

DBMS Project file



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Introduction



What is the system?

- A database that stores all information for online learning courses.
- Keeps track of students, teachers, and courses.
- Stores course materials like videos, readings, and tests.
- Records grades and student progress.
- Handles user logins and accounts.
- Manages course enrollments.
- Tracks when users complete activities.
- Allows for messages between users.



Who will be the user?

- Students who take online courses.
- Teachers who create and teach courses.
- School staff who manage the system.
- IT workers who fix technical problems.
- Parents who check on their children's progress.
- School leaders who review overall results.
- Content creators who make course materials

Introduction



What's its future scope?

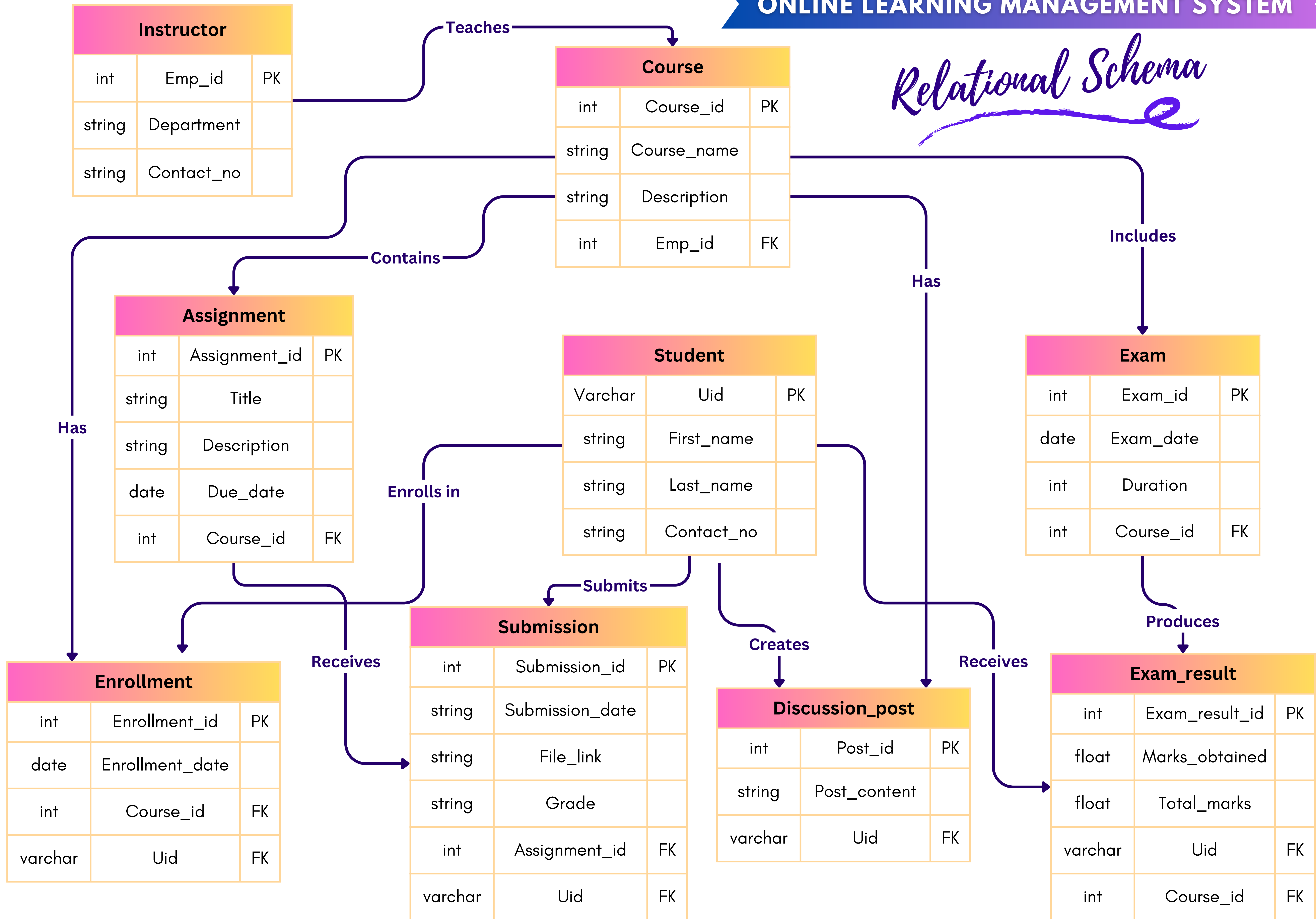
- Adding AI to create personal learning plans.
- Better data reports to help teachers.
- Mobile apps for learning anywhere.
- Adding virtual reality for hands-on learning.
- Making learning work better for people with disabilities.
- Connecting with other school systems.
- Using data to predict which students need help.
- Adding game-like features to make learning fun.
- Supporting very small lessons for busy learners.
- Adding ways to prove skills learned, not just grades

Objective

- Make learning available to everyone, anywhere, anytime.
- Create an organized way to store and manage all course content.
- Track student progress and performance accurately.
- Provide easy access to learning materials for students.
- Help teachers manage their courses efficiently.
- Simplify administrative tasks like enrollment and grading.
- Enable communication between students and teachers.
- Improve learning outcomes through data analysis.
- Reduce costs compared to traditional classroom teaching.
- Allow for self-paced learning options.
- Support different learning styles with various content types.
- Provide secure storage for educational records.
- Make it easy to update course materials.
- Generate useful reports on student performance.
- Create a central place for all learning activities

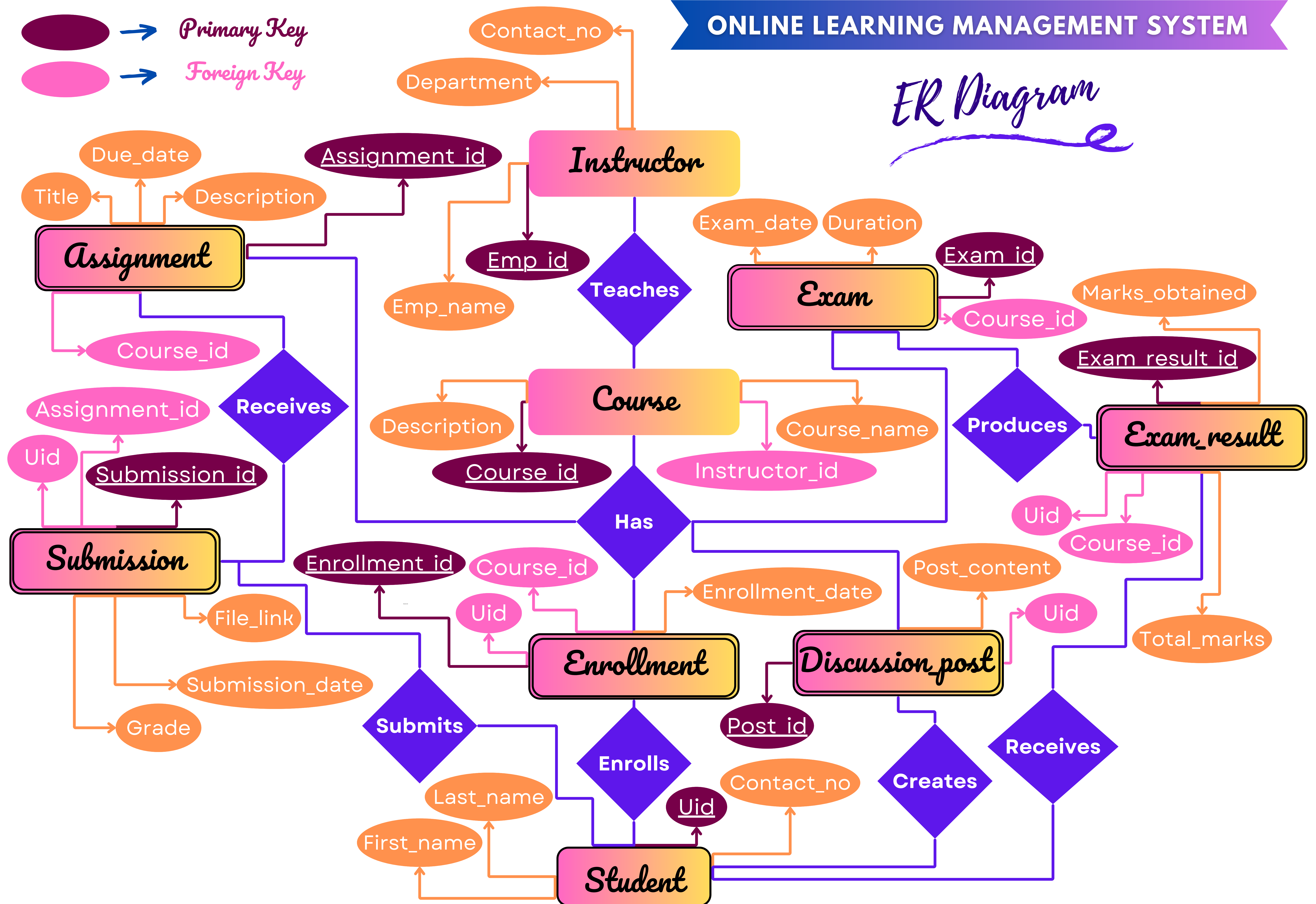
ONLINE LEARNING MANAGEMENT SYSTEM

Relational Schema



ONLINE LEARNING MANAGEMENT SYSTEM

ER Diagram



DDL Commands

Create Command

-- Create the database

```
CREATE DATABASE OLMS;  
USE olms;
```

-- Create Instructor table

```
CREATE TABLE Instructor (  
    id INT PRIMARY KEY AUTO_INCREMENT,  
    Emp_id INT NOT NULL UNIQUE,  
    Department VARCHAR(100) NOT NULL,  
    Contact_no VARCHAR(20) NOT NULL,  
    CHECK (LENGTH(Contact_no) >= 10)  
);
```

-- Create Course table

```
CREATE TABLE Course (  
    Course_id INT PRIMARY KEY AUTO_INCREMENT,  
    Course_name VARCHAR(100) NOT NULL UNIQUE,  
    Description TEXT,  
    Emp_id INT,  
    FOREIGN KEY (Emp_id) REFERENCES Instructor(id),  
    CHECK (LENGTH(Course_name) >= 3)  
);
```

-- Create Student table

```
CREATE TABLE Student (  
    Uid VARCHAR(20) PRIMARY KEY,  
    First_name VARCHAR(50) NOT NULL,  
    Last_name VARCHAR(50) NOT NULL,  
    Contact_no VARCHAR(20) NOT NULL UNIQUE,  
    CHECK (LENGTH(Contact_no) >= 10),  
    CHECK (LENGTH(Uid) >= 5)  
);
```


