**Student Course Enrollment (Practicle Example on Normalization)**

**Unnormalized:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **StudentID** | **StudentName** | **Courses** | **CourseID** | **InstructorName** |
| 101 | Alice | Math,History | 5001,5002 | Dr. Smith, Dr. Johnson |
| 102 | Bob | Math | 5001 | Dr. Smith |

**1NF:**

**Split multivalued:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **StudentID** | **StudentName** | **Courses** | **CourseID** | **InstructorName** |
| 101 | Alice | Math | 5001 | Dr. Smith |
| 101 | Alice | History | 5002 | Dr. Johnson |
| 102 | Bob | Math | 5001 | Dr. Smith |

**2NF:**

**Split composit keys**

|  |  |
| --- | --- |
| **StudentID** | **StudentName** |
| 101 | Alice |
| 102 | Bob |

|  |  |  |
| --- | --- | --- |
| **CourseID** | **Courses** | **InstructorName** |
| 5001 | Math | Dr. Smith |
| 5002 | History | Dr. Johnson |

|  |  |
| --- | --- |
| **StudentID** | **CourseID** |
| 101 | 5001 |
| 101 | 5002 |
| 102 | 5001 |

**3NF:**

**Separate any column than depend on columns other than primary key.**

InstructorName depends on CourseName.

|  |  |
| --- | --- |
| **CourseID** | **Courses** |
| 5001 | Math |
| 5002 | History |

|  |  |
| --- | --- |
| **CouseID** | **InstructorName** |
| 5001 | Dr. Smith |
| 5002 | Dr. Jhonson |