha	Biotechnology		3	8.60	
22DB1A5516	Yash Verma	Information Technology		1	7.70	
22DB1A5517	Zara Ali	Chemical Engineering		2	9.40	
22DB1A5518	Aman Srivastava	Aerospace Engineering		1	8.80	
22DB1A5519	Bhavna Tripathi	Biomedical Engineering		3	7.60	
22DB1A5520	Chirag Aggarwal	Environmental Engineering		2	8.30	
+-----+-----+-----+-----+-----+-----+						

## 7) Query to fetch average CGPA of students:

```
SELECT AVG(CGPA) AS Average_CGPA
FROM Students_Grade;
```

Output:

+-----+
Average_CGPA
+-----+
8.25
+-----+

## 8) Query to fetch the number of students enrolled in each course:

```
SELECT Course, COUNT(*) AS Number_of_Students
FROM Students_Course
GROUP BY Course;
```

Output:

+-----+	+-----+
Course	Number_of_Students
+-----+	+-----+
Computer Science	2
Mechanical Engineering	2
Electrical Engineering	2
Civil Engineering	2
Biotechnology	2
Information Technology	2
Chemical Engineering	2
Aerospace Engineering	2
Biomedical Engineering	2



**9) Query to fetch students' names and their courses ordered by CGPA in descending order:**

```
SELECT si.Name, sc.Course, sg.CGPA
FROM Students_Info si
JOIN Students_Course sc ON si.Student_id = sc.Student_id
JOIN Students_Grade sg ON si.Student_id = sg.Student_id
ORDER BY sg.CGPA DESC;
```

Output:

Name	Course	CGPA
Zara Ali	Chemical Engineering	9.40
Nidhi Rao	Computer Science	9.30
Aditi Patel	Mechanical Engineering	9.20
Isha Mehta	Chemical Engineering	9.10
Tanmay Shah	Civil Engineering	9.00
Arjun Reddy	Civil Engineering	8.90
Aman Srivastava	Aerospace Engineering	8.80
Karan Jain	Aerospace Engineering	8.70
Vidya Sinha	Biotechnology	8.60
Aarav Sharma	Computer Science	8.50
Manish Malhotra	Environmental Engineering	8.40
Chirag Aggarwal	Environmental Engineering	8.30
Sneha Kulkarni	Electrical Engineering	8.20
Divya Singh	Biotechnology	8.00
Pranav Desai	Mechanical Engineering	7.90
Ananya Nair	Electrical Engineering	7.80
Yash Verma	Information Technology	7.70
Bhavna Tripathi	Biomedical Engineering	7.60
Rohan Gupta	Information Technology	7.50
Lakshmi Iyer	Biomedical Engineering	7.20

**10) Query to fetch students' names and their addresses who have a CGPA above 8.0:**

```
SELECT si.Name, si.Address, sg.CGPA
FROM Students_Info si
JOIN Students_Grade sg ON si.Student_id = sg.Student_id
WHERE sg.CGPA > 8.0;
```

Output:

Name	Address	CGPA
Aarav Sharma	123 MG Road, Bengaluru, Karnataka, India	8.50
Aditi Patel	456 SG Highway, Ahmedabad, Gujarat, India	9.20
Arjun Reddy	101 Jubilee Hills, Hyderabad, Telangana, India	8.90
Isha Mehta	404 Marine Drive, Mumbai, Maharashtra, India	9.10
Karan Jain	505 Connaught Place, New Delhi, Delhi, India	8.70
Manish Malhotra	707 Law College Road, Pune, Maharashtra, India	8.40
Nidhi Rao	808 Banjara Hills, Hyderabad, Telangana, India	9.30
Sneha Kulkarni	1010 FC Road, Pune, Maharashtra, India	8.20
Tanmay Shah	1111 Race Course Road, Ahmedabad, Gujarat, India	9.00
Vidya Sinha	1212 MG Road, Indore, Madhya Pradesh, India	8.60
Zara Ali	1414 Dalhousie Square, Kolkata, West Bengal, India	9.40
Aman Srivastava	1515 Alkapuri, Vadodara, Gujarat, India	8.80
Chirag Aggarwal	1717 Koramangala, Bengaluru, Karnataka, India	8.30

**11) Query to fetch students' names and their phone numbers who are studying Computer Science:**

```
SELECT si.Name, si.Phone_No
FROM Students_Info si
JOIN Students_Course sc ON si.Student_id = sc.Student_id
WHERE sc.Course = 'Computer Science';
```

Output:

Name	Phone_No
Aarav Sharma	9876543210
Nidhi Rao	8877665544

**12) Query to fetch students who have not been assigned any courses yet:**

```
SELECT si.Student_id, si.Name
FROM Students_Info si
LEFT JOIN Students_Course sc ON si.Student_id = sc.Student_id
WHERE sc.Student_id IS NULL;
```

Output:

Student_id	Name
22DB1A5518	Aman Srivastava
22DB1A5519	Bhavna Tripathi
22DB1A5520	Chirag Aggarwal