-- Create Assignment table

```
CREATE TABLE Assignment (  
    Assignment_id INT PRIMARY KEY AUTO_INCREMENT,  
    Title VARCHAR(100) NOT NULL,  
    Description TEXT,  
    Due_date DATE NOT NULL,  
    Course_id INT NOT NULL,  
    FOREIGN KEY (Course_id) REFERENCES Course(Course_id),  
    CHECK (Due_date > '2023-01-01')  
);
```

-- Create Enrollment table

```
CREATE TABLE Enrollment (  
    Enrollment_id INT PRIMARY KEY AUTO_INCREMENT,  
    Enrollment_date DATE NOT NULL DEFAULT (CURRENT_DATE),  
    Course_id INT NOT NULL,  
    Uid VARCHAR(20) NOT NULL,  
    FOREIGN KEY (Course_id) REFERENCES Course(Course_id),  
    FOREIGN KEY (Uid) REFERENCES Student(Uid),  
    UNIQUE (Course_id, Uid)  
);
```

-- Create Submission table

```
CREATE TABLE Submission (  
    Submission_id INT PRIMARY KEY AUTO_INCREMENT,  
    Submission_date VARCHAR(50) NOT NULL,  
    File_link VARCHAR(255) NOT NULL,  
    Grade VARCHAR(10) DEFAULT 'Pending',  
    Assignment_id INT NOT NULL,  
    Uid VARCHAR(20) NOT NULL,  
    FOREIGN KEY (Assignment_id) REFERENCES Assignment(Assignment_id),  
    FOREIGN KEY (Uid) REFERENCES Student(Uid),  
    UNIQUE (Assignment_id, Uid),  
    CHECK (Grade IN ('A+', 'A', 'A-', 'B+', 'B', 'B-', 'C+', 'C', 'C-', 'D', 'F', 'Pending'))  
);
```

-- Create Exam table

```
CREATE TABLE Exam (  
    Exam_id INT PRIMARY KEY AUTO_INCREMENT,  
    Exam_date DATE NOT NULL,  
    Duration INT NOT NULL DEFAULT 120,  
    Course_id INT NOT NULL,  
    FOREIGN KEY (Course_id) REFERENCES Course(Course_id),  
    CHECK (Duration > 0 AND Duration <= 240),  
    CHECK (Exam_date > '2023-01-01')  
);
```

-- Create Exam_result table

```
CREATE TABLE Exam_result (  
    Exam_result_id INT PRIMARY KEY AUTO_INCREMENT,  
    Marks_obtained FLOAT NOT NULL,  
    Total_marks FLOAT NOT NULL DEFAULT 100.0,  
    Uid VARCHAR(20) NOT NULL,  
    Course_id INT NOT NULL,  
    FOREIGN KEY (Uid) REFERENCES Student(Uid),  
    FOREIGN KEY (Course_id) REFERENCES Course(Course_id),  
    UNIQUE (Uid, Course_id),  
    CHECK (Marks_obtained >= 0 AND Marks_obtained <= Total_marks),  
    CHECK (Total_marks > 0)  
);
```

-- Create Discussion_post table

```
CREATE TABLE Discussion_post (  
    Post_id INT PRIMARY KEY AUTO_INCREMENT,  
    Post_content TEXT NOT NULL,  
    Post_date DATETIME DEFAULT CURRENT_TIMESTAMP,  
    Uid VARCHAR(20) NOT NULL,  
    FOREIGN KEY (Uid) REFERENCES Student(Uid),  
    CHECK (LENGTH(Post_content) > 0)  
);
```

Alter Command

-- Add a new column to the Student table

```
ALTER TABLE Student ADD COLUMN Graduation_year INT;
```

-- Modify a column in the Course table

```
ALTER TABLE Course MODIFY COLUMN Course_name VARCHAR(100) NOT NULL;
```

-- Add a constraint to the Assignment table

```
ALTER TABLE Assignment ADD CONSTRAINT check_deadline  
CHECK (Due_date > '2023-01-01');
```

-- Drop a column from the Submission table

```
ALTER TABLE Submission DROP COLUMN File_link;
```

-- Add a foreign key constraint

```
ALTER TABLE Discussion_post ADD COLUMN Course_id INT;  
ALTER TABLE Discussion_post ADD CONSTRAINT fk_course_discussion  
FOREIGN KEY (Course_id) REFERENCES Course(Course_id);
```

Drop Command

-- Drop a table if it exists

```
DROP TABLE IF EXISTS Temporary_records;
```

-- Drop multiple tables

```
DROP TABLE IF EXISTS Old_assignments, Archived_submissions;
```

Rename Command

-- Rename a single table

```
RENAME TABLE Exam TO Course_exam;
```

-- Rename multiple tables

RENAME TABLE

Discussion_post TO Forum_post,
Submission TO Assignment_submission;

Truncate Command

-- Remove all data from a table but keep the structure

TRUNCATE TABLE Exam_result;

```
mysql> show tables;
+-----+
| Tables_in_olms |
+-----+
| assignment      |
| course          |
| discussion_post |
| enrollment      |
| exam            |
| exam_result     |
| instructor      |
| student         |
| submission      |
+-----+
9 rows in set (0.00 sec)
```

```
mysql> show tables;
+-----+
| Tables_in_olms |
+-----+
| assignment      |
| assignment_submission |
| course          |
| course_exam    |
| enrollment      |
| exam_result     |
| forum_post      |
| instructor      |
| student         |
+-----+
9 rows in set (0.00 sec)
```

```
mysql> show columns in assignment;
```

Field	Type	Null	Key	Default	Extra
Assignment_id	int	NO	PRI	NULL	auto_increment
Title	varchar(100)	NO		NULL	
Description	text	YES		NULL	
Due_date	date	NO		NULL	
Course_id	int	NO	MUL	NULL	

```
5 rows in set (0.03 sec)
```

```
mysql> show columns in assignment_submission;
```

Field	Type	Null	Key	Default	Extra
Submission_id	int	NO	PRI	NULL	auto_increment
Submission_date	varchar(50)	NO		NULL	
Grade	varchar(10)	YES		Pending	
Assignment_id	int	NO	MUL	NULL	
Uid	varchar(20)	NO	MUL	NULL	

```
5 rows in set (0.02 sec)
```

```
mysql> show columns in course;
```

Field	Type	Null	Key	Default	Extra
Course_id	int	NO	PRI	NULL	auto_increment
Course_name	varchar(100)	NO	UNI	NULL	
Description	text	YES		NULL	
Emp_id	int	YES	MUL	NULL	

```
4 rows in set (0.01 sec)
```

```
mysql> show columns in course_exam;
```

Field	Type	Null	Key	Default	Extra
Exam_id	int	NO	PRI	NULL	auto_increment
Exam_date	date	NO		NULL	
Duration	int	NO		120	
Course_id	int	NO	MUL	NULL	

```
4 rows in set (0.01 sec)
```

```
mysql> show columns in enrollmet;
```

Field	Type	Null	Key	Default	Extra
Enrollment_id	int	NO	PRI	NULL	auto_increment
Enrollment_date	date	NO		curdate()	DEFAULT_GENERATED
Course_id	int	NO	MUL	NULL	
Uid	varchar(20)	NO	MUL	NULL	

```
4 rows in set (0.01 sec)
```

```
mysql> show columns in exam_result;
```

Field	Type	Null	Key	Default	Extra
Exam_result_id	int	NO	PRI	NULL	auto_increment
Marks_obtained	float	NO		NULL	
Total_marks	float	NO		100	
Uid	varchar(20)	NO	MUL	NULL	
Course_id	int	NO	MUL	NULL	

```
5 rows in set (0.00 sec)
```

```
mysql> show columns in forum_post;
```

Field	Type	Null	Key	Default	Extra
Post_id	int	NO	PRI	NULL	auto_increment
Post_content	text	NO		NULL	
Post_date	datetime	YES		CURRENT_TIMESTAMP	DEFAULT_GENERATED
Uid	varchar(20)	NO	MUL	NULL	
Course_id	int	YES	MUL	NULL	

```
5 rows in set (0.01 sec)
```

```
mysql> show columns in instructor;
```

Field	Type	Null	Key	Default	Extra
id	int	NO	PRI	NULL	auto_increment
Emp_id	int	NO	UNI	NULL	
Department	varchar(100)	NO		NULL	
Contact_no	varchar(20)	NO		NULL	

```
4 rows in set (0.00 sec)
```

```
mysql> show columns in student;
```

Field	Type	Null	Key	Default	Extra
Uid	varchar(20)	NO	PRI	NULL	
First_name	varchar(50)	NO		NULL	
Last_name	varchar(50)	NO		NULL	
Contact_no	varchar(20)	NO	UNI	NULL	
Graduation_year	int	YES		NULL	

```
5 rows in set (0.00 sec)
```

DML Commands

Insert Command

-- Insert data into Instructor table

```
INSERT INTO Instructor (Emp_id, Department, Contact_no) VALUES
(3782, 'Computer Science', '9876543210'),
(3783, 'Computer Applications', '9876543211'),
(3784, 'Information Technology', '9876543212'),
(3785, 'Data Science', '9876543213'),
(3786, 'Artificial Intelligence', '9876543214'),
(3787, 'Software Engineering', '9876543215'),
(3788, 'Cyber Security', '9876543216'),
(3789, 'Cloud Computing', '9876543217'),
(3790, 'Machine Learning', '9876543218'),
(3791, 'Mobile Development', '9876543219');
```

-- Insert data into Course table

```
INSERT INTO Course (Course_name, Description, Emp_id) VALUES
('Python Programming', 'Introduction to Python programming language',
1),
('Database Management', 'Fundamentals of DBMS and SQL', 2),
('Web Development', 'HTML, CSS, and JavaScript basics', 3),
('Data Structures', 'Advanced data structures and algorithms', 4),
('Artificial Intelligence', 'Basics of AI and Machine Learning', 5),
('Java Programming', 'Core Java and OOP concepts', 6),
('Network Security', 'Fundamentals of cybersecurity', 7),
('Cloud Architecture', 'AWS and Azure fundamentals', 8),
('Mobile App Development', 'Android and iOS development', 9),
('Operating Systems', 'OS concepts and administration', 10);
```


-- Insert data into Student table

```
INSERT INTO Student (Uid, First_name, Last_name, Contact_no,
Graduation_year) VALUES
('23BCA10301', 'Aarav', 'Sharma', '9898989801', 2026),
('23BCA10302', 'Diya', 'Patel', '9898989802', 2026),
('23MCA10303', 'Arjun', 'Kumar', '9898989803', 2025),
('23MCA10304', 'Ananya', 'Singh', '9898989804', 2025),
('23BIT10305', 'Advait', 'Verma', '9898989805', 2026),
('23BCA10306', 'Ishaan', 'Malhotra', '9898989806', 2026),
('23MCA10307', 'Zara', 'Kapoor', '9898989807', 2025),
('23BIT10308', 'Vihaan', 'Reddy', '9898989808', 2026),
('23BCA10309', 'Riya', 'Gupta', '9898989809', 2026),
('23MCA10310', 'Kabir', 'Mehra', '9898989810', 2025),
('23BIT10311', 'Aisha', 'Joshi', '9898989811', 2026),
('23BCA10312', 'Vivaan', 'Choudhury', '9898989812', 2026);
```

