Hibernate
Many_To_Many Relationship

Overview

This document covers:

- What is a Many-To-Many relationship.
- How to implement Many-To-Many in Hibernate.
- Database impact and the role of the link table.
- Using the @ManyToMany annotation.
- Optimizing bidirectional relationships.

Many-To-Many Relationship

A many-to-many relationship occurs when multiple records in a table are associated with multiple records in another table.

Example Scenario:

- A Tutor can teach multiple Subjects.
- A Subject can be taught by multiple Tutors.
- This requires a link table to manage the associations.

Implementing Many-To-Many in Hibernate

To define a Many-To-Many relationship, we need collections in both entity classes.

Tutor Class:

```
@Entity
public class Tutor {
    @Id
    @GeneratedValue(strategy = GenerationType.IDENTITY)
    private Long id;
    private String name;
    @ManyToMany(mappedBy = "tutors")
    private Set<Subject> subjectsToTeach = new HashSet<>();

    public void addSubject(Subject subject) {
        this.subjectsToTeach.add(subject);
        }
  }
```

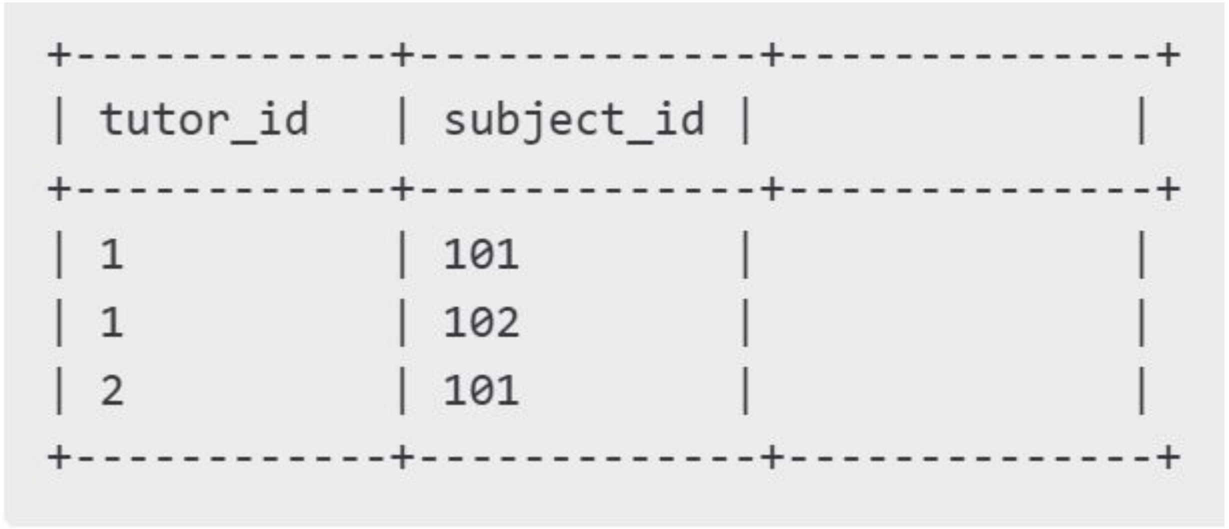
Implementing Many-To-Many in Hibernate

Subject Class:

```
@Entity

public class Subject {

    @Id

    @GeneratedValue(strategy = GenerationType.IDENTITY)

    private Long id;

    private String name;

    @ManyToMany

    private Set<Tutor> tutors = new HashSet<>();

}
```

What happens in the database?

Hibernate automatically creates a link table to manage the Many-To-Many relationship:



```
+-----------+------------+--------------+
| tutor_id  | subject_id |              |
+-----------+------------+--------------+
| 1         | 101        |              |
| 1         | 102        |              |
| 2         | 101        |              |
+-----------+------------+--------------+
```

A method in the Subject class to add a new tutor

We need a method to add a new tutor to the group of tutor for a subject:

```java
public void addTutorToSubject(Tutor tutor) {

    this.tutors.add(tutor);

}
```

A method in the Tutor class to add a new subject

We need to have a method in order to add a subject to a tutorr’s collection of subjects.

