Inheritance: Table per Class

Inheritance Mapping Strategies

- Single table
- **Table per class**
- Joined table
- Mapped superclass

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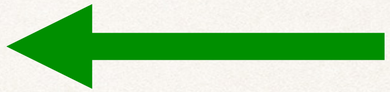
- **Table per class** 
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Table per Class

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  - Remember, a concrete class is a non-abstract class
- Includes fields defined in subclass and fields inherited from superclass
- These fields are mapped to a table for the concrete class

Table per Class

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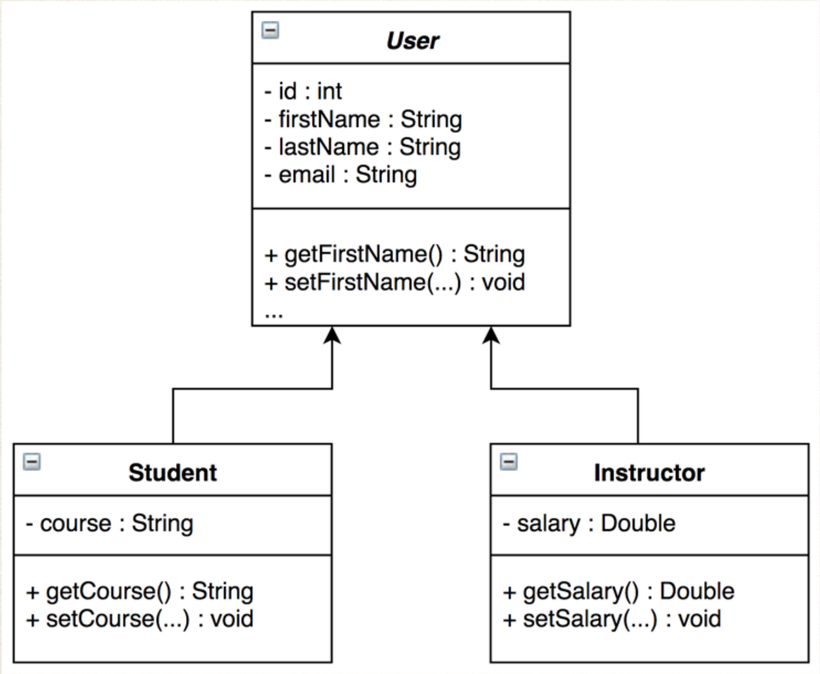


