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Ans 4.2:

Code:

```
DROP TABLE IF EXISTS StudentEnrollments;
```

```
CREATE TABLE StudentEnrollments (
    enrollment_id INT PRIMARY KEY,
    student_name VARCHAR(100) NOT NULL,
    course_id VARCHAR(10) NOT NULL,
    enrollment_date DATE NOT NULL,
    CONSTRAINT unique_student_course UNIQUE (student_name,
course_id) -- ensures uniqueness
) ENGINE=InnoDB;
```

```
INSERT INTO StudentEnrollments VALUES
```

```
(1, 'Ashish', 'CSE101', '2024-07-01'),
(2, 'Smaran', 'CSE102', '2024-07-01'),
(3, 'Vaibhav', 'CSE101', '2024-07-01');
```

-- Part A

START TRANSACTION;

INSERT INTO StudentEnrollments VALUES (4, 'Ashish', 'CSE101', '2024-07-02'); -- duplicate

COMMIT;

--PART B

--USER A

START TRANSACTION;

SELECT * FROM StudentEnrollments

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

FOR UPDATE;

--user B

START TRANSACTION;

UPDATE StudentEnrollments

SET enrollment_date = '2024-07-05'

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

COMMIT;

-- Now User B's query executes and updates the row.

COMMIT;

SELECT * FROM StudentEnrollments;

--PART C

--USER A

```
START TRANSACTION;
UPDATE StudentEnrollments
SET enrollment_date = '2024-07-10'
WHERE enrollment_id = 1;
-- Not committed yet
```

```
--USER B
UPDATE StudentEnrollments
SET enrollment_date = '2024-07-15'
WHERE enrollment_id = 1;
COMMIT;
```

```
SELECT * FROM StudentEnrollments WHERE enrollment_id = 1
```

```
START TRANSACTION;
SELECT * FROM StudentEnrollments WHERE enrollment_id = 1 FOR
UPDATE;
UPDATE StudentEnrollments
SET enrollment_date = '2024-07-20'
WHERE enrollment_id = 1;
-- Keep open
```

```
-- User B tries to update (will be blocked until A commits):
UPDATE StudentEnrollments
SET enrollment_date = '2024-07-25'
WHERE enrollment_id = 1;
```

-- When User A commits:

COMMIT;

-- Now User B executes

COMMIT;

-- Final state remains consistent:

SELECT * FROM StudentEnrollments WHERE enrollment_id = 1;

(a) PART A

Error: Duplicate entry 'Ashish-CSE101' for key 'studentenrollments.unique_student_course'

(b) PART B

enrollment_id	student_name	course_id	enrollment_date
1	Ashish	CSE101	2024-07-01T00:00:00.000Z
2	Smaran	CSE102	2024-07-01T00:00:00.000Z
3	Vaibhav	CSE101	2024-07-01T00:00:00.000Z

(c) PART C

enrollment_id	student_name	course_id	enrollment_date
1	Ashish	CSE101	2024-07-25T00:00:00.000Z