### 13) Query to fetch students' names, courses, and CGPA for those studying Mechanical Engineering:

```
SELECT si.Name, sc.Course, sg.CGPA
FROM Students_Info si
JOIN Students_Course sc ON si.Student_id = sc.Student_id
JOIN Students_Grade sg ON si.Student_id = sg.Student_id
WHERE sc.Course = 'Mechanical Engineering';
```

Output:

Name	Course	CGPA
Aditi Patel	Mechanical Engineering	9.2
Pranav Desai	Mechanical Engineering	7.9
Tanmay Shah	Mechanical Engineering	9.0

### 14) Query to fetch students' names and their average CGPA grouped by course:

```
SELECT si.Name, sc.Course, AVG(sg.CGPA) AS Average.CGPA
FROM Students_Info si
JOIN Students_Course sc ON si.Student_id = sc.Student_id
JOIN Students_Grade sg ON si.Student_id = sg.Student_id
GROUP BY si.Name, sc.Course;
```

### Output:

Name	Address	CGPA
Aarav Sharma	123 MG Road, Bengaluru, Karnataka, India	8.50
Aditi Patel	456 SG Highway, Ahmedabad, Gujarat, India	9.20
Arjun Reddy	101 Jubilee Hills, Hyderabad, Telangana, India	8.90
Isha Mehta	404 Marine Drive, Mumbai, Maharashtra, India	9.10
Karan Jain	505 Connaught Place, New Delhi, Delhi, India	8.70
Manish Malhotra	707 Law College Road, Pune, Maharashtra, India	8.40
Nidhi Rao	808 Banjara Hills, Hyderabad, Telangana, India	9.30
Sneha Kulkarni	1010 FC Road, Pune, Maharashtra, India	8.20
Tanmay Shah	1111 Race Course Road, Ahmedabad, Gujarat, India	9.00
Vidya Sinha	1212 MG Road, Indore, Madhya Pradesh, India	8.60
Zara Ali	1414 Dalhousie Square, Kolkata, West Bengal, India	9.40
Aman Srivastava	1515 Alkapuri, Vadodara, Gujarat, India	8.80
Chirag Aggarwal	1717 Koramangala, Bengaluru, Karnataka, India	8.30

### 15) Query to fetch the count of students in each year of study:

```
SELECT Year_Of_Study, COUNT(*) AS Number_of_Students
FROM Students_Course
GROUP BY Year_Of_Study;
```

### Output:

Year_Of_Study	Number_of_Students
1	7
2	7
3	6

### 16) Query to fetch students' names and their addresses sorted by Name:

```
SELECT Name, Address
FROM Students_Info
ORDER BY Name;
```

Output:

Name	Address
Aarav Sharma	123 MG Road, Bengaluru, Karnataka, India
Aditi Patel	456 SG Highway, Ahmedabad, Gujarat, India
Aman Srivastava	1515 Alkapuri, Vadodara, Gujarat, India
Ananya Nair	789 Brigade Road, Kochi, Kerala, India
Arjun Reddy	101 Jubilee Hills, Hyderabad, Telangana, India
Bhavna Tripathi	1616 Chowringhee, Kolkata, West Bengal, India
Chirag Aggarwal	1717 Koramangala, Bengaluru, Karnataka, India
Divya Singh	202 Civil Lines, Kanpur, Uttar Pradesh, India
Isha Mehta	404 Marine Drive, Mumbai, Maharashtra, India
Karan Jain	505 Connaught Place, New Delhi, Delhi, India
Lakshmi Iyer	606 Anna Nagar, Chennai, Tamil Nadu, India
Manish Malhotra	707 Law College Road, Pune, Maharashtra, India
Nidhi Rao	808 Banjara Hills, Hyderabad, Telangana, India
Pranav Desai	909 Nehru Place, New Delhi, Delhi, India
Rohan Gupta	303 Park Street, Kolkata, West Bengal, India
Sneha Kulkarni	1010 FC Road, Pune, Maharashtra, India
Tanmay Shah	1111 Race Course Road, Ahmedabad, Gujarat, India
Vidya Sinha	1212 MG Road, Indore, Madhya Pradesh, India
Yash Verma	1313 Residency Road, Bengaluru, Karnataka, India
Zara Ali	1414 Dalhousie Square, Kolkata, West Bengal, India

**17) Query to fetch students' names and their CGPA ordered by CGPA in descending order:**

```
SELECT si.Name, sg.CGPA
FROM Students_Info si
JOIN Students_Grade sg ON si.Student_id = sg.Student_id
ORDER BY sg.CGPA DESC;
```

Output:

Name	CGPA
Zara Ali	9.40
Nidhi Rao	9.30
Aditi Patel	9.20
Isha Mehta	9.10
Tanmay Shah	9.00
Arjun Reddy	8.90
Aman Srivastava	8.80
Karan Jain	8.70
Vidya Sinha	8.60
Aarav Sharma	8.50