-- Insert data into Assignment table

```
INSERT INTO Assignment (Title, Description, Due_date, Course_id) VALUES
('Python Basics', 'Create a simple calculator program', '2024-03-30', 1),
('SQL Queries', 'Write complex SQL queries', '2024-04-15', 2),
('HTML Portfolio', 'Create a personal portfolio website', '2024-04-20', 3),
('DSA Project', 'Implement a balanced BST', '2024-04-25', 4),
('AI Model', 'Build a simple classification model', '2024-05-01', 5),
('Java Classes', 'Create a library management system', '2024-05-05', 6),
('Security Audit', 'Perform security assessment', '2024-05-10', 7),
('Cloud Deploy', 'Deploy application on AWS', '2024-05-15', 8),
('Android App', 'Create a todo list app', '2024-05-20', 9),
('Shell Script', 'Write backup automation script', '2024-05-25', 10);
```

-- Insert data into Enrollment table

```
INSERT INTO Enrollment (Course_id, Uid) VALUES
(1, '23BCA10301'), (2, '23BCA10301'), (3, '23BCA10301'),
(1, '23BCA10302'), (4, '23BCA10302'),
(2, '23MCA10303'), (5, '23MCA10303'), (6, '23MCA10303'),
(3, '23MCA10304'), (7, '23MCA10304'),
```

```
(4, '23BIT10305'), (8, '23BIT10305'),  
(5, '23BCA10306'), (9, '23BCA10306'),  
(6, '23MCA10307'), (10, '23MCA10307'),  
(7, '23BIT10308'), (1, '23BIT10308'),  
(8, '23BCA10309'), (2, '23BCA10309'),  
(9, '23MCA10310'), (3, '23MCA10310');
```

-- Insert data into Assignment_submission

```
INSERT INTO Assignment_submission (Submission_date, Grade,  
Assignment_id, Uid) VALUES  
( '2024-03-25', 'A', 1, '23BCA10301'),  
( '2024-03-26', 'B+', 1, '23BCA10302'),  
( '2024-04-10', 'A-', 2, '23MCA10303'),  
( '2024-04-12', 'A+', 3, '23MCA10304'),  
( '2024-04-15', 'B', 4, '23BIT10305'),  
( '2024-04-18', 'A', 5, '23BCA10306'),  
( '2024-04-20', 'B+', 6, '23MCA10307'),  
( '2024-04-22', 'A-', 7, '23BIT10308'),  
( '2024-04-25', 'B-', 8, '23BCA10309'),  
( '2024-04-28', 'A', 9, '23MCA10310'),  
( '2024-05-01', 'A+', 10, '23MCA10307'),  
( '2024-05-03', 'B+', 1, '23BIT10308');
```

-- Insert data into Course_exam

```
INSERT INTO Course_exam (Exam_date, Duration, Course_id) VALUES  
( '2024-05-15', 180, 1),  
( '2024-05-16', 180, 2),  
( '2024-05-17', 180, 3),  
( '2024-05-18', 180, 4),  
( '2024-05-19', 180, 5),  
( '2024-05-20', 180, 6),  
( '2024-05-21', 180, 7),  
( '2024-05-22', 180, 8),  
( '2024-05-23', 180, 9),  
( '2024-05-24', 180, 10);
```

-- Insert data into Exam_result

```
INSERT INTO Exam_result (Marks_obtained, Total_marks, Uid, Course_id)
VALUES
(85.5, 100.0, '23BCA10301', 1),
(92.0, 100.0, '23BCA10302', 1),
(88.5, 100.0, '23MCA10303', 2),
(95.0, 100.0, '23MCA10304', 3),
(87.5, 100.0, '23BIT10305', 4),
(91.0, 100.0, '23BCA10306', 5),
(89.5, 100.0, '23MCA10307', 6),
(93.5, 100.0, '23BIT10308', 7),
(86.0, 100.0, '23BCA10309', 8),
(90.5, 100.0, '23MCA10310', 9),
(88.0, 100.0, '23BIT10311', 10),
('94.5', 100.0, '23BCA10312', 1);
```

-- Insert data into Forum_post

```
INSERT INTO Forum_post (Post_content, Uid, Course_id) VALUES
('Need help with Python loops concept', '23BCA10301', 1),
('Sharing my SQL assignment approach', '23BCA10302', 2),
('HTML vs CSS discussion', '23MCA10303', 3),
('Binary Tree implementation doubt', '23MCA10304', 4),
('AI project group formation', '23BIT10305', 5),
('Java inheritance example needed', '23BCA10306', 6),
('Cybersecurity best practices', '23MCA10307', 7),
('AWS deployment issues', '23BIT10308', 8),
('Android Studio setup problem', '23BCA10309', 9),
('Linux commands cheat sheet', '23MCA10310', 10),
('Database normalization doubt', '23BIT10311', 2),
('Web hosting recommendations?', '23BCA10312', 3);
```

Select Command

-- Select all records from Instructor table

```
SELECT * FROM Instructor;
```

```
mysql> SELECT * FROM Instructor;
```

id	Emp_id	Department	Contact_no
1	1001	Computer Science	9876543210
2	1002	Mathematics	9765432109
3	1003	Physics	9654321098
4	1004	Chemistry	9543210987
5	1005	English Literature	9432109876
6	1006	Economics	9321098765
7	1007	Mechanical Engineering	9210987654
8	1008	Biotechnology	9109876543
9	1009	History	9098765432
10	1010	Fine Arts	9987654321
11	3782	Computer Science	9876543210
12	3783	Computer Applications	9876543211
13	3784	Information Technology	9876543212
14	3785	Data Science	9876543213
15	3786	Artificial Intelligence	9876543214
16	3787	Software Engineering	9876543215
17	3788	Cyber Security	9876543216
18	3789	Cloud Computing	9876543217
19	3790	Machine Learning	9876543218
20	3791	Mobile Development	9876543219

```
20 rows in set (0.00 sec)
```

--Select all records from Course table

SELECT * FROM Course;

```
mysql> SELECT * FROM Course;
```

Course_id	Course_name	Description	Emp_id
1	Introduction to Programming	Basic programming concepts using Python	1
2	Calculus I	Fundamental concepts of differential and integral calculus	2
3	Quantum Physics	Introduction to quantum mechanics and its applications	3
4	Organic Chemistry	Study of carbon compounds and reactions	4
5	Modern Indian Literature	Exploration of contemporary Indian literary works	5
6	Microeconomics	Study of market behavior of individuals and firms	6
7	Thermodynamics	Principles of energy transfer and work	7
8	Molecular Biology	Study of cellular processes and DNA	8
9	Ancient Indian Civilization	Exploring the Indus Valley and Vedic periods	9
10	Contemporary Art	Modern and post-modern art movements in India	10
11	Python Programming	Introduction to Python programming language	1
12	Database Management	Fundamentals of DBMS and SQL	2
13	Web Development	HTML, CSS, and JavaScript basics	3
14	Data Structures	Advanced data structures and algorithms	4
15	Artificial Intelligence	Basics of AI and Machine Learning	5
16	Java Programming	Core Java and OOP concepts	6
17	Network Security	Fundamentals of cybersecurity	7
18	Cloud Architecture	AWS and Azure fundamentals	8
19	Mobile App Development	Android and iOS development	9
20	Operating Systems	OS concepts and administration	10

20 rows in set (0.00 sec)

--Select all records from Student table

SELECT * FROM Student;

```
mysql> SELECT * FROM Student;
```

Uid	First_name	Last_name	Contact_no	Graduation_year
23 ART 10313	Rohan	Nair	7432109876	NULL
23 BCA 10301	Rahul	Sharma	8765432109	NULL
23 BCA 10306	Ananya	Gupta	8210987654	NULL
23 BIO 10311	Aditya	Verma	7654321098	NULL
23 BIO 10316	Kavita	Tiwari	7109876543	NULL
23 CHM 10304	Neha	Singh	8432109876	NULL
23 ECO 10309	Karan	Kapoor	7876543210	NULL
23 ECO 10314	Anjali	Menon	7321098765	NULL
23 ENG 10305	Vikram	Malhotra	8321098765	NULL
23 HIS 10312	Pooja	Choudhary	7543210987	NULL
23 MEC 10310	Meera	Desai	7765432109	NULL
23 MEC 10315	Siddharth	Bose	7210987654	NULL
23 MTH 10302	Priya	Patel	8654321098	NULL
23 MTH 10307	Raj	Kumar	8109876543	NULL
23 PHY 10303	Arjun	Reddy	8543210987	NULL
23 PHY 10308	Divya	Joshi	8987654321	NULL
23BCA10301	Aarav	Sharma	9898989801	2026
23BCA10302	Diya	Patel	9898989802	2026
23BCA10306	Ishaan	Malhotra	9898989806	2026
23BCA10309	Riya	Gupta	9898989809	2026
23BCA10312	Vivaan	Choudhury	9898989812	2026
23BIT10305	Advait	Verma	9898989805	2026
23BIT10308	Vihaan	Reddy	9898989808	2026
23BIT10311	Aisha	Joshi	9898989811	2026
23MCA10303	Arjun	Kumar	9898989803	2025
23MCA10304	Ananya	Singh	9898989804	2025
23MCA10307	Zara	Kapoor	9898989807	2025
23MCA10310	Kabir	Mehra	9898989810	2025

28 rows in set (0.00 sec)