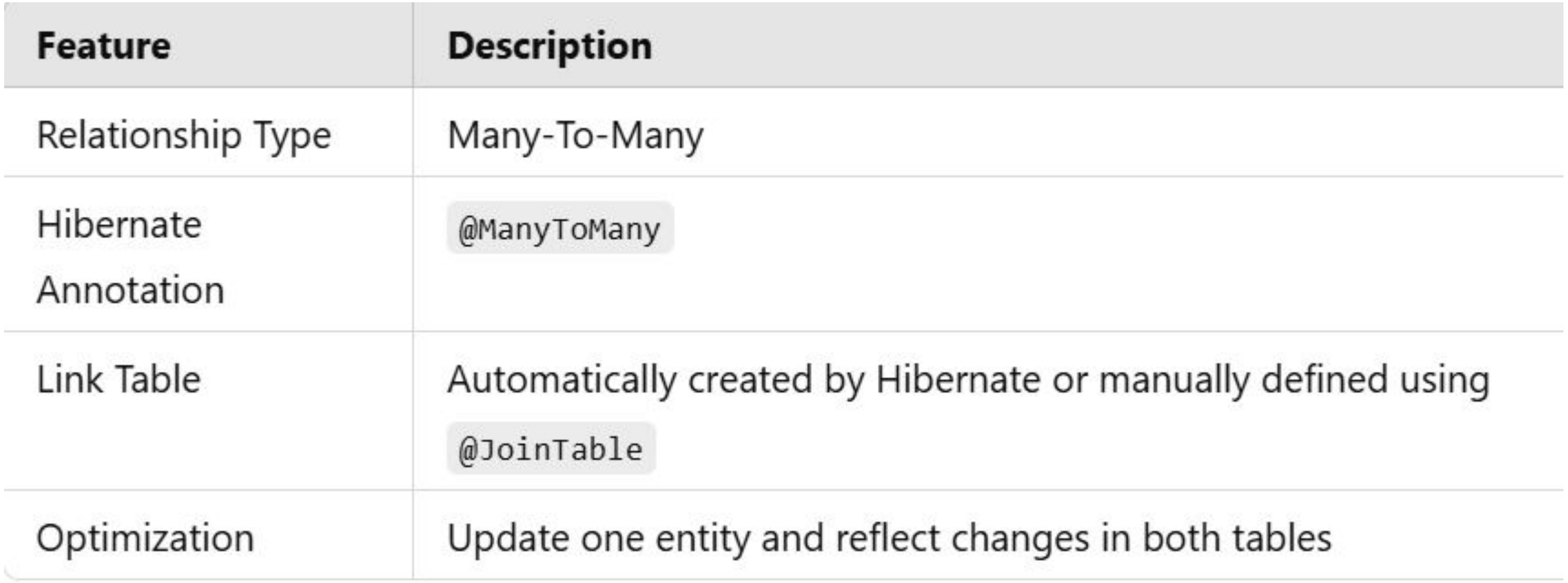
```
public void addSubjectsToTeach(Subject subject) {
    this.subjectsToTeach.add(subject);
}
```

Optimizing Bidirectional Updates

```
public void addSubject(Subject subject) {

    this.subjectsToTeach.add(subject);

    subject.getTutors().add(this);

   // Ensures the relationship is stored in both tables

}
```

This removes the need to manually call addTutor() every time.

Summary Table



Feature	Description
Relationship Type	Many-To-Many
Hibernate Annotation	`@ManyToMany`
Link Table	Automatically created by Hibernate or manually defined using `@JoinTable`
Optimization	Update one entity and reflect changes in both tables

@JoinTable

```
@ManyToMany
@JoinTable(
    name = "tutor_subject",
    joinColumns = @JoinColumn(name = "tutor_id"),
    inverseJoinColumns = @JoinColumn(name = "subject_id")
)
private Set<Subject> subjectsToTeach;
```