Table per Class

abstract

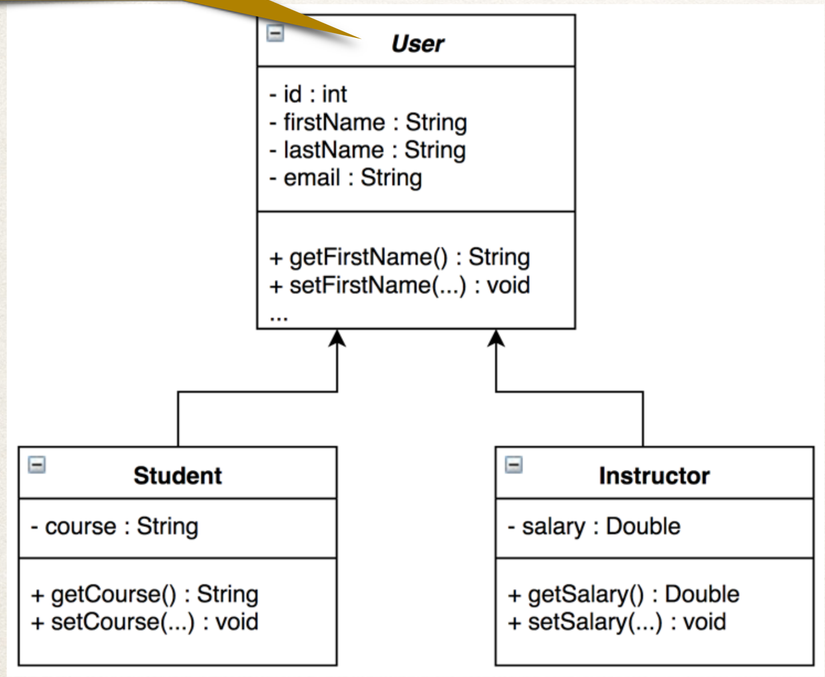


Table per Class

abstract

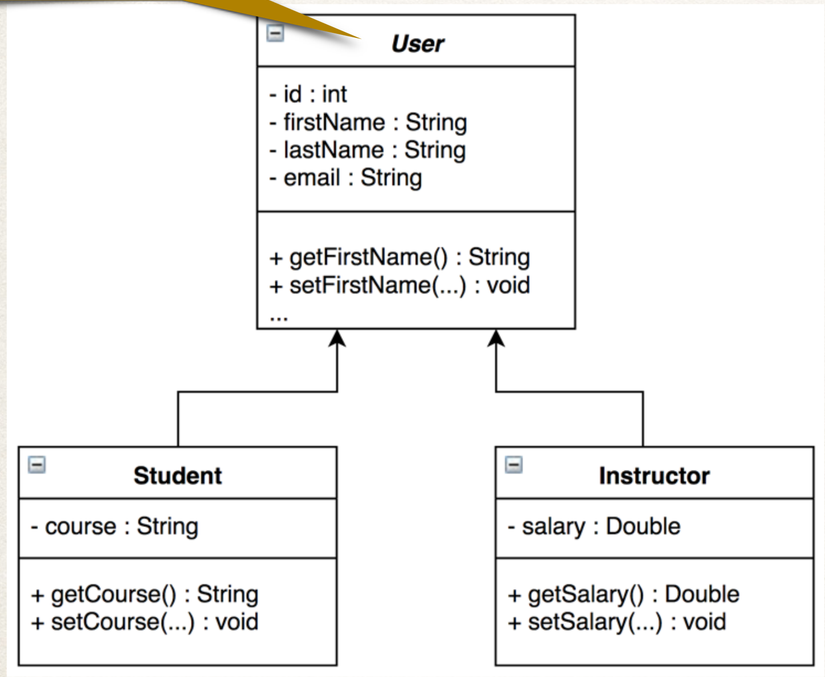
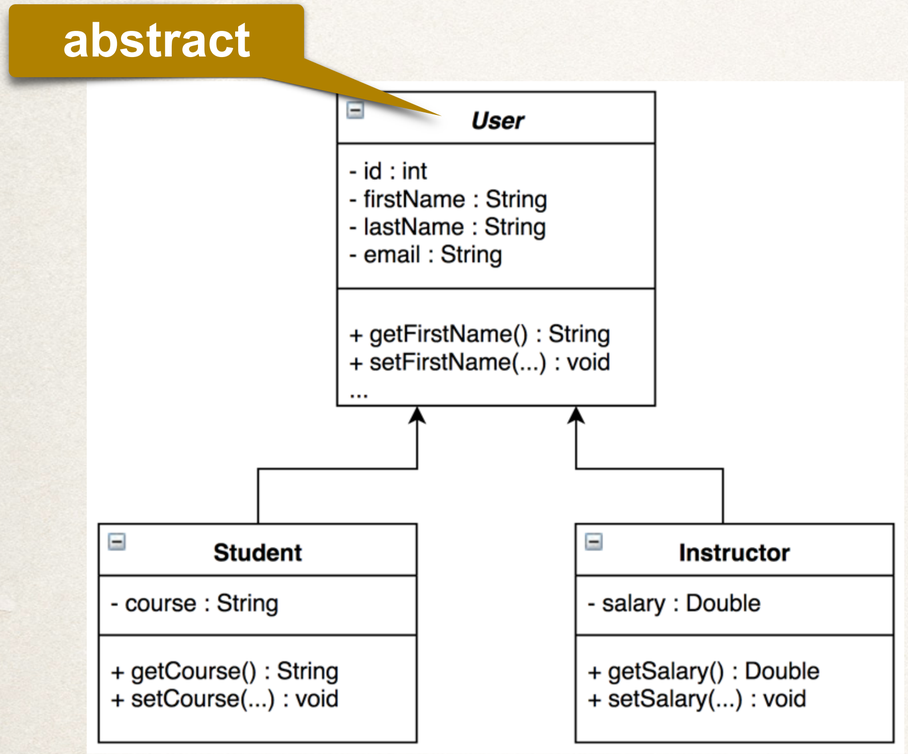
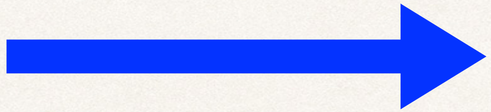


