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CLASS	622-B

❖ 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;
```

```sql
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;
```

- Ouput:

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

--Only the last transaction committed will be reflected.