--Select all records from Assignment table

SELECT * FROM Assignment;

```
mysql> SELECT * FROM Assignment;
```

Assignment_id	Title	Description	Due_date	Course_id
1	Python Basics	Create a simple calculator using Python	2023-06-15	1
2	Integration Problems	Solve 10 integration problems from Chapter 5	2023-06-20	2
3	Quantum States	Write a paper on quantum states and probabilities	2023-06-25	3
4	Synthesis of Aspirin	Lab report on aspirin synthesis experiment	2023-06-18	4
5	Book Review	Review of "The God of Small Things" by Arundhati Roy	2023-06-22	5
6	Market Analysis	Analyze a local market using microeconomic principles	2023-06-17	6
7	Heat Engine Design	Design a theoretical heat engine with maximum efficiency	2023-06-23	7
8	DNA Extraction	Lab report on DNA extraction and analysis	2023-06-19	8
9	Historical Essay	Essay on the impact of Ashokan edicts on Indian governance	2023-06-24	9
10	Art Portfolio	Create a portfolio inspired by contemporary Indian artists	2023-06-21	10
11	Python Basics	Create a simple calculator program	2024-03-30	1
12	SQL Queries	Write complex SQL queries	2024-04-15	2
13	HTML Portfolio	Create a personal portfolio website	2024-04-20	3
14	DSA Project	Implement a balanced BST	2024-04-25	4
15	AI Model	Build a simple classification model	2024-05-01	5
16	Java Classes	Create a library management system	2024-05-05	6
17	Security Audit	Perform security assessment	2024-05-10	7
18	Cloud Deploy	Deploy application on AWS	2024-05-15	8
19	Android App	Create a todo list app	2024-05-20	9
20	Shell Script	Write backup automation script	2024-05-25	10

20 rows in set (0.00 sec)

--Select all records from Assignment_submission table

SELECT * FROM Assignment_submission;

```
mysql> SELECT * FROM Assignment_submission;
```

Submission_id	Submission_date	Grade	Assignment_id	Uid
1	2024-03-25	A	1	23BCA10301
2	2024-03-26	B+	1	23BCA10302
3	2024-04-10	A-	2	23MCA10303
4	2024-04-12	A+	3	23MCA10304
5	2024-04-15	B	4	23BIT10305
6	2024-04-18	A	5	23BCA10306
7	2024-04-20	B+	6	23MCA10307
8	2024-04-22	A-	7	23BIT10308
9	2024-04-25	B-	8	23BCA10309
10	2024-04-28	A	9	23MCA10310
11	2024-05-01	A+	10	23MCA10307
12	2024-05-03	B+	1	23BIT10308

12 rows in set (0.00 sec)

--Select all records from Enrollment table

SELECT * FROM Enrollment;

mysql> SELECT * FROM Enrollment;

Enrollment_id	Enrollment_date	Course_id	Uid
1	2023-05-01	1	23 BCA 10301
2	2023-05-01	2	23 BCA 10301
3	2023-05-02	1	23 MTH 10302
4	2023-05-03	3	23 PHY 10303
5	2023-05-03	4	23 CHM 10304
6	2023-05-04	5	23 ENG 10305
7	2023-05-04	1	23 BCA 10306
8	2023-05-05	2	23 MTH 10307
9	2023-05-05	3	23 PHY 10308
10	2023-05-06	4	23 MTH 10302
11	2023-05-07	6	23 ECO 10309
12	2023-05-08	7	23 MEC 10310
13	2023-05-09	8	23 BIO 10311
14	2023-05-10	9	23 HIS 10312
15	2023-05-11	10	23 ART 10313
16	2023-05-12	6	23 ECO 10314
17	2023-05-13	7	23 MEC 10315
18	2023-05-14	8	23 BIO 10316
19	2023-05-15	9	23 BCA 10301
20	2023-05-16	10	23 MTH 10302
21	2025-04-03	1	23BCA10301
22	2025-04-03	2	23BCA10301
23	2025-04-03	3	23BCA10301
24	2025-04-03	1	23BCA10302
25	2025-04-03	4	23BCA10302
26	2025-04-03	2	23MCA10303
27	2025-04-03	5	23MCA10303
28	2025-04-03	6	23MCA10303
29	2025-04-03	3	23MCA10304
30	2025-04-03	7	23MCA10304
31	2025-04-03	4	23BIT10305
32	2025-04-03	8	23BIT10305
33	2025-04-03	5	23BCA10306
34	2025-04-03	9	23BCA10306
35	2025-04-03	6	23MCA10307
36	2025-04-03	10	23MCA10307
37	2025-04-03	7	23BIT10308
38	2025-04-03	1	23BIT10308
39	2025-04-03	8	23BCA10309
40	2025-04-03	2	23BCA10309
41	2025-04-03	9	23MCA10310
42	2025-04-03	3	23MCA10310

42 rows in set (0.01 sec)

--Select all records from Course_exam table

SELECT * FROM Course_exam;

```
mysql> SELECT * FROM Course_exam;
```

Exam_id	Exam_date	Duration	Course_id
1	2023-07-10	120	1
2	2023-07-12	180	2
3	2023-07-15	150	3
4	2023-07-18	120	4
5	2023-07-20	90	5
6	2023-07-22	120	6
7	2023-07-25	150	7
8	2023-07-28	120	8
9	2023-07-30	90	9
10	2023-08-02	120	10
11	2024-05-15	180	1
12	2024-05-16	180	2
13	2024-05-17	180	3
14	2024-05-18	180	4
15	2024-05-19	180	5
16	2024-05-20	180	6
17	2024-05-21	180	7
18	2024-05-22	180	8
19	2024-05-23	180	9
20	2024-05-24	180	10

20 rows in set (0.00 sec)

--Select all records from Exam_result table

SELECT * FROM Exam_result;

```
mysql> SELECT * FROM Exam_result;
```

Exam_result_id	Marks_obtained	Total_marks	Uid	Course_id
1	85.5	100	23BCA10301	1
2	92	100	23BCA10302	1
3	88.5	100	23MCA10303	2
4	95	100	23MCA10304	3
5	87.5	100	23BIT10305	4
6	91	100	23BCA10306	5
7	89.5	100	23MCA10307	6
8	93.5	100	23BIT10308	7
9	86	100	23BCA10309	8
10	90.5	100	23MCA10310	9
11	88	100	23BIT10311	10
12	94.5	100	23BCA10312	1

12 rows in set (0.00 sec)

--Select all records from Forum_post table

SELECT * FROM Forum_post;

```
mysql> SELECT * FROM Forum_post;
```

Post_id	Post_content	Post_date	Uid	Course_id
1	Need help with Python loops concept	2025-04-03 03:12:29	23BCA10301	1
2	Sharing my SQL assignment approach	2025-04-03 03:12:29	23BCA10302	2
3	HTML vs CSS discussion	2025-04-03 03:12:29	23MCA10303	3
4	Binary Tree implementation doubt	2025-04-03 03:12:29	23MCA10304	4
5	AI project group formation	2025-04-03 03:12:29	23BIT10305	5
6	Java inheritance example needed	2025-04-03 03:12:29	23BCA10306	6
7	Cybersecurity best practices	2025-04-03 03:12:29	23MCA10307	7
8	AWS deployment issues	2025-04-03 03:12:29	23BIT10308	8
9	Android Studio setup problem	2025-04-03 03:12:29	23BCA10309	9
10	Linux commands cheat sheet	2025-04-03 03:12:29	23MCA10310	10
11	Database normalization doubt	2025-04-03 03:12:29	23BIT10311	2
12	Web hosting recommendations?	2025-04-03 03:12:29	23BCA10312	3

12 rows in set (0.00 sec)

-- Select specific columns from Instructor

SELECT Emp_id, Department, Contact_no FROM Instructor;

```
mysql> SELECT Emp_id, Department, Contact_no FROM Instructor;
```

Emp_id	Department	Contact_no
1001	Computer Science	9876543210
1002	Mathematics	9765432109
1003	Physics	9654321098
1004	Chemistry	9543210987
1005	English Literature	9432109876
1006	Economics	9321098765
1007	Mechanical Engineering	9210987654
1008	Biotechnology	9109876543
1009	History	9098765432
1010	Fine Arts	9987654321
3782	Computer Science	9876543210
3783	Computer Applications	9876543211
3784	Information Technology	9876543212
3785	Data Science	9876543213
3786	Artificial Intelligence	9876543214
3787	Software Engineering	9876543215
3788	Cyber Security	9876543216
3789	Cloud Computing	9876543217
3790	Machine Learning	9876543218
3791	Mobile Development	9876543219

20 rows in set (0.00 sec)

-- Select specific columns from Course

SELECT Course_id, Course_name, Description FROM Course;

```
mysql> SELECT Course_id, Course_name, Description FROM Course;
```

Course_id	Course_name	Description
1	Introduction to Programming	Basic programming concepts using Python
2	Calculus I	Fundamental concepts of differential and integral calculus
3	Quantum Physics	Introduction to quantum mechanics and its applications
4	Organic Chemistry	Study of carbon compounds and reactions
5	Modern Indian Literature	Exploration of contemporary Indian literary works
6	Microeconomics	Study of market behavior of individuals and firms
7	Thermodynamics	Principles of energy transfer and work
8	Molecular Biology	Study of cellular processes and DNA
9	Ancient Indian Civilization	Exploring the Indus Valley and Vedic periods
10	Contemporary Art	Modern and post-modern art movements in India
11	Python Programming	Introduction to Python programming language
12	Database Management	Fundamentals of DBMS and SQL
13	Web Development	HTML, CSS, and JavaScript basics
14	Data Structures	Advanced data structures and algorithms
15	Artificial Intelligence	Basics of AI and Machine Learning
16	Java Programming	Core Java and OOP concepts
17	Network Security	Fundamentals of cybersecurity
18	Cloud Architecture	AWS and Azure fundamentals
19	Mobile App Development	Android and iOS development
20	Operating Systems	OS concepts and administration

20 rows in set (0.00 sec)

-- Select specific columns from Assignment

SELECT Assignment_id, Title, Due_date FROM Assignment;

```
mysql> SELECT Assignment_id, Title, Due_date FROM Assignment;
```

Assignment_id	Title	Due_date
1	Python Basics	2023-06-15
2	Integration Problems	2023-06-20
3	Quantum States	2023-06-25
4	Synthesis of Aspirin	2023-06-18
5	Book Review	2023-06-22
6	Market Analysis	2023-06-17
7	Heat Engine Design	2023-06-23
8	DNA Extraction	2023-06-19
9	Historical Essay	2023-06-24
10	Art Portfolio	2023-06-21
11	Python Basics	2024-03-30
12	SQL Queries	2024-04-15
13	HTML Portfolio	2024-04-20
14	DSA Project	2024-04-25
15	AI Model	2024-05-01
16	Java Classes	2024-05-05
17	Security Audit	2024-05-10
18	Cloud Deploy	2024-05-15
19	Android App	2024-05-20
20	Shell Script	2024-05-25

20 rows in set (0.00 sec)

-- Select specific columns from Student

SELECT Uid, First_name, Last_name, Graduation_year FROM Student;

```
mysql> SELECT Uid, First_name, Last_name, Graduation_year FROM Student;
```