Table per Class





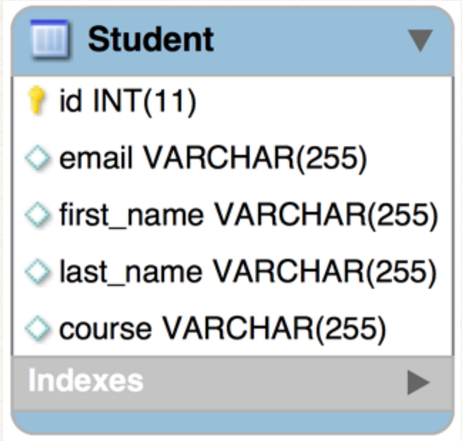
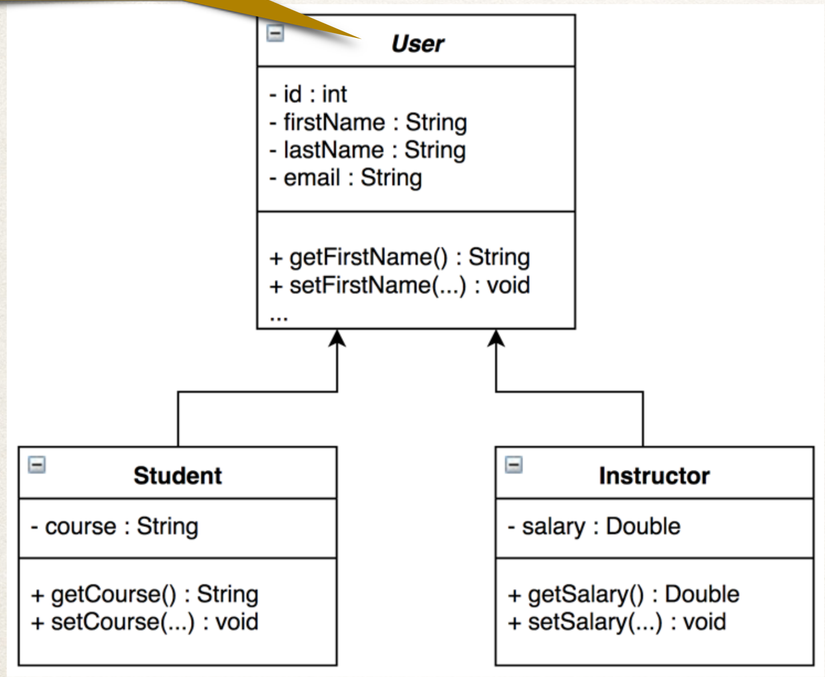
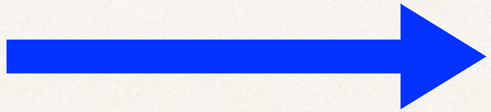
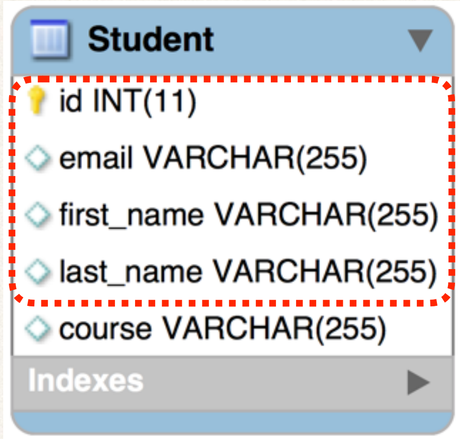


