**Lost Update**

T1: Student 111 Enrolls in 44560

T2: Student 222 Enrolls in 44560

We will look only at updates of the attribute enrolled in the Section table, currently at 35.

Serial Execution

|  |  |  |
| --- | --- | --- |
| Transaction | Action | Stored Value |
| T1 | Read enrolled | 35 |
| T1 | Increment enrolled by 1 (36) | 35 |
| T1 | Write enrolled | 36 |
| T2 | Read enrolled | 36 |
| T2 | Increment enrolled by 1 (37) | 36 |
| T2 | Write enrolled | 37 |

Lost update

|  |  |  |
| --- | --- | --- |
| Transaction | Action | Stored Value |
| T1 | Read enrolled | 35 |
| T2 | Read enrolled | 35 |
| T1 | Increment by 1 (36) | 35 |
| T2 | Increment by 1 (36) | 35 |
| T1 | Write enrolled | 36 |
| T2 | Write enrolled | 36 |

**Uncommitted data**

T1: Student 111 Enrolls in 44560, but then transaction is rolled back

T2: Student 222 Enrolls in 44560

We will look only at updates of the attribute enrolled in the Section table, currently at 35.

Serial Execution

|  |  |  |
| --- | --- | --- |
| Transaction | Action | Stored Value |
| T1 | Read enrolled | 35 |
| T1 | Increment enrolled by 1 (36) | 35 |
| T1 | Write enrolled | 36 |
| T1 | \*\*Rollback\*\* | 35 |
| T2 | Read enrolled | 35 |
| T2 | Increment enrolled by 1 (36) | 35 |
| T2 | Write enrolled | 36 |

Uncommited Data

|  |  |  |
| --- | --- | --- |
| Transaction | Action | Stored Value |
| T1 | Read enrolled | 35 |
| T1 | Increment enrolled by 1 (36) | 35 |
| T1 | Write enrolled | 36 |
| T2 | Read enrolled (uncommitted data) | 36 |
| T2 | Increment enrolled by 1 (37) | 36 |
| T1 | \*\*Rollback\*\* | 35 |
| T2 | Write enrolled | 37 |

**Inconsistent Retrievals**

T1 is finding the total number of seats available for all sections.

T2 is updating the seats available (decrement by 1) for section 23456

T3 is updating the seats available (decrement by 1) for section 56789.

Current contents of Section

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CRN** | **Capacity** | **Enrolled** | **Seats Available** | **CourseID** |
| 12345 | 30 | 15 | 15 | 44560 |
| 23456 | 45 | 35 | 10 | 44542 |
| 34567 | 35 | 30 | 5 | 44141 |
| 45678 | 25 | 20 | 5 | 44141 |
| 56789 | 30 | 10 | 20 | 44241 |
| 67890 | 20 | 15 | 5 | 44242 |

Total seats available = 60

After execution of T2 and T3, total seats available will be 58

Inconsistent retrieval

|  |  |  |  |
| --- | --- | --- | --- |
| **Transaction** | **Action** | **Value** | **Total** |
| T1 | Read Seats Available for CRN 12345 | 15 | 15 |
| T1 | Read Seats Available for CRN 23456 | 10 | 25 |
| T2 | Read Seats Available for CRN 23456 |  |  |
| T2 | Decrement Seats Available for CRN 23456 by 1 (9) |  |  |
| T2 | Write Seats Available for CRN 23456 |  |  |
| T2 | \*\* COMMIT \*\* |  |  |
| T3 | Read Seats Available for CRN 56789 |  |  |
| T3 | Decrement Seats Available for CRN 56789 by 1 (19) |  |  |
| T3 | Write Seats Available for CRN 56789 |  |  |
| T3 | \*\* COMMIT \*\* |  |  |
| T1 | Read Seats Available for CRN 34567 | 5 | 30 |
| T1 | Read Seats Available for 45678 | 5 | 35 |
| T1 | Read Seats Available for 56789 | 19 | 54 |
| T1 | Read Seats Available for 67890 | 5 | 59 |