Name : Hrithvik Kondalkar

Roll : 002211001088

***ER DIAGRAM***

HAS

7…7

HAS

0…\*

1…1

COURSE

IN

1…\*

1…1

ENROLLMENT

STUDENT

0.. \*

1…1

GRADE\_CARD

HAS

5..6

ENROLLED

0.. \*

1...\*

SUBJECTS

CREATE TABLE enrollments (

enrl\_id NUMBER(15) NOT NULL,

student\_id NUMBER(10) NOT NULL,

course\_id NUMBER(3) NOT NULL,

PRIMARY KEY (enrl\_id),

FOREIGN KEY (student\_id) REFERENCES students (student\_id) ON DELETE CASCADE,

FOREIGN KEY (course\_id) REFERENCES courses (course\_id)

ON DELETE CASCADE

);

CREATE TABLE enrollment\_subjects (

enrl\_id NUMBER(15) NOT NULL,

course\_id NUMBER(3) NOT NULL,

subject\_id NUMBER(3) NOT NULL,

PRIMARY KEY (enrl\_id, subject\_id),

FOREIGN KEY (enrl\_id) REFERENCES enrollments (enrl\_id) ON DELETE CASCADE,

FOREIGN KEY (course\_id,subject\_id) REFERENCES subjects (course\_id,subject\_id)

ON DELETE CASCADE

);

CREATE TABLE grades (

enrl\_id NUMBER(15) NOT NULL,

semester NUMBER(1) NOT NULL,

subject\_id NUMBER(3) NOT NULL,

subject\_marks NUMBER(4,1) NOT NULL,

PRIMARY KEY (enrl\_id, semester,subject\_id),

FOREIGN KEY (enrl\_id) REFERENCES enrollments (enrl\_id) ON DELETE CASCADE,

FOREIGN KEY (enrl\_id, subject\_id) REFERENCES enrollment\_subjects(enrl\_id, subject\_id)

ON DELETE CASCADE

);

.

***DATABASE SCHEMA***

CREATE TABLE students (

student\_id NUMBER(10) NOT NULL,

name VARCHAR(255) NOT NULL,

email VARCHAR(255) NOT NULL,

PRIMARY KEY (student\_id)

);

CREATE TABLE courses (

course\_id NUMBER(2) NOT NULL,

course\_name VARCHAR(255) NOT NULL,

max\_strength INT NOT NULL,

PRIMARY KEY (course\_id)

);

CREATE TABLE subjects (

course\_id NUMBER(2) NOT NULL,

subject\_id NUMBER(3) NOT NULL,

subject\_name VARCHAR(255) NOT NULL,

PRIMARY KEY (course\_id,subject\_id),

FOREIGN KEY (course\_id) REFERENCES courses(course\_id)

ON DELETE CASCADE

);

1. *Insert at least five tuples in each table.*

-- courses TABLE insertion

INSERT INTO courses VALUES (1, 'Math', 50);

INSERT INTO courses VALUES (2, 'History', 30);

INSERT INTO courses VALUES (3, 'Physics', 60);

INSERT INTO courses VALUES (4, 'English', 45);

INSERT INTO courses VALUES (5, 'Computer Science', 55);

-- subjects TABLE insertion for the first course (Math)

INSERT INTO subjects VALUES (1, 1, 'Algebra');

INSERT INTO subjects VALUES (1, 2, 'Geometry');

INSERT INTO subjects VALUES (1, 3, 'Calculus');

INSERT INTO subjects VALUES (1, 4, 'Statistics');

INSERT INTO subjects VALUES (1, 5, 'Linear Algebra');

INSERT INTO subjects VALUES (1, 6, 'Differential Equations');

INSERT INTO subjects VALUES (1, 7, 'Number Theory');

-- subjects TABLE insertion for the second course (History)

INSERT INTO subjects VALUES (2, 8, 'World History');

INSERT INTO subjects VALUES (2, 9, 'English Literature');

INSERT INTO subjects VALUES (2, 10, 'Ancient History');

INSERT INTO subjects VALUES (2, 19, 'Medivial History');

INSERT INTO subjects VALUES (2, 20, 'Cold War');

INSERT INTO subjects VALUES (2, 21, 'History elective 1');