Table per Class

abstract



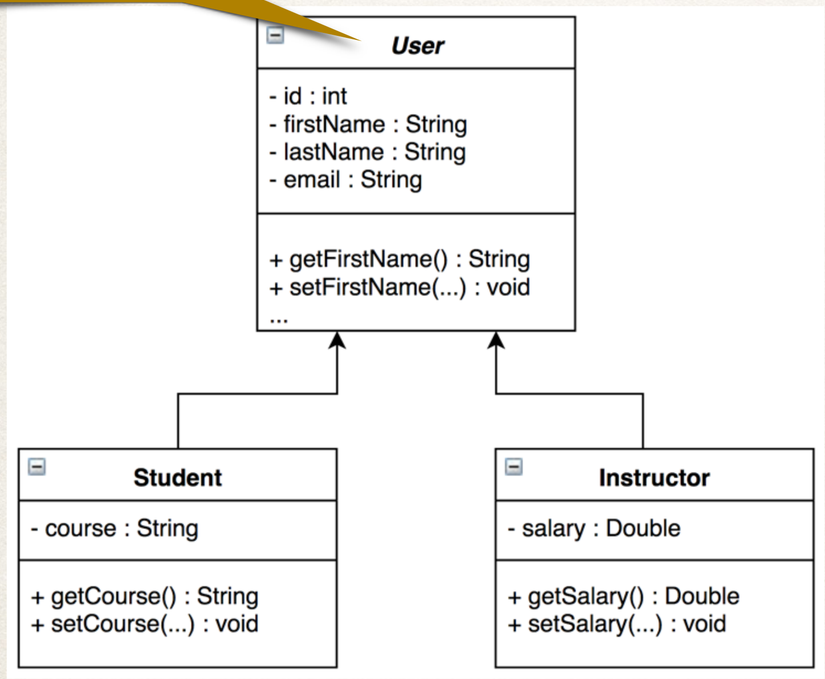


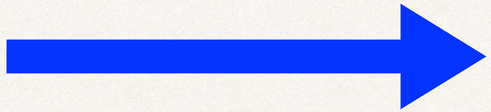


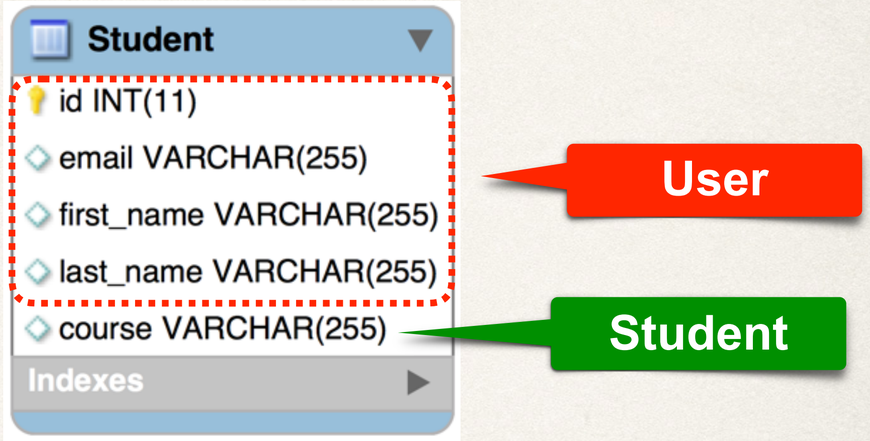
User

Table per Class

abstract







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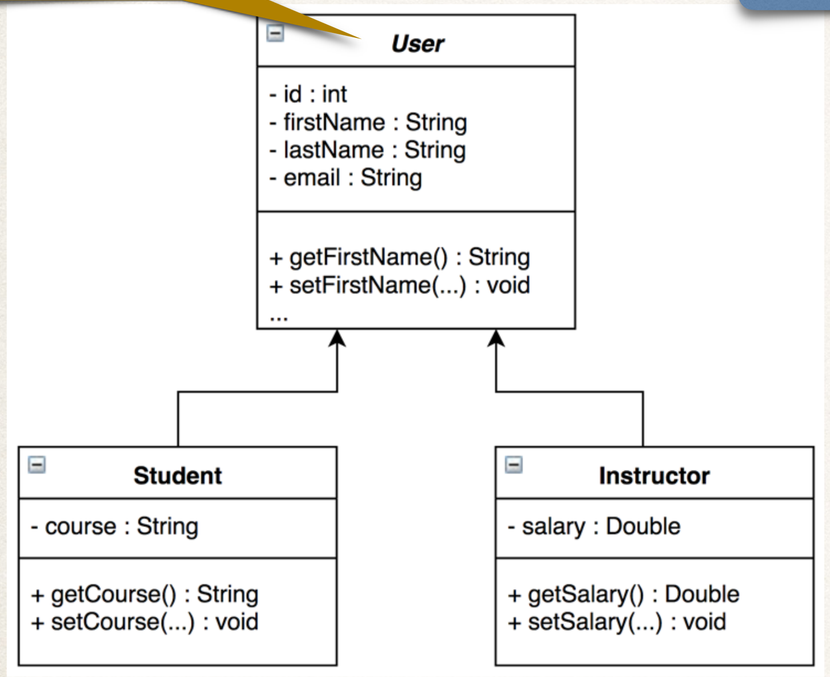