Uid	First_name	Last_name	Graduation_year
23 ART 10313	Rohan	Nair	NULL
23 BCA 10301	Rahul	Sharma	NULL
23 BCA 10306	Ananya	Gupta	NULL
23 BIO 10311	Aditya	Verma	NULL
23 BIO 10316	Kavita	Tiwari	NULL
23 CHM 10304	Neha	Singh	NULL
23 ECO 10309	Karan	Kapoor	NULL
23 ECO 10314	Anjali	Menon	NULL
23 ENG 10305	Vikram	Malhotra	NULL
23 HIS 10312	Pooja	Choudhary	NULL
23 MEC 10310	Meera	Desai	NULL
23 MEC 10315	Siddharth	Bose	NULL
23 MTH 10302	Priya	Patel	NULL
23 MTH 10307	Raj	Kumar	NULL
23 PHY 10303	Arjun	Reddy	NULL
23 PHY 10308	Divya	Joshi	NULL
23BCA10301	Aarav	Sharma	2026
23BCA10302	Diya	Patel	2026
23BCA10306	Ishaan	Malhotra	2026
23BCA10309	Riya	Gupta	2026
23BCA10312	Vivaan	Choudhury	2026
23BIT10305	Advait	Verma	2026
23BIT10308	Vihaan	Reddy	2026
23BIT10311	Aisha	Joshi	2026
23MCA10303	Arjun	Kumar	2025
23MCA10304	Ananya	Singh	2025
23MCA10307	Zara	Kapoor	2025
23MCA10310	Kabir	Mehra	2025

28 rows in set (0.00 sec)

-- Select specific columns from Assignment_submission

```
SELECT Assignment_id, Submission_date, Grade
FROM Assignment_submission;
```

```
mysql> SELECT Assignment_id, Submission_date, Grade FROM Assignment_submission;
+-----+-----+-----+
| Assignment_id | Submission_date | Grade |
+-----+-----+-----+
|          1   | 2024-03-25     | A     |
|          1   | 2024-03-26     | B+    |
|          2   | 2024-04-10     | A-    |
|          3   | 2024-04-12     | A+    |
|          4   | 2024-04-15     | B     |
|          5   | 2024-04-18     | A     |
|          6   | 2024-04-20     | B+    |
|          7   | 2024-04-22     | A-    |
|          8   | 2024-04-25     | B-    |
|          9   | 2024-04-28     | A     |
|         10   | 2024-05-01     | A+    |
|          1   | 2024-05-03     | B+    |
+-----+-----+-----+
12 rows in set (0.00 sec)
```

-- Select specific columns from Course_exam

```
SELECT Exam_id, Exam_date, Duration FROM Course_exam;
```

```
mysql> SELECT Exam_id, Exam_date, Duration FROM Course_exam;
+-----+-----+-----+
| Exam_id | Exam_date | Duration |
+-----+-----+-----+
|        1 | 2023-07-10 |      120 |
|        2 | 2023-07-12 |      180 |
|        3 | 2023-07-15 |      150 |
|        4 | 2023-07-18 |      120 |
|        5 | 2023-07-20 |       90 |
|        6 | 2023-07-22 |      120 |
|        7 | 2023-07-25 |      150 |
|        8 | 2023-07-28 |      120 |
|        9 | 2023-07-30 |       90 |
|       10 | 2023-08-02 |      120 |
|       11 | 2024-05-15 |      180 |
|       12 | 2024-05-16 |      180 |
|       13 | 2024-05-17 |      180 |
|       14 | 2024-05-18 |      180 |
|       15 | 2024-05-19 |      180 |
|       16 | 2024-05-20 |      180 |
|       17 | 2024-05-21 |      180 |
|       18 | 2024-05-22 |      180 |
|       19 | 2024-05-23 |      180 |
|       20 | 2024-05-24 |      180 |
+-----+-----+-----+
20 rows in set (0.00 sec)
```

Update Command

-- Update Assignment submission grade

```
UPDATE Assignment_submission SET Grade = 'A+'  
WHERE Assignment_id = 1 AND Uid = '23BCA10301';
```

```
mysql> select * from Assignment_submission;
```

Submission_id	Submission_date	Grade	Assignment_id	Uid
1	2024-03-25	A+	1	23BCA10301
2	2024-03-26	B+	1	23BCA10302
3	2024-04-10	A-	2	23MCA10303
4	2024-04-12	A+	3	23MCA10304
5	2024-04-15	B	4	23BIT10305
6	2024-04-18	A	5	23BCA10306
7	2024-04-20	B+	6	23MCA10307
8	2024-04-22	A-	7	23BIT10308
9	2024-04-25	B-	8	23BCA10309
10	2024-04-28	A	9	23MCA10310
11	2024-05-01	A+	10	23MCA10307
12	2024-05-03	B+	1	23BIT10308

```
12 rows in set (0.00 sec)
```

Delete Command

-- Delete a forum post

DELETE FROM Forum_post WHERE Post_id = 1;

```
mysql> select * from Forum_post;
```

Post_id	Post_content	Post_date	Uid	Course_id
1	Need help with Python loops concept	2025-04-03 03:12:29	23BCA10301	1
2	Sharing my SQL assignment approach	2025-04-03 03:12:29	23BCA10302	2
3	HTML vs CSS discussion	2025-04-03 03:12:29	23MCA10303	3
4	Binary Tree implementation doubt	2025-04-03 03:12:29	23MCA10304	4
5	AI project group formation	2025-04-03 03:12:29	23BIT10305	5
6	Java inheritance example needed	2025-04-03 03:12:29	23BCA10306	6
7	Cybersecurity best practices	2025-04-03 03:12:29	23MCA10307	7
8	AWS deployment issues	2025-04-03 03:12:29	23BIT10308	8
9	Android Studio setup problem	2025-04-03 03:12:29	23BCA10309	9
10	Linux commands cheat sheet	2025-04-03 03:12:29	23MCA10310	10
11	Database normalization doubt	2025-04-03 03:12:29	23BIT10311	2
12	Web hosting recommendations?	2025-04-03 03:12:29	23BCA10312	3

12 rows in set (0.00 sec)

```
mysql> select * from Forum_post;
```

Post_id	Post_content	Post_date	Uid	Course_id
2	Sharing my SQL assignment approach	2025-04-03 03:12:29	23BCA10302	2
3	HTML vs CSS discussion	2025-04-03 03:12:29	23MCA10303	3
4	Binary Tree implementation doubt	2025-04-03 03:12:29	23MCA10304	4
5	AI project group formation	2025-04-03 03:12:29	23BIT10305	5
6	Java inheritance example needed	2025-04-03 03:12:29	23BCA10306	6
7	Cybersecurity best practices	2025-04-03 03:12:29	23MCA10307	7
8	AWS deployment issues	2025-04-03 03:12:29	23BIT10308	8
9	Android Studio setup problem	2025-04-03 03:12:29	23BCA10309	9
10	Linux commands cheat sheet	2025-04-03 03:12:29	23MCA10310	10
11	Database normalization doubt	2025-04-03 03:12:29	23BIT10311	2
12	Web hosting recommendations?	2025-04-03 03:12:29	23BCA10312	3

11 rows in set (0.00 sec)

DCL Commands

Grant Command

-- Create users

```
CREATE USER 'professor'@'localhost' IDENTIFIED BY 'prof123';  
CREATE USER 'student'@'localhost' IDENTIFIED BY 'stud123';  
CREATE USER 'admin'@'localhost' IDENTIFIED BY 'admin123';
```

--View created users

```
SELECT user, host FROM mysql.user;
```

```
mysql> SELECT user, host FROM mysql.user;
```

user	host
admin	localhost
anubhav	localhost
mysql.infoschema	localhost
mysql.session	localhost
mysql.sys	localhost
professor	localhost
root	localhost
student	localhost

```
8 rows in set (0.00 sec)
```

-- Grant privileges to admin (full access)

```
GRANT ALL PRIVILEGES ON olms.*  
TO 'admin'@'localhost';
```

-- Grant privileges to professor

```
GRANT SELECT, INSERT, UPDATE, DELETE  
ON olms.Course TO 'professor'@'localhost';
```

```
GRANT SELECT, INSERT, UPDATE, DELETE  
ON olms.Assignment TO 'professor'@'localhost';
```

```
GRANT SELECT, INSERT, UPDATE  
ON olms.Assignment_submission TO 'professor'@'localhost';
```

```
GRANT SELECT, INSERT, UPDATE, DELETE  
ON olms.Course_exam TO 'professor'@'localhost';
```

```
GRANT SELECT, INSERT, UPDATE  
ON olms.Exam_result TO 'professor'@'localhost';
```

```
GRANT SELECT ON olms.Student TO 'professor'@'localhost';
```

```
GRANT SELECT ON olms.Enrollment TO 'professor'@'localhost';
```

-- Grant privileges to student

```
GRANT SELECT ON olms.Course TO 'student'@'localhost';
```

```
GRANT SELECT ON olms.Assignment TO 'student'@'localhost';
```

```
GRANT SELECT, INSERT ON olms.Assignment_submission  
TO 'student'@'localhost';
```

```
GRANT SELECT ON olms.Course_exam TO 'student'@'localhost';
```

```
GRANT SELECT ON olms.Exam_result TO 'student'@'localhost';
```

```
GRANT SELECT, INSERT ON olms.Forum_post TO 'student'@'localhost';
```

-- Show granted privileges

```
SHOW GRANTS FOR 'professor'@'localhost';
```

```
SHOW GRANTS FOR 'student'@'localhost';
```

```
SHOW GRANTS FOR 'admin'@'localhost';
```

```
mysql> SHOW GRANTS FOR 'professor'@'localhost';
+-----+
| Grants for professor@localhost |
+-----+
| GRANT USAGE ON *.* TO `professor`@`localhost` |
| GRANT SELECT, INSERT, UPDATE ON `olms`.`assignment_submission` TO `professor`@`localhost` |
| GRANT SELECT, INSERT, UPDATE, DELETE ON `olms`.`assignment` TO `professor`@`localhost` |
| GRANT SELECT, INSERT, UPDATE, DELETE ON `olms`.`course_exam` TO `professor`@`localhost` |
| GRANT SELECT, INSERT, UPDATE, DELETE ON `olms`.`course` TO `professor`@`localhost` |
| GRANT SELECT ON `olms`.`enrollment` TO `professor`@`localhost` |
| GRANT SELECT, INSERT, UPDATE ON `olms`.`exam_result` TO `professor`@`localhost` |
| GRANT SELECT ON `olms`.`student` TO `professor`@`localhost` |
+-----+
8 rows in set (0.00 sec)

mysql> SHOW GRANTS FOR 'student'@'localhost';
+-----+
| Grants for student@localhost |
+-----+
| GRANT USAGE ON *.* TO `student`@`localhost` |
| GRANT SELECT, INSERT ON `olms`.`assignment_submission` TO `student`@`localhost` |
| GRANT SELECT ON `olms`.`assignment` TO `student`@`localhost` |
| GRANT SELECT ON `olms`.`course_exam` TO `student`@`localhost` |
| GRANT SELECT ON `olms`.`course` TO `student`@`localhost` |
| GRANT SELECT ON `olms`.`exam_result` TO `student`@`localhost` |
| GRANT SELECT, INSERT ON `olms`.`forum_post` TO `student`@`localhost` |
+-----+
7 rows in set (0.00 sec)

mysql> SHOW GRANTS FOR 'admin'@'localhost';
+-----+
| Grants for admin@localhost |
+-----+
| GRANT USAGE ON *.* TO `admin`@`localhost` |
| GRANT ALL PRIVILEGES ON `olms`.* TO `admin`@`localhost` |
+-----+
2 rows in set (0.00 sec)
```