INSERT INTO subjects VALUES (2, 22, 'History elective 2');

-- subjects TABLE insertion for the third course (Physics)

INSERT INTO subjects VALUES (3, 11, 'Classical Mechanics');

INSERT INTO subjects VALUES (3, 12, 'Electromagnetism');

INSERT INTO subjects VALUES (3, 6, 'Differential Equations');

INSERT INTO subjects VALUES (3, 4, 'Statistics');

INSERT INTO subjects VALUES (3, 2, 'Geometry');

INSERT INTO subjects VALUES (3, 18, 'Thermodynamics');

INSERT INTO subjects VALUES (3, 28, 'Fluid Mechanics');

-- subjects TABLE insertion for the fourth course (English)

INSERT INTO subjects VALUES (4, 9, 'English Literature');

INSERT INTO subjects VALUES (4, 13, 'Grammar');

INSERT INTO subjects VALUES (4, 23, 'Sociology');

INSERT INTO subjects VALUES (4, 24, 'Play writing');

INSERT INTO subjects VALUES (4, 25, 'Public speaking');

INSERT INTO subjects VALUES (4, 26, 'English elective 1');

INSERT INTO subjects VALUES (4, 27, 'English elective 2');

-- subjects TABLE insertion for the fifth course (Com)

INSERT INTO subjects VALUES (5, 14, 'Introduction to Object Oriented Programming');

INSERT INTO subjects VALUES (5, 15, 'Data Structures');

INSERT INTO subjects VALUES (5, 16, 'Computer Architecture');

INSERT INTO subjects VALUES (5, 17, 'Database Management');

INSERT INTO subjects VALUES (5, 3, 'Calculus');

INSERT INTO subjects VALUES (5, 5, 'Linear Algebra');

INSERT INTO subjects VALUES (5, 4, 'Statistics');

-- students TABLE insertion

INSERT INTO students (student\_id, name, email) VALUES (2022001, 'Sarah Johnson', 'sarah.j@gmail.com');

INSERT INTO students (student\_id, name, email) VALUES (2022002, 'Michael Brown', 'michael.b@gmail.com');

INSERT INTO students (student\_id, name, email) VALUES (2021001, 'Emily Davis', 'emily.d@gmail.com');

INSERT INTO students (student\_id, name, email) VALUES (2022003, 'Daniel Smith', 'daniel.s@gmail.com');

INSERT INTO students (student\_id, name, email) VALUES (2021002, 'Olivia Wilson', 'olivia.w@gmail.com');

INSERT INTO students (student\_id, name, email) VALUES (2021003, 'Liam Martinez', 'liam.m@gmail.com');

INSERT INTO students (student\_id, name, email) VALUES (2021004, 'Sophia Garcia', 'sophia.g@gmail.com');

INSERT INTO students (student\_id, name, email) VALUES (2022004, 'Matthew Lee', 'matthew.l@gmail.com');

INSERT INTO students (student\_id, name, email) VALUES (2022005, 'Ava Rodriguez', 'ava.r@gmail.com');

INSERT INTO students (student\_id, name, email) VALUES (2021005, 'Ethan Harris', 'ethan.h@gmail.com');

-- enrollments TABLE insertion

INSERT INTO enrollments (enrl\_id, student\_id, course\_id, enroll\_date ) VALUES (1001, 2021001, 1, '19-FEB-2021');

INSERT INTO enrollments (enrl\_id, student\_id, course\_id, enroll\_date ) VALUES (1002, 2021002, 2, '20-FEB-2021');

INSERT INTO enrollments (enrl\_id, student\_id, course\_id, enroll\_date ) VALUES (1003, 2021003, 3, '21-FEB-2021');

INSERT INTO enrollments (enrl\_id, student\_id, course\_id, enroll\_date ) VALUES (1004, 2021004, 3, '21-FEB-2021');

INSERT INTO enrollments (enrl\_id, student\_id, course\_id, enroll\_date ) VALUES (1005, 2021005, 5, '23-FEB-2021');

INSERT INTO enrollments (enrl\_id, student\_id, course\_id, enroll\_date ) VALUES (1006, 2022001, 1, '19-FEB-2022');