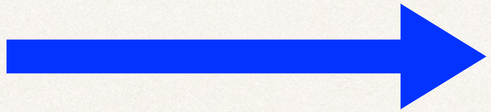
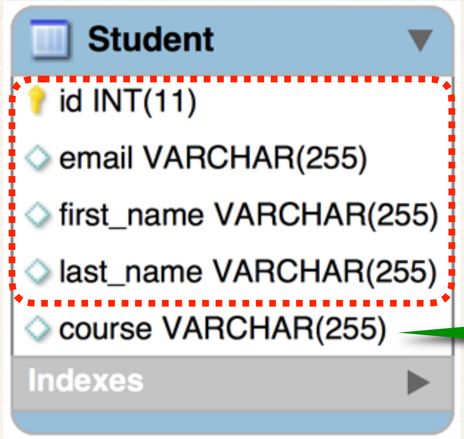


Table per class for the concrete classes



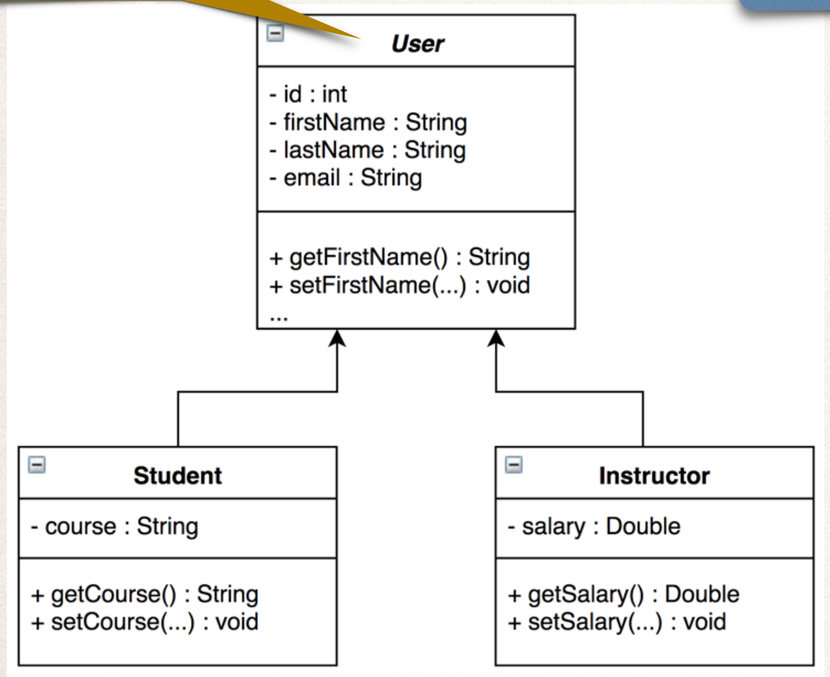


User

Student

Table per Class

abstract



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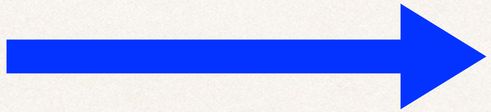