-- Testing Users

Note: run the following commands in powershell

-- Login as professor

```
mysql -u professor -p
```

-- Test professor privileges

```
SELECT * FROM olms.Course; -- Should work
```

```
DELETE FROM olms.Student; -- Should fail
```

UPDATE olms.Assignment_submission SET Grade = 'A'; -- *Should work*

```
PS C:\Users\Anubhav Ghosh> mysql -u professor -p
Enter password: *****
```

```
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 10
Server version: 8.0.40 MySQL Community Server - GPL
```

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Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

```
mysql> SELECT * FROM olms.Course;
```

Course_id	Course_name	Description	Emp_id
1	Introduction to Programming	Basic programming concepts using Python	1
2	Calculus I	Fundamental concepts of differential and integral calculus	2
3	Quantum Physics	Introduction to quantum mechanics and its applications	3
4	Organic Chemistry	Study of carbon compounds and reactions	4
5	Modern Indian Literature	Exploration of contemporary Indian literary works	5
6	Microeconomics	Study of market behavior of individuals and firms	6
7	Thermodynamics	Principles of energy transfer and work	7
8	Molecular Biology	Study of cellular processes and DNA	8
9	Ancient Indian Civilization	Exploring the Indus Valley and Vedic periods	9
10	Contemporary Art	Modern and post-modern art movements in India	10
11	Python Programming	Introduction to Python programming language	1
12	Database Management	Fundamentals of DBMS and SQL	2
13	Web Development	HTML, CSS, and JavaScript basics	3
14	Data Structures	Advanced data structures and algorithms	4
15	Artificial Intelligence	Basics of AI and Machine Learning	5
16	Java Programming	Core Java and OOP concepts	6
17	Network Security	Fundamentals of cybersecurity	7
18	Cloud Architecture	AWS and Azure fundamentals	8
19	Mobile App Development	Android and iOS development	9
20	Operating Systems	OS concepts and administration	10

20 rows in set (0.02 sec)

```
mysql> DELETE FROM olms.Student;
```

```
ERROR 1142 (42000): DELETE command denied to user 'professor'@'localhost' for table 'student'
```

```
mysql> UPDATE olms.Assignment_submission SET Grade = 'A';
```

```
Query OK, 10 rows affected (0.01 sec)
```

```
Rows matched: 12  Changed: 10  Warnings: 0
```

```
mysql> select * from olms.Assignment_submission;
```

Submission_id	Submission_date	Grade	Assignment_id	Uid
1	2024-03-25	A	1	23BCA10301
2	2024-03-26	A	1	23BCA10302
3	2024-04-10	A	2	23MCA10303
4	2024-04-12	A	3	23MCA10304
5	2024-04-15	A	4	23BIT10305
6	2024-04-18	A	5	23BCA10306
7	2024-04-20	A	6	23MCA10307
8	2024-04-22	A	7	23BIT10308
9	2024-04-25	A	8	23BCA10309
10	2024-04-28	A	9	23MCA10310
11	2024-05-01	A	10	23MCA10307
12	2024-05-03	A	1	23BIT10308

12 rows in set (0.00 sec)

-- Login as student

mysql -u student -p

-- Test student privileges

SELECT * FROM olms.Course; -- *Should work*

INSERT INTO olms.Course VALUES
(21,'OOPs','Object Oriented Programming',2); -- *Should fail*

SELECT * FROM olms.Assignment; -- *Should work*

```
PS C:\Users\Anubhav Ghosh> mysql -u student -p
Enter password: *****
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 14
Server version: 8.0.40 MySQL Community Server - GPL

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Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.
```

```
mysql> SELECT * FROM olms.Course;
```

Course_id	Course_name	Description	Emp_id
1	Introduction to Programming	Basic programming concepts using Python	1
2	Calculus I	Fundamental concepts of differential and integral calculus	2
3	Quantum Physics	Introduction to quantum mechanics and its applications	3
4	Organic Chemistry	Study of carbon compounds and reactions	4
5	Modern Indian Literature	Exploration of contemporary Indian literary works	5
6	Microeconomics	Study of market behavior of individuals and firms	6
7	Thermodynamics	Principles of energy transfer and work	7
8	Molecular Biology	Study of cellular processes and DNA	8
9	Ancient Indian Civilization	Exploring the Indus Valley and Vedic periods	9
10	Contemporary Art	Modern and post-modern art movements in India	10
11	Python Programming	Introduction to Python programming language	1
12	Database Management	Fundamentals of DBMS and SQL	2
13	Web Development	HTML, CSS, and JavaScript basics	3
14	Data Structures	Advanced data structures and algorithms	4
15	Artificial Intelligence	Basics of AI and Machine Learning	5
16	Java Programming	Core Java and OOP concepts	6
17	Network Security	Fundamentals of cybersecurity	7
18	Cloud Architecture	AWS and Azure fundamentals	8
19	Mobile App Development	Android and iOS development	9
20	Operating Systems	OS concepts and administration	10

```
20 rows in set (0.00 sec)
```

```
mysql> INSERT INTO olms.Course VALUES
-> (21,'OOPs','Object Oriented Programming',2);
ERROR 1142 (42000): INSERT command denied to user 'student'@'localhost' for table 'course'
```

```
mysql> SELECT * FROM olms.Assignment;
```

Assignment_id	Title	Description	Due_date	Course_id
1	Python Basics	Create a simple calculator using Python	2023-06-15	1
2	Integration Problems	Solve 10 integration problems from Chapter 5	2023-06-20	2
3	Quantum States	Write a paper on quantum states and probabilities	2023-06-25	3
4	Synthesis of Aspirin	Lab report on aspirin synthesis experiment	2023-06-18	4
5	Book Review	Review of "The God of Small Things" by Arundhati Roy	2023-06-22	5
6	Market Analysis	Analyze a local market using microeconomic principles	2023-06-17	6
7	Heat Engine Design	Design a theoretical heat engine with maximum efficiency	2023-06-23	7
8	DNA Extraction	Lab report on DNA extraction and analysis	2023-06-19	8
9	Historical Essay	Essay on the impact of Ashokan edicts on Indian governance	2023-06-24	9
10	Art Portfolio	Create a portfolio inspired by contemporary Indian artists	2023-06-21	10
11	Python Basics	Create a simple calculator program	2024-03-30	1
12	SQL Queries	Write complex SQL queries	2024-04-15	2
13	HTML Portfolio	Create a personal portfolio website	2024-04-20	3
14	DSA Project	Implement a balanced BST	2024-04-25	4
15	AI Model	Build a simple classification model	2024-05-01	5
16	Java Classes	Create a library management system	2024-05-05	6
17	Security Audit	Perform security assessment	2024-05-10	7
18	Cloud Deploy	Deploy application on AWS	2024-05-15	8
19	Android App	Create a todo list app	2024-05-20	9
20	Shell Script	Write backup automation script	2024-05-25	10

```
20 rows in set (0.01 sec)
```

Revoke Command

-- Revoke specific privileges

```
REVOKE DELETE ON olms.Assignment_submission
FROM 'professor'@'localhost';
```

```
mysql> SHOW GRANTS FOR 'professor'@'localhost';
```

Grants for professor@localhost
GRANT USAGE ON *.* TO 'professor'@'localhost'
GRANT SELECT, INSERT, UPDATE ON 'olms`.`assignment_submission` TO 'professor'@'localhost'
GRANT SELECT, INSERT, UPDATE, DELETE ON 'olms`.`assignment` TO 'professor'@'localhost'
GRANT SELECT, INSERT, UPDATE, DELETE ON 'olms`.`course_exam` TO 'professor'@'localhost'
GRANT SELECT, INSERT, UPDATE, DELETE ON 'olms`.`course` TO 'professor'@'localhost'
GRANT SELECT ON 'olms`.`enrollment` TO 'professor'@'localhost'
GRANT SELECT, INSERT, UPDATE ON 'olms`.`exam_result` TO 'professor'@'localhost'
GRANT SELECT ON 'olms`.`student` TO 'professor'@'localhost'

```
8 rows in set (0.00 sec)
```

```
REVOKE INSERT ON olms.Forum_post  
FROM 'student'@'localhost';
```

```
mysql> SHOW GRANTS FOR 'student'@'localhost';
```

```
+-----+  
| Grants for student@localhost  
+-----+  
| GRANT USAGE ON *.* TO `student`@`localhost`  
| GRANT SELECT, INSERT ON `olms`.`assignment_submission` TO `student`@`localhost`  
| GRANT SELECT ON `olms`.`assignment` TO `student`@`localhost`  
| GRANT SELECT ON `olms`.`course_exam` TO `student`@`localhost`  
| GRANT SELECT ON `olms`.`course` TO `student`@`localhost`  
| GRANT SELECT ON `olms`.`exam_result` TO `student`@`localhost`  
| GRANT SELECT ON `olms`.`forum_post` TO `student`@`localhost`  
+-----+
```

```
7 rows in set (0.00 sec)
```

```
-- Revoke all privileges
```

```
REVOKE ALL PRIVILEGES ON olms.*  
FROM 'student'@'localhost';
```


TCL Commands

Commit Command

-- START TRANSACTION with COMMIT

START TRANSACTION;

INSERT INTO Course (Course_name, Description, Emp_id)
VALUES ('Blockchain Technology', 'Introduction to cryptocurrency and
blockchain', 1);

COMMIT;

```
mysql> START TRANSACTION;  
Query OK, 0 rows affected (0.00 sec)
```

```
mysql> INSERT INTO Course (Course_name, Description, Emp_id)  
-> VALUES ('Blockchain Technology', 'Introduction to cryptocurrency and blockchain', 1);  
Query OK, 1 row affected (0.00 sec)
```

```
mysql> SELECT * FROM Course  
-> ORDER BY Course_id DESC  
-> LIMIT 5;
```

Course_id	Course_name	Description	Emp_id
26	Blockchain Technology	Introduction to cryptocurrency and blockchain	1
20	Operating Systems	OS concepts and administration	10
19	Mobile App Development	Android and iOS development	9
18	Cloud Architecture	AWS and Azure fundamentals	8
17	Network Security	Fundamentals of cybersecurity	7

```
5 rows in set (0.00 sec)
```

```
mysql> commit;  
Query OK, 0 rows affected (0.02 sec)
```

```
mysql> SELECT * FROM Course  
-> ORDER BY Course_id DESC  
-> LIMIT 5;
```