INSERT INTO enrollments (enrl\_id, student\_id, course\_id, enroll\_date ) VALUES (1007, 2022002, 4, '20-FEB-2022');

INSERT INTO enrollments (enrl\_id, student\_id, course\_id, enroll\_date ) VALUES (1008, 2022003, 3, '21-FEB-2022');

INSERT INTO enrollments (enrl\_id, student\_id, course\_id, enroll\_date ) VALUES (1009, 2022004, 5, '22-FEB-2022');

INSERT INTO enrollments (enrl\_id, student\_id, course\_id, enroll\_date ) VALUES (1010, 2022005, 5, '22-FEB-2022');

-- Add subjects to enrollment\_subjects for students

-- Student 2021001 (Emily Davis) enrolled in Math (course\_id 1)

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1001, 1, 1);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1001, 1, 2);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1001, 1, 3);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1001, 1, 4);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1001, 1, 5);

-- Student 2021002 (Olivia Wilson) enrolled in History (course\_id 2)

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1002, 2, 8);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1002, 2, 9);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1002, 2, 10);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1002, 2, 19);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1002, 2, 20);

-- Student 2021003 (Liam Martinez) enrolled in Physics (course\_id 3)

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1003, 3, 11);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1003, 3, 12);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1003, 3, 6);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1003, 3, 4);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1003, 3, 2);

-- Student 2021004 (Sophia Garcia) also enrolled in Physics (course\_id 3)

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1004, 3, 11);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1004, 3, 12);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1004, 3, 6);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1004, 3, 4);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1004, 3, 18);

-- Student 2021005 (Ethan Harris) enrolled in Computer Science (course\_id 5)

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1005, 5, 14);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1005, 5, 15);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1005, 5, 16);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1005, 5, 17);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1005, 5, 3);

-- Student 2022001 (Sarah Johnson) enrolled in Math (course\_id 1)

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1006, 1, 1);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1006, 1, 2);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1006, 1, 3);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1006, 1, 4);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1006, 1, 5);

-- Student 2022002 (Michael Brown) enrolled in English (course\_id 4)

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1007, 4, 9);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1007, 4, 13);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1007, 4, 23);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1007, 4, 24);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1007, 4, 25);

-- Student 2022003 (Daniel Smith) also enrolled in Physics (course\_id 3)

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1008, 3, 11);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1008, 3, 12);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1008, 3, 6);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1008, 3, 4);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1008, 3, 28);

-- Student 2022004 (Matthew Lee) also enrolled in Computer Science (course\_id 5)

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1009, 5, 14);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1009, 5, 15);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1009, 5, 16);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1009, 5, 17);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1009, 5, 3);

-- Student 2022005 (Ava Rodriguez) also enrolled in Computer Science (course\_id 5)

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1010, 5, 14);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1010, 5, 15);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1010, 5, 16);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1010, 5, 17);

INSERT INTO enrollment\_subjects (enrl\_id, course\_id, subject\_id) VALUES (1010, 5, 4);

-- Grades for Student 2021001 (Emily Davis)

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1001, 1, 1, 85.5);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1001, 1, 2, 78.0);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1001, 2, 3, 92.0);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1001, 2, 4, 88.5);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1001, 2, 5, 94.0);

-- Grades for Student 2021002 (Olivia Wilson)

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1002, 1, 8, 76.0);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1002, 1, 9, 82.5);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1002, 2, 10, 88.0);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1002, 2, 19, 90.5);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1002, 2, 20, 79.0);

-- Grades for Student 2021003 (Liam Martinez)

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1003, 1, 11, 95.0);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1003, 1, 12, 88.5);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1003, 2, 4, 91.0);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1003, 2, 2, 94.5);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1003, 2, 6, 85.0);

-- Grades for Student 2021004 (Sophia Garcia)

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1004, 1, 11, 90.0);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1004, 1, 12, 84.5);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1004, 2, 18, 92.5);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1004, 2, 4, 87.0);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1004, 2, 6, 86.5);

-- Grades for Student 2021005 (Ethan Harris)

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1005, 1, 14, 91.0);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1005, 1, 15, 86.5);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1005, 2, 3, 88.0);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1005, 2, 17, 92.5);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1005, 2, 16, 87.0);