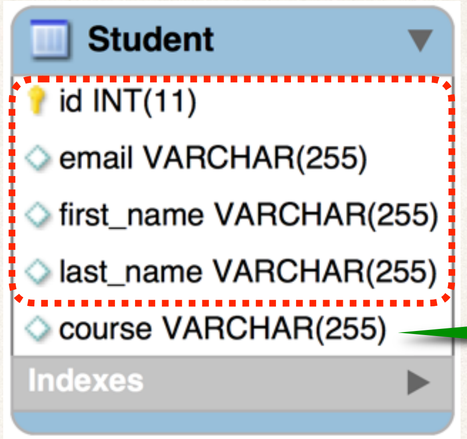

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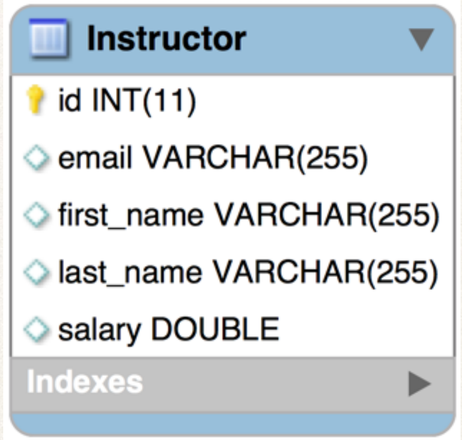

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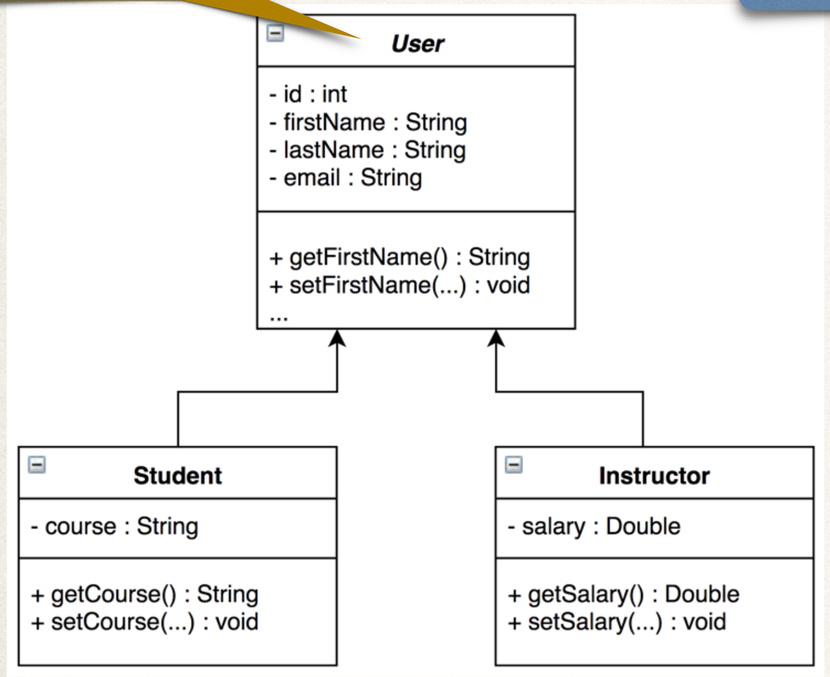

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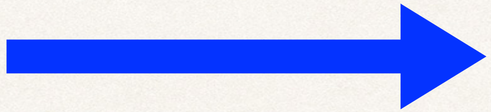

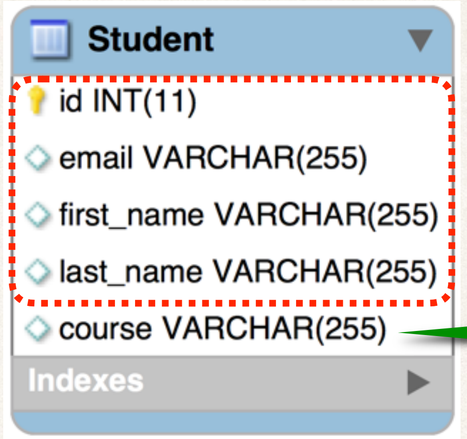

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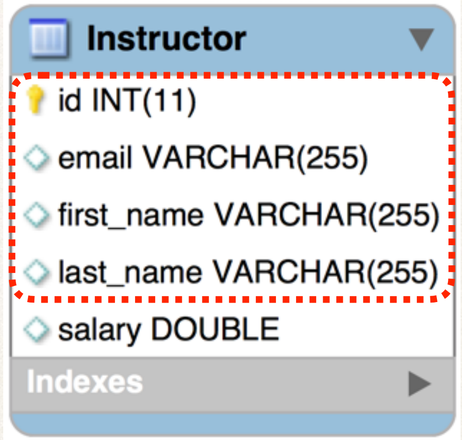

