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ADBMS PRACTISE 4.2

- **CODE (Part-A):- Prevent Duplicate Enrollments Using Locking**

```

CREATE TABLE StudentEnrollments (
    enrollment_id INT PRIMARY KEY AUTO_INCREMENT,
    student_name VARCHAR(100),
    course_id VARCHAR(10),
    enrollment_date DATE,
    UNIQUE (student_name, course_id)
);
INSERT INTO StudentEnrollments (student_name, course_id,
enrollment_date)
VALUES ('Ashish', 'CSE101', CURDATE()),
      ('Smaran', 'CSE102', CURDATE()),
      ('Vaibhav', 'CSE101', CURDATE());
-- User 1 starts a transaction
START TRANSACTION;

```

```
INSERT INTO StudentEnrollments (student_name, course_id,  
enrollment_date)  
VALUES ('Varun', 'CSE101', CURDATE());
```

```
COMMIT;  
-- User 1 starts a transaction  
START TRANSACTION;
```

```
INSERT INTO StudentEnrollments (student_name, course_id,  
enrollment_date)  
VALUES ('Varun', 'CSE101', CURDATE());
```

```
ROLLBACK; --Rollbacks because of the duplication  
SELECT * FROM StudentEnrollments;
```

- **OUTPUT**

enrollment_id	student_name	course_id	enrollment_date
1	Ashish	CSE101	2025-09-19T00:00:00.000Z
2	Smaran	CSE102	2025-09-19T00:00:00.000Z
3	Vaibhav	CSE101	2025-09-19T00:00:00.000Z
7	Varun	CSE101	2025-09-19T00:00:00.000Z

- **CODE (Part-B):- Use SELECT FOR UPDATE to Lock Student Record Insertion**

```
START TRANSACTION;
```

```
SELECT * FROM StudentEnrollments  
WHERE student_name = 'Ashish' AND course_id = 'CSE101'  
FOR UPDATE;
```

```
START TRANSACTION;
```

```
-- User B tries to update the same row
```

```
UPDATE StudentEnrollments  
SET enrollment_date = DATE '2024-09-20'  
WHERE student_name = 'Ashish' AND course_id = 'CSE101';
```

- **OUTPUT**

User B will be blocked until User A finishes the transaction.

- **CODE (Part-C):- Demonstrate Locking Preserving Consistency in Concurrent Transactions**

```
-- User A starts a transaction
```

```
START TRANSACTION;
```

```
SELECT * FROM StudentEnrollments  
WHERE student_name = 'Ashish' AND course_id = 'CSE101'  
FOR UPDATE;
```

```
UPDATE StudentEnrollments  
SET enrollment_date = '2024-07-02'
```

```
WHERE student_name = 'Ashish' AND course_id = 'CSE101';
```

```
START TRANSACTION;
```

```
-- User B attempts to update the same row
```

```
UPDATE StudentEnrollments
```

```
SET enrollment_date = '2024-07-03'
```

```
WHERE student_name = 'Ashish' AND course_id = 'CSE101';
```

```
-- User A commits the transaction
```

```
COMMIT;
```

```
-- User B commits the transaction
```

```
COMMIT;
```

- **Output:**

--Only the last transaction committed will be reflected.

enrollment_id	student_name	course_id	enrollment_date
1	Ashish	CSE101	2024-07-03T00:00:00.000Z
2	Smaran	CSE102	2025-09-19T00:00:00.000Z
3	Vaibhav	CSE101	2025-09-19T00:00:00.000Z
7	Varun	CSE101	2025-09-19T00:00:00.000Z