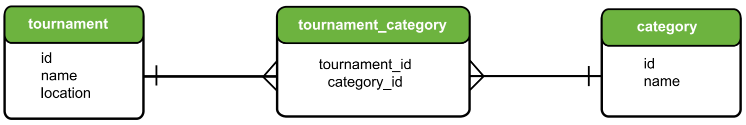
Many-to-Many Bidirectional Relationship

Learn how to change the unidirectional many-to-many relationship to a bidirectional relationship.

We'll cover the following

- mappedBy property
- @JsonIgnoreProperties

In a bidirectional relationship, each side has a reference to the other. In our example, the `Category` class did not have any reference to the `Tournament` class. Now we will add a reference to the `Tournament` class so that the relationship can be navigated from both sides. This will have no effect on the underlying database structure. The join table **tournament_catogories** already has the foreign keys of both the tournament and category tables and it is possible to write SQL queries to get tournaments associated with a category.



For a many-to-many relationship, we can choose any side to be the owner. The relationship is configured in the owner side using the `@JoinTable` annotation. On the target side we use the `mappedBy` attribute to specify the name of the field that maps the relationship in the owning side. From the database design point of view, there is no owner of a many-to-many relationship. It would not make any difference to the table structure if we swap the `@JoinTable` and `mappedBy`.

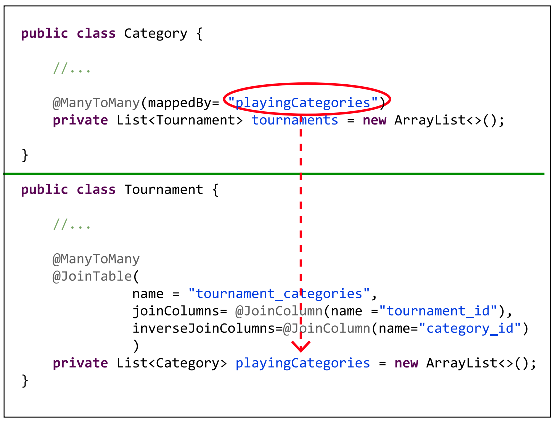
1. We will begin by creating a `List` of `tournaments` in the `Category` class along with the getter and setter methods.

```
package io.datajek.databaserelationships.manytomany;

@Entity
public class Category {
    @Id
    @GeneratedValue(strategy=GenerationType.IDENTITY)
    private int id;

    @Column(unique = true)
    private String name;

    private List<Tournament> tournaments = new ArrayList<>();
    //...
}
```

`mappedBy` property

2. On the `tournaments` field created above, use the `@ManyToMany` annotation with the `mappedBy` property. This shows the value that is used to map the relationship in the `Tournament` class.

```
@ManyToMany(mappedBy= "playingCategories")
private List<Tournament> tournaments = new ArrayList<>();
```



```
public class Category {

    //...

    @ManyToMany(mappedBy= "playingCategories")
    private List<Tournament> tournaments = new ArrayList<>();

}
public class Tournament {

    //...

    @ManyToMany
    @JoinTable(
              name = "tournament_categories",
              joinColumns= @JoinColumn(name ="tournament_id"),
              inverseJoinColumns=@JoinColumn(name="category_id")
              )
    private List<Category> playingCategories = new ArrayList<>();
}
```

3. We will also use the cascade property to cascade all operations except `REMOVE` because we do not want to delete all associated tournaments, if a category gets deleted.

```
@ManyToMany(mappedBy= "playingCategories",
        cascade= {CascadeType.DETACH, CascadeType.MERGE, CascadeType.PERSIST, CascadeType.REFRESH},
        fetch=FetchType.LAZY)
    private List<Tournament> tournaments = new ArrayList<>();
```

4. It is the responsibility of the application to manage a bidirectional relationship. When we add a category to a tournament, we must also add the tournament to that category to preserve the relationship in both directions. Failure to do so may result in unexpected JPA behavior.

   We will update the `addCategory` method in the `Tournament` class to set up the bidirectional relationship by adding the tournament to the category.

```
public void addCategory(Category category) {
   playingCategories.add(category);
   //set up bidirectional relationship
   category.getTournaments().add(this);
}
```

   Similarly, we will update the `removeCategory` method in the `Tournament` class to remove the association from both sides.

```
public void removeCategory(Category category) {
   if (playingCategories != null)
          playingCategories.remove(category);
   //update bidirectional relationship
   category.getTournaments().remove(this);
}
```