User

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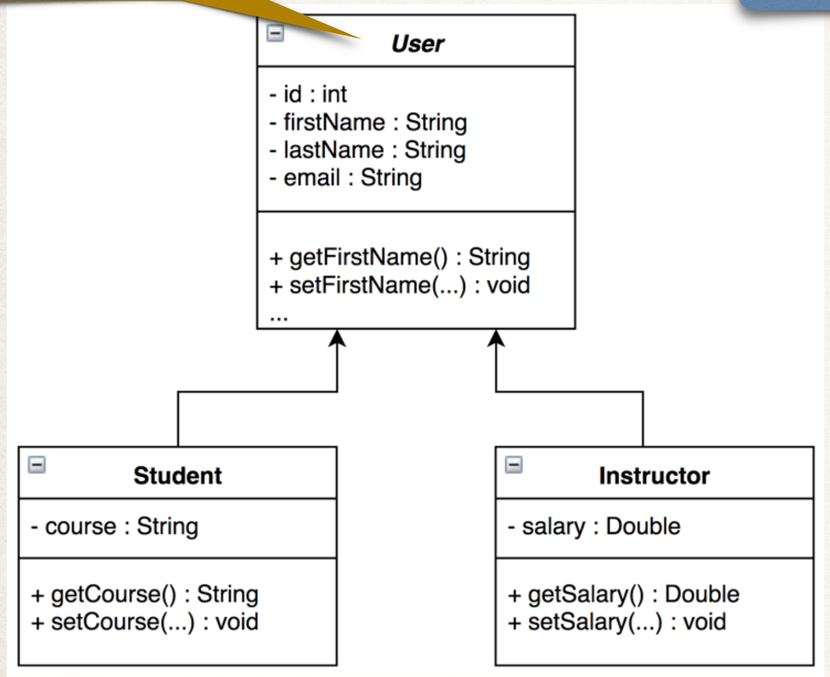

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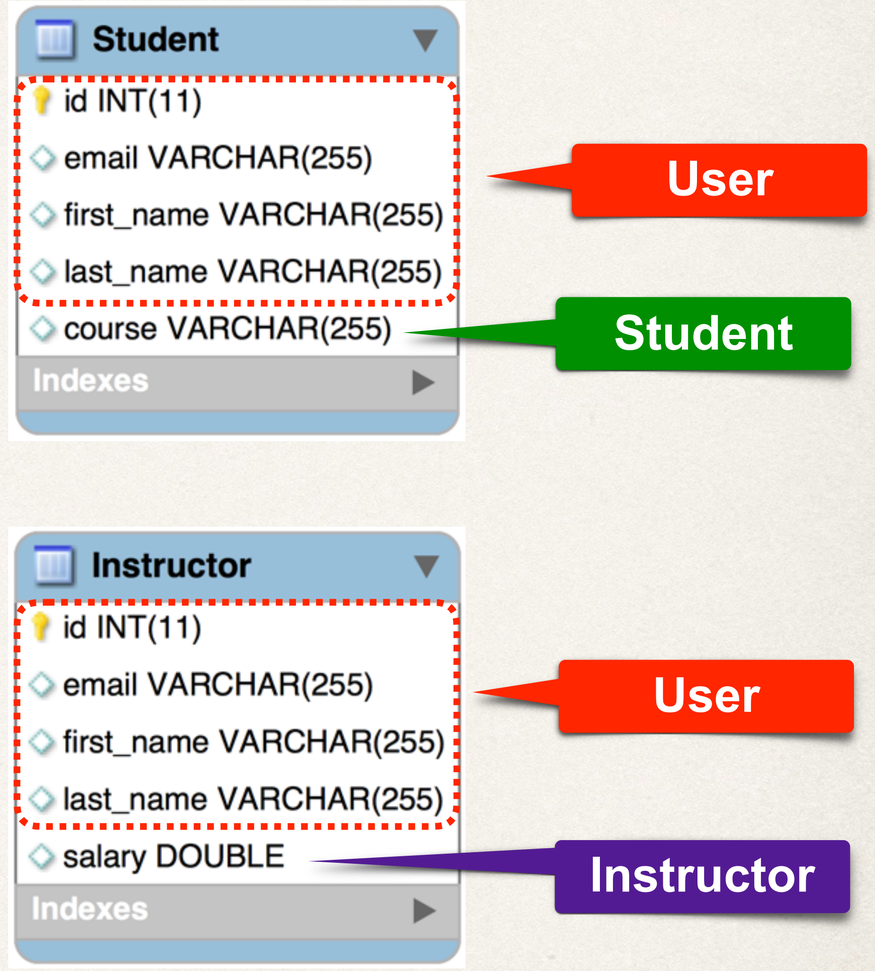