-- Grades for Student 2022001 (Sarah Johnson)

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1006, 1, 1, 87.5);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1006, 1, 2, 84.0);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1006, 2, 3, 90.5);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1006, 2, 4, 88.0);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1006, 2, 5, 92.0);

-- Grades for Student 2022002 (Michael Brown)

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1007, 1, 9, 82.0);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1007, 1, 13, 76.5);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1007, 2, 24, 81.0);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1007, 2, 23, 88.0);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1007, 2, 25, 84.5);

-- Grades for Student 2022003 (Daniel Smith)

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1008, 1, 11, 88.0);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1008, 1, 12, 84.5);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1008, 2, 6, 92.5);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1008, 2, 4, 87.0);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1008, 2, 28, 86.5);

-- Grades for Student 2022004 (Matthew Lee)

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1009, 1, 14, 89.5);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1009, 1, 15, 87.0);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1009, 2, 3, 86.0);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1009, 2, 17, 91.5);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1009, 2, 16, 88.5);

-- Grades for Student 2022005 (Ava Rodriguez)

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1010, 1, 14, 92.0);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1010, 1, 15, 88.5);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1010, 2, 4, 87.0);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1010, 2, 17, 90.5);

INSERT INTO grades (enrl\_id, semester, subject\_id, subject\_marks) VALUES (1010, 2, 16, 88.0);

1. At the time of creation if we forget to create a field enrollment date (ENROLL\_DATE) in ENROLL table so add the field.

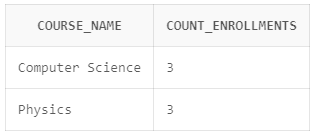
**ALTER TABLE enrollments ADD enroll\_date DATE;**

1. Course name cannot be blank, therefore add the criteria in the specific table.

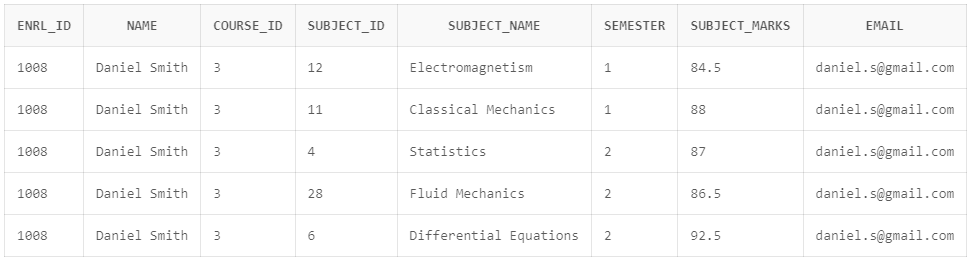
**ALTER TABLE courses ALTER COLUMN course\_name VARCHAR(255) NOT NULL;**

1. Find the Course which has 3 or more students.

**select course\_name, cnt count\_enrollments from(select course\_id, count(course\_id) cnt from enrollments group by course\_id) natural join courses ;**

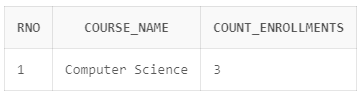


1. Give the details of a STUDENT with all Subjects and Grade where he/she enroll (Enter the sid value as input).

 **select enrl\_id, name, course\_id, subject\_id, subject\_name, semester, subject\_marks, email from enrollment\_subjects natural join grades natural join subjects natural join enrollments natural join students where enrl\_id = 1008 order by semester;**

1. Display the course where the maximum number of students enrols.

**select \* from (select row\_number() over(order by cnt desc) rno, course\_name, cnt count\_enrollments from(select course\_id, count(course\_id) cnt from enrollments group by course\_id) natural join courses) where rno=1;**



1. Find out the course where no student is enrolled.

**select \* from (select course\_id, count(course\_id) cnt from enrollments group by course\_id) natural left join courses where cnt = NULL;**



1. Delete Course no 30 from COURSE table.

**delete from course WHERE course\_id =30;**

1. Rename the COURSE table as DEPARTMENT.

**ALTER TABLE course RENAME TO department;**

1. Change the Marks of Students from “A” to “B” who is Enroll in the subject “Database Management”.