	Manish Malhotra		8.40	
	Chirag Aggarwal		8.30	
	Sneha Kulkarni		8.20	
	Divya Singh		8.00	
	Pranav Desai		7.90	
	Ananya Nair		7.80	
	Yash Verma		7.70	
	Bhavna Tripathi		7.60	
	Rohan Gupta		7.50	
	Lakshmi Iyer		7.20	
+	-----	+	-----	+

### 18) Query to fetch Students with the Highest CGPA in Each Course

```
SELECT sc.Course, si.Name, sg.CGPA
```

```
FROM Students_Info si
```

```
JOIN Students_Course sc ON si.Student_id = sc.Student_id
```

```
JOIN Students_Grade sg ON si.Student_id = sg.Student_id
```

```
WHERE sg.CGPA = (
```

```
    SELECT MAX(sg_inner.CGPA)
```

```
    FROM Students_Grade sg_inner
```

```
    JOIN Students_Course sc_inner ON sg_inner.Student_id =
    sc_inner.Student_id
```

```
    WHERE sc_inner.Course = sc.Course);
```

Output:

Course	Name	CGPA
Mechanical Engineering	Aditi Patel	9.20
Environmental Engineering	Manish Malhotra	8.40
Computer Science	Nidhi Rao	9.30
Electrical Engineering	Sneha Kulkarni	8.20
Civil Engineering	Tanmay Shah	9.00
Biotechnology	Vidya Sinha	8.60
Information Technology	Yash Verma	7.70
Chemical Engineering	Zara Ali	9.40

Aerospace Engineering	Aman Srivastava	8.80	
Biomedical Engineering	Bhavna Tripathi	7.60	
+-----+	+-----+	+-----+	+-----+

**19) Query to fetch students' names, courses, and average CGPA by course, sorted by average CGPA in descending order:**

```
SELECT si.Name, sc.Course, AVG(sg.CGPA) AS Average_CGPA
FROM Students_Info si
JOIN Students_Course sc ON si.Student_id = sc.Student_id
JOIN Students_Grade sg ON si.Student_id = sg.Student_id
GROUP BY si.Name, sc.Course
ORDER BY Average_CGPA DESC;
```

**Output:**

+-----+	+-----+	+-----+
Name	Course	Average_CGPA
+-----+	+-----+	+-----+
Zara Ali	Chemical Engineering	9.400000
Nidhi Rao	Computer Science	9.300000
Aditi Patel	Mechanical Engineering	9.200000
Isha Mehta	Chemical Engineering	9.100000
Tanmay Shah	Civil Engineering	9.000000
Arjun Reddy	Civil Engineering	8.900000
Aman Srivastava	Aerospace Engineering	8.800000
Karan Jain	Aerospace Engineering	8.700000
Vidya Sinha	Biotechnology	8.600000
Aarav Sharma	Computer Science	8.500000
Manish Malhotra	Environmental Engineering	8.400000
Chirag Aggarwal	Environmental Engineering	8.300000
Sneha Kulkarni	Electrical Engineering	8.200000
Divya Singh	Biotechnology	8.000000
Pranav Desai	Mechanical Engineering	7.900000
Ananya Nair	Electrical Engineering	7.800000
Yash Verma	Information Technology	7.700000
Bhavna Tripathi	Biomedical Engineering	7.600000
Rohan Gupta	Information Technology	7.500000
Lakshmi Iyer	Biomedical Engineering	7.200000
+-----+	+-----+	+-----+

**20) Query to fetch the Student\_id, Name, Course, and Year\_Of\_Study for all students who are either in their first year of study or in their final year of study (assumed to be the third year).**

```
SELECT si.Student_id, si.Name, sc.Course, sc.Year_Of_Study
FROM Students_Info si
```

```
JOIN Students_Course sc ON si.Student_id = sc.Student_id
WHERE sc.Year_Of_Study = 1
```

UNION ALL

```
SELECT si.Student_id, si.Name, sc.Course, sc.Year_Of_Study
FROM Students_Info si
JOIN Students_Course sc ON si.Student_id = sc.Student_id
WHERE sc.Year_Of_Study = 3;
```

Output:

Student_id	Name	Course	Year_Of_Study
22DB1A5501	Aarav Sharma	Computer Science	1
22DB1A5503	Ananya Nair	Electrical Engineering	1
22DB1A5506	Rohan Gupta	Information Technology	1
22DB1A5509	Lakshmi Iyer	Biomedical Engineering	1
22DB1A5513	Sneha Kulkarni	Electrical Engineering	1
22DB1A5516	Yash Verma	Information Technology	1
22DB1A5518	Aman Srivastava	Aerospace Engineering	1
22DB1A5504	Arjun Reddy	Civil Engineering	3
22DB1A5507	Isha Mehta	Chemical Engineering	3
22DB1A5510	Manish Malhotra	Environmental Engineering	3
22DB1A5512	Pranav Desai	Mechanical Engineering	3
22DB1A5515	Vidya Sinha	Biotechnology	3
22DB1A5519	Bhavna Tripathi	Biomedical Engineering	3