Course_id	Course_name	Description	Emp_id
26	Blockchain Technology	Introduction to cryptocurrency and blockchain	1
20	Operating Systems	OS concepts and administration	10
19	Mobile App Development	Android and iOS development	9
18	Cloud Architecture	AWS and Azure fundamentals	8
17	Network Security	Fundamentals of cybersecurity	7

```
5 rows in set (0.00 sec)
```

Rollback Command

START TRANSACTION;

```
-- Update a student's grade
```

```
UPDATE Assignment_submission SET Grade = 'B+'  
WHERE Assignment_id = 5;
```

```
-- Check if we want to keep this change
```

```
-- If we don't like the change, we can rollback
```

ROLLBACK;

```
mysql> START TRANSACTION;
Query OK, 0 rows affected (0.00 sec)
```

```
mysql> UPDATE Assignment_submission SET Grade = 'B+' WHERE Assignment_id = 5;
Query OK, 1 row affected (0.01 sec)
Rows matched: 1  Changed: 1  Warnings: 0
```

```
mysql> select * from Assignment_submission;
```

Submission_id	Submission_date	Grade	Assignment_id	Uid
1	2024-03-25	A	1	23BCA10301
2	2024-03-26	A	1	23BCA10302
3	2024-04-10	A	2	23MCA10303
4	2024-04-12	A	3	23MCA10304
5	2024-04-15	A	4	23BIT10305
6	2024-04-18	B+	5	23BCA10306
7	2024-04-20	A	6	23MCA10307
8	2024-04-22	A	7	23BIT10308
9	2024-04-25	A	8	23BCA10309
10	2024-04-28	A	9	23MCA10310
11	2024-05-01	A	10	23MCA10307
12	2024-05-03	A	1	23BIT10308

```
12 rows in set (0.00 sec)
```

```
mysql> ROLLBACK;
```

```
Query OK, 0 rows affected (0.01 sec)
```

```
mysql> select * from Assignment_submission;
```

Submission_id	Submission_date	Grade	Assignment_id	Uid
1	2024-03-25	A	1	23BCA10301
2	2024-03-26	A	1	23BCA10302
3	2024-04-10	A	2	23MCA10303
4	2024-04-12	A	3	23MCA10304
5	2024-04-15	A	4	23BIT10305
6	2024-04-18	A	5	23BCA10306
7	2024-04-20	A	6	23MCA10307
8	2024-04-22	A	7	23BIT10308
9	2024-04-25	A	8	23BCA10309
10	2024-04-28	A	9	23MCA10310
11	2024-05-01	A	10	23MCA10307
12	2024-05-03	A	1	23BIT10308

```
12 rows in set (0.00 sec)
```

Savepoint Command

START TRANSACTION;

INSERT INTO Student (Uid, First_name, Last_name, Contact_no,
Graduation_year)
VALUES ('23BCA10313', 'Rohan', 'Mehta', '9898989813', 2026);

SAVEPOINT after_student_insert;

INSERT INTO Enrollment (Course_id, Uid)
VALUES (1, '23BCA10313'), (2, '23BCA10313');

SAVEPOINT after_enrollment;

INSERT INTO Forum_post (Post_content, Uid, Course_id)
VALUES ('Hello everyone! New to the course.', '23BCA10313', 1);

ROLLBACK TO after_student_insert;

COMMIT;

```

mysql> START TRANSACTION;
Query OK, 0 rows affected (0.00 sec)

mysql> INSERT INTO Student (Uid, First_name, Last_name, Contact_no, Graduation_year)
-> VALUES ('23BCA10313', 'Rohan', 'Mehta', '9898989813', 2026);
Query OK, 1 row affected (0.01 sec)

mysql> SAVEPOINT after_student_insert;
Query OK, 0 rows affected (0.00 sec)

mysql> INSERT INTO Enrollment (Course_id, Uid) VALUES (1, '23BCA10313'), (2, '23BCA10313');
Query OK, 2 rows affected (0.00 sec)
Records: 2 Duplicates: 0 Warnings: 0

mysql>
mysql> SAVEPOINT after_enrollment;
Query OK, 0 rows affected (0.00 sec)

mysql> INSERT INTO Forum_post (Post_content, Uid, Course_id)
-> VALUES ('Hello everyone! New to the course.', '23BCA10313', 1);
Query OK, 1 row affected (0.00 sec)

```

```
mysql> select * from Student;
```

Uid	First_name	Last_name	Contact_no	Graduation_year
23 ART 10313	Rohan	Nair	7432109876	NULL
23 BCA 10301	Rahul	Sharma	8765432109	NULL
23 BCA 10306	Ananya	Gupta	8210987654	NULL
23 BIO 10311	Aditya	Verma	7654321098	NULL
23 BIO 10316	Kavita	Tiwari	7109876543	NULL
23 CHM 10304	Neha	Singh	8432109876	NULL
23 ECO 10309	Karan	Kapoor	7876543210	NULL
23 ECO 10314	Anjali	Menon	7321098765	NULL
23 ENG 10305	Vikram	Malhotra	8321098765	NULL
23 HIS 10312	Pooja	Choudhary	7543210987	NULL
23 MEC 10310	Meera	Desai	7765432109	NULL
23 MEC 10315	Siddharth	Bose	7210987654	NULL
23 MTH 10302	Priya	Patel	8654321098	NULL
23 MTH 10307	Raj	Kumar	8109876543	NULL
23 PHY 10303	Arjun	Reddy	8543210987	NULL
23 PHY 10308	Divya	Joshi	8987654321	NULL
23BCA10301	Aarav	Sharma	9898989801	2026
23BCA10302	Diya	Patel	9898989802	2026
23BCA10306	Ishaan	Malhotra	9898989806	2026
23BCA10309	Riya	Gupta	9898989809	2026
23BCA10312	Vivaan	Choudhury	9898989812	2026
23BCA10313	Rohan	Mehta	9898989813	2026
23BIT10305	Advait	Verma	9898989805	2026
23BIT10308	Vihaan	Reddy	9898989808	2026
23BIT10311	Aisha	Joshi	9898989811	2026
23MCA10303	Arjun	Kumar	9898989803	2025
23MCA10304	Ananya	Singh	9898989804	2025
23MCA10307	Zara	Kapoor	9898989807	2025
23MCA10310	Kabir	Mehra	9898989810	2025

```
29 rows in set (0.00 sec)
```

```
mysql> select * from Enrollment ORDER BY Enrollment_id DESC LIMIT 5;
```

Enrollment_id	Enrollment_date	Course_id	Uid
44	2025-04-04	2	23BCA10313
43	2025-04-04	1	23BCA10313
42	2025-04-03	3	23MCA10310
41	2025-04-03	9	23MCA10310
40	2025-04-03	2	23BCA10309

5 rows in set (0.00 sec)

```
mysql> select * from Forum_post;
```

Post_id	Post_content	Post_date	Uid	Course_id
2	Sharing my SQL assignment approach	2025-04-03 03:12:29	23BCA10302	2
3	HTML vs CSS discussion	2025-04-03 03:12:29	23MCA10303	3
4	Binary Tree implementation doubt	2025-04-03 03:12:29	23MCA10304	4
5	AI project group formation	2025-04-03 03:12:29	23BIT10305	5
6	Java inheritance example needed	2025-04-03 03:12:29	23BCA10306	6
7	Cybersecurity best practices	2025-04-03 03:12:29	23MCA10307	7
8	AWS deployment issues	2025-04-03 03:12:29	23BIT10308	8
9	Android Studio setup problem	2025-04-03 03:12:29	23BCA10309	9
10	Linux commands cheat sheet	2025-04-03 03:12:29	23MCA10310	10
11	Database normalization doubt	2025-04-03 03:12:29	23BIT10311	2
12	Web hosting recommendations?	2025-04-03 03:12:29	23BCA10312	3
13	Hello everyone! New to the course.	2025-04-04 00:43:38	23BCA10313	1

12 rows in set (0.00 sec)

```
mysql> ROLLBACK TO after_student_insert;
```

Query OK, 0 rows affected (0.00 sec)

```
mysql> select * from Enrollment ORDER BY Enrollment_id DESC LIMIT 5;
```

Enrollment_id	Enrollment_date	Course_id	Uid
42	2025-04-03	3	23MCA10310
41	2025-04-03	9	23MCA10310
40	2025-04-03	2	23BCA10309
39	2025-04-03	8	23BCA10309
38	2025-04-03	1	23BIT10308

5 rows in set (0.00 sec)

```
mysql> select * from Forum_post;
```

Post_id	Post_content	Post_date	Uid	Course_id
2	Sharing my SQL assignment approach	2025-04-03 03:12:29	23BCA10302	2
3	HTML vs CSS discussion	2025-04-03 03:12:29	23MCA10303	3
4	Binary Tree implementation doubt	2025-04-03 03:12:29	23MCA10304	4
5	AI project group formation	2025-04-03 03:12:29	23BIT10305	5
6	Java inheritance example needed	2025-04-03 03:12:29	23BCA10306	6
7	Cybersecurity best practices	2025-04-03 03:12:29	23MCA10307	7
8	AWS deployment issues	2025-04-03 03:12:29	23BIT10308	8
9	Android Studio setup problem	2025-04-03 03:12:29	23BCA10309	9
10	Linux commands cheat sheet	2025-04-03 03:12:29	23MCA10310	10
11	Database normalization doubt	2025-04-03 03:12:29	23BIT10311	2
12	Web hosting recommendations?	2025-04-03 03:12:29	23BCA10312	3

11 rows in set (0.00 sec)

Aggregate Function

-- *COUNT: Count the total number of students enrolled in each course*

```
SELECT c.Course_name, COUNT(e.Uid) as Total_Students
FROM Course c
LEFT JOIN Enrollment e ON c.Course_id = e.Course_id
GROUP BY c.Course_name;
```

```
mysql> SELECT c.Course_name, COUNT(e.Uid) as Total_Students
-> FROM Course c
-> LEFT JOIN Enrollment e ON c.Course_id = e.Course_id
-> GROUP BY c.Course_name;
```

Course_name	Total_Students
Ancient Indian Civilization	4
Artificial Intelligence	0
Blockchain Technology	0
Calculus I	5
Cloud Architecture	0
Contemporary Art	3
Data Structures	0
Database Management	0
Introduction to Programming	6
Java Programming	0
Microeconomics	4
Mobile App Development	0
Modern Indian Literature	3
Molecular Biology	4
Network Security	0
Operating Systems	0
Organic Chemistry	4
Python Programming	0
Quantum Physics	5
Thermodynamics	4
Web Development	0