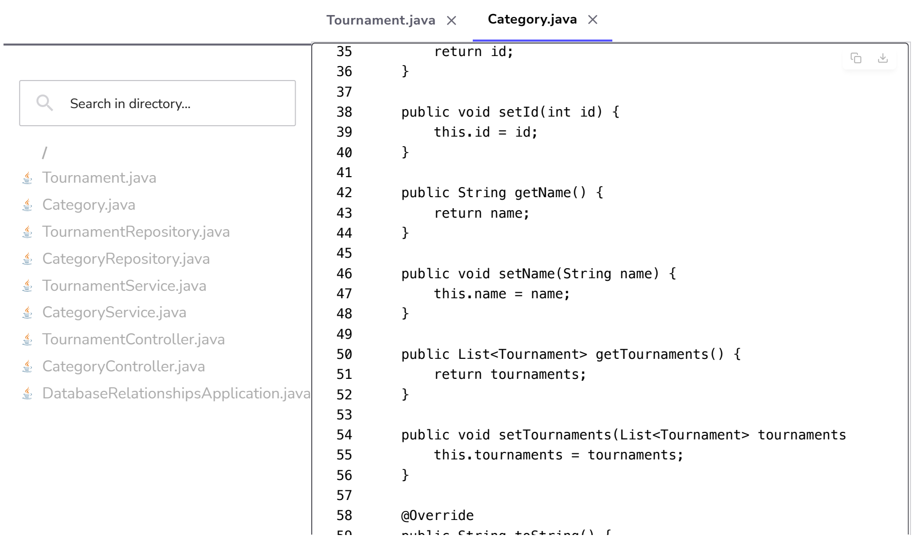
`@JsonIgnoreProperties`

4. JSON gets into infinite recursion when trying to de-serialize bidirectional relationships. We have seen two ways to solve this issue in the One-to-One Bidirectional Relationship lesson. Here, we will see yet another approach to avoid infinite recursion. We can use the property that we want to ignore with the `@JsonIgnoreProperties`. This annotation can be used at field level in both the `Tournament` and `Category` class.

```
@JsonIgnoreProperties("tournaments")
private List<Category> playingCategories = new ArrayList<>();
```

```
@JsonIgnoreProperties("playingCategories")
private List<Tournament> tournaments = new ArrayList<>();
```

> In a many-to-many relationship, there is no owner when it comes to the table structure. This is different from a one-to-many relationship where the many side is always the owning side containing the key of the one side.



```
        return id;
    }

    public void setId(int id) {
        this.id = id;
    }

    public String getName() {
        return name;
    }

    public void setName(String name) {
        this.name = name;
    }

    public List<Tournament> getTournaments() {
        return tournaments;
    }

    public void setTournaments(List<Tournament> tournaments
        this.tournaments = tournaments;
    }

    @Override
    public String toString() {
```

```
    public String toString() {
        return "Category [id=" + id + ", name=" + name + ",
    }
}
```

Run Save Reset

Your app can be found at: https://ed-6231652667490304.educative.run/tournaments

To test this application, we will add two tournaments and five categories.

To create tournament entries, send **POST** request to /**tournaments** as follows:

```
{
    "name": "Canadian Open",
    "location": "Toronto"
}
```

```
{
    "name": "US Open",
    "location": "New York City"
}
```

Then, add five categories by sending **POST** requests to /**categories** as follows:

```
{
    "name" : "Men's Singles"
}
```

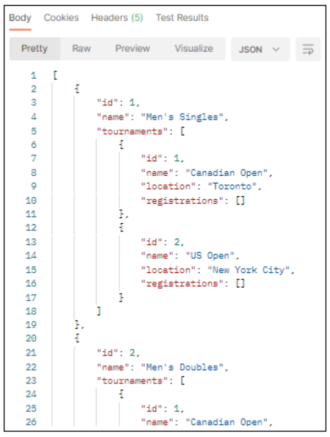
```
{
    "name" : "Men's Doubles"
}
```

```
{
    "name" : "Ladies Singles"
}
```

```
{
    "name" : "Ladies Doubles"
}
```

```
{
    "name" : "Mixed Doubles"
}
```

A **GET** request to /**categories** now shows the tournaments associated with each catogory. This is different from the many-to-many unidirectional relationship, the `Category` had no information about `Tournament`.



```
[
    {
        "id": 1,
        "name": "Men's Singles",
        "tournaments": [
            {
                "id": 1,
                "name": "Canadian Open",
                "location": "Toronto",
                "registrations": []
            },
            {
                "id": 2,
                "name": "US Open",
                "location": "New York City",
                "registrations": []
            }
        ]
    },
    {
        "id": 2,
        "name": "Men's Doubles",
        "tournaments": [
            {
                "id": 1,
                "name": "Canadian Open",
```

GET request to /categories in a bidirectional relationship

We can also test the cascade options by deleting a tournament or category and verify the results using the web console of