21 rows in set (0.01 sec)

-- SUM: Calculate total marks obtained by each student across all exams

```
SELECT s.First_name, s.Last_name, SUM(er.Marks_obtained) as Total_Marks
FROM Student s
JOIN Exam_result er ON s.Uid = er.Uid
GROUP BY s.Uid, s.First_name, s.Last_name;
```

```
mysql> SELECT s.First_name, s.Last_name, SUM(er.Marks_obtained) as Total_Marks
-> FROM Student s
-> JOIN Exam_result er ON s.Uid = er.Uid
-> GROUP BY s.Uid, s.First_name, s.Last_name;
```

First_name	Last_name	Total_Marks
Aarav	Sharma	85.5
Diya	Patel	92
Arjun	Kumar	88.5
Ananya	Singh	95
Advait	Verma	87.5
Ishaan	Malhotra	91
Zara	Kapoor	89.5
Vihaan	Reddy	93.5
Riya	Gupta	86
Kabir	Mehra	90.5
Aisha	Joshi	88
Vivaan	Choudhury	94.5

12 rows in set (0.01 sec)

-- AVG: Calculate average marks for each course

```
SELECT c.Course_name, AVG(er.Marks_obtained) as Average_Marks
FROM Course c
JOIN Exam_result er ON c.Course_id = er.Course_id
GROUP BY c.Course_name;
```



```
mysql> SELECT c.Course_name, AVG(er.Marks_obtained) as Average_Marks
-> FROM Course c
-> JOIN Exam_result er ON c.Course_id = er.Course_id
-> GROUP BY c.Course_name;
```

Course_name	Average_Marks
Introduction to Programming	90.66666666666667
Calculus I	88.5
Quantum Physics	95
Organic Chemistry	87.5
Modern Indian Literature	91
Microeconomics	89.5
Thermodynamics	93.5
Molecular Biology	86
Ancient Indian Civilization	90.5
Contemporary Art	88

10 rows in set (0.00 sec)

-- MAX: Find the highest marks obtained in each course

```
SELECT c.Course_name, MAX(er.Marks_obtained) as Highest_Marks
FROM Course c
JOIN Exam_result er ON c.Course_id = er.Course_id
GROUP BY c.Course_name;
```

```
mysql> -- MAX: Find the highest marks obtained in each course
mysql> SELECT c.Course_name, MAX(er.Marks_obtained) as Highest_Marks
-> FROM Course c
-> JOIN Exam_result er ON c.Course_id = er.Course_id
-> GROUP BY c.Course_name;
```

Course_name	Highest_Marks
Introduction to Programming	94.5
Calculus I	88.5
Quantum Physics	95
Organic Chemistry	87.5
Modern Indian Literature	91
Microeconomics	89.5
Thermodynamics	93.5
Molecular Biology	86
Ancient Indian Civilization	90.5
Contemporary Art	88

10 rows in set (0.00 sec)

-- MIN: Find the lowest marks obtained in each course

```
SELECT c.Course_name, MIN(er.Marks_obtained) as Lowest_Marks
FROM Course c
JOIN Exam_result er ON c.Course_id = er.Course_id
GROUP BY c.Course_name;
```

```
mysql> -- MIN: Find the lowest marks obtained in each course
mysql> SELECT c.Course_name, MIN(er.Marks_obtained) as Lowest_Marks
-> FROM Course c
-> JOIN Exam_result er ON c.Course_id = er.Course_id
-> GROUP BY c.Course_name;
```

Course_name	Lowest_Marks
Introduction to Programming	85.5
Calculus I	88.5
Quantum Physics	95
Organic Chemistry	87.5
Modern Indian Literature	91
Microeconomics	89.5
Thermodynamics	93.5
Molecular Biology	86
Ancient Indian Civilization	90.5
Contemporary Art	88

```
10 rows in set (0.00 sec)
```

-- GROUP_CONCAT: List all students enrolled in each course

```
SELECT c.Course_name,
```

```

GROUP_CONCAT(CONCAT(s.First_name, ' ', s.Last_name) SEPARATOR ', ') as
Enrolled_Students
FROM Course c
JOIN Enrollment e ON c.Course_id = e.Course_id
JOIN Student s ON e.Uid = s.Uid
GROUP BY c.Course_name;

```

```
mysql> -- GROUP_CONCAT: List all students enrolled in each course
```

```

mysql> SELECT c.Course_name,
-> GROUP_CONCAT(CONCAT(s.First_name, ' ', s.Last_name) SEPARATOR ', ') as Enrolled_Students
-> FROM Course c
-> JOIN Enrollment e ON c.Course_id = e.Course_id
-> JOIN Student s ON e.Uid = s.Uid
-> GROUP BY c.Course_name;

```

Course_name	Enrolled_Students
Ancient Indian Civilization	Ishaan Malhotra, Rahul Sharma, Pooja Choudhary, Kabir Mehra
Calculus I	Arjun Kumar, Rahul Sharma, Raj Kumar, Aarav Sharma, Riya Gupta
Contemporary Art	Priya Patel, Zara Kapoor, Rohan Nair
Introduction to Programming	Ananya Gupta, Priya Patel, Aarav Sharma, Diya Patel, Vihaan Reddy, Rahul Sharma
Microeconomics	Karan Kapoor, Anjali Menon, Arjun Kumar, Zara Kapoor
Modern Indian Literature	Arjun Kumar, Vikram Malhotra, Ishaan Malhotra
Molecular Biology	Kavita Tiwari, Riya Gupta, Advait Verma, Aditya Verma
Organic Chemistry	Neha Singh, Advait Verma, Diya Patel, Priya Patel
Quantum Physics	Arjun Reddy, Divya Joshi, Aarav Sharma, Ananya Singh, Kabir Mehra
Thermodynamics	Meera Desai, Siddharth Bose, Vihaan Reddy, Ananya Singh

```
10 rows in set (0.02 sec)
```

Views in MySQL

-- This view joins Course and Instructor tables to show course details with instructor information

```
CREATE VIEW course_details AS
SELECT
    c.Course_id,
    c.Course_name,
    c.Description,
    i.Department AS Instructor_Department,
    i.Contact_no AS Instructor_Contact
FROM Course c
JOIN Instructor i ON c.Emp_id = i.id;
```

-- Shows total number of students in each course

```
CREATE VIEW course_statistics AS
SELECT
    c.Course_name,
    COUNT(e.Uid) AS Total_Students
FROM Course c
LEFT JOIN Enrollment e ON c.Course_id = e.Course_id
GROUP BY c.Course_name;
```

-- Query to show all create view

SHOW FULL TABLES

IN olms

WHERE TABLE_TYPE LIKE 'VIEW';

```
mysql> SHOW FULL TABLES IN olms WHERE TABLE_TYPE LIKE 'VIEW';
```

Tables_in_olms	Table_type
course_details	VIEW
course_statistics	VIEW

2 rows in set (0.00 sec)

-- Query the course_statistics view

SELECT * FROM course_statistics;

```
mysql> SELECT * FROM course_statistics;
```

Course_name	Total_Students
Ancient Indian Civilization	4
Artificial Intelligence	0
Blockchain Technology	0
Calculus I	5
Cloud Architecture	0
Contemporary Art	3
Data Structures	0
Database Management	0
Introduction to Programming	6
Java Programming	0
Microeconomics	4
Mobile App Development	0
Modern Indian Literature	3
Molecular Biology	4
Network Security	0
Operating Systems	0
Organic Chemistry	4
Python Programming	0
Quantum Physics	5
Thermodynamics	4
Web Development	0

-- Query the course_details view

SELECT * FROM course_details;

```
mysql> SELECT * FROM course_details;
```

Course_id	Course_name	Description	Instructor_Department	Instructor_Contact
1	Introduction to Programming	Basic programming concepts using Python	Computer Science	9876543210
2	Calculus I	Fundamental concepts of differential and integral calculus	Mathematics	9765432109
3	Quantum Physics	Introduction to quantum mechanics and its applications	Physics	9654321098
4	Organic Chemistry	Study of carbon compounds and reactions	Chemistry	9543210987
5	Modern Indian Literature	Exploration of contemporary Indian literary works	English Literature	9432109876
6	Microeconomics	Study of market behavior of individuals and firms	Economics	9321098765
7	Thermodynamics	Principles of energy transfer and work	Mechanical Engineering	9210987654
8	Molecular Biology	Study of cellular processes and DNA	Biotechnology	9109876543
9	Ancient Indian Civilization	Exploring the Indus Valley and Vedic periods	History	9098765432
10	Contemporary Art	Modern and post-modern art movements in India	Fine Arts	9987654321
11	Python Programming	Introduction to Python programming language	Computer Science	9876543210
12	Database Management	Fundamentals of DBMS and SQL	Mathematics	9765432109
13	Web Development	HTML, CSS, and JavaScript basics	Physics	9654321098
14	Data Structures	Advanced data structures and algorithms	Chemistry	9543210987
15	Artificial Intelligence	Basics of AI and Machine Learning	English Literature	9432109876
16	Java Programming	Core Java and OOP concepts	Economics	9321098765
17	Network Security	Fundamentals of cybersecurity	Mechanical Engineering	9210987654
18	Cloud Architecture	AWS and Azure fundamentals	Biotechnology	9109876543
19	Mobile App Development	Android and iOS development	History	9098765432
20	Operating Systems	OS concepts and administration	Fine Arts	9987654321
26	Blockchain Technology	Introduction to cryptocurrency and blockchain	Computer Science	9876543210

21 rows in set (0.00 sec)

-- Drop View

SELECT * FROM course_details;

```
mysql> DROP VIEW IF EXISTS course_details;
Query OK, 0 rows affected (0.01 sec)
```

```
mysql> SHOW FULL TABLES IN olms WHERE TABLE_TYPE LIKE 'VIEW';
```

Tables_in_olms	Table_type
course_statistics	VIEW

1 row in set (0.00 sec)

Conclusion

The OLMS database project shows how to build an online system for managing education. It includes important database ideas while keeping it easy to scalability, security, and performance. This project helps understand database management and can be used in online education systems.

Good database design, security, and powerful search features make this project useful for learning and school management. Its simple structure makes it easy to update and improve in the future, making it a long-term solution for schools.



Learning Outcomes

1. Database Design

- ✓ Understanding of entity-relationship modeling
- ✓ Normalization principles
- ✓ Schema design best practices

2. SQL Proficiency

- ✓ DDL, DCL, and TCL command mastery
- ✓ Complex query writing
- ✓ Data manipulation and retrieval
- ✓ Aggregate function implementation

Conclusion

3. Security Awareness

- ✓ User management
- ✓ Access control
- ✓ Privilege management
- ✓ Data protection