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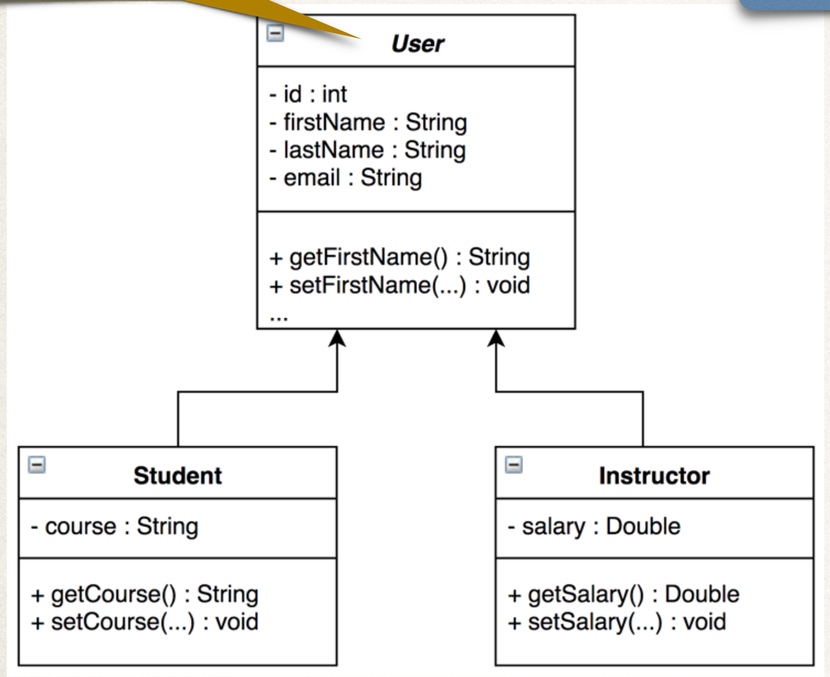

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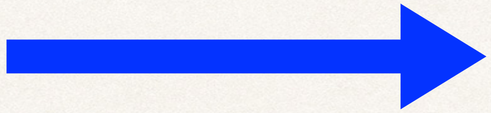
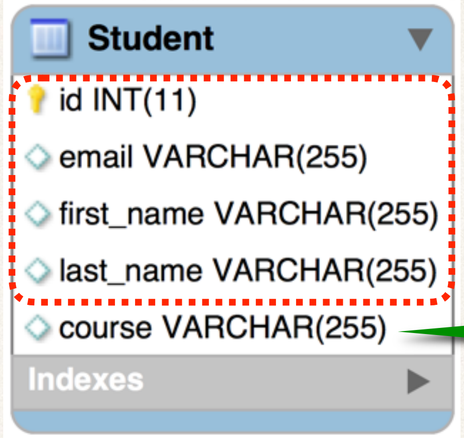
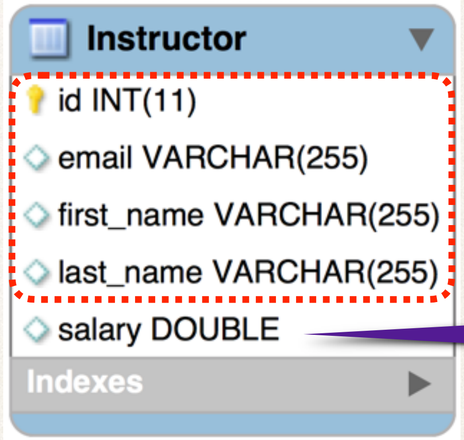


Note: Only the related fields
No extra columns





Development Process

Step-By-Step

Development Process

Step-By-Step

1. In superclass, specify inheritance strategy: `TABLE_PER_CLASS`

Development Process

Step-By-Step

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2. Remove annotations for Discriminator

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Step-By-Step

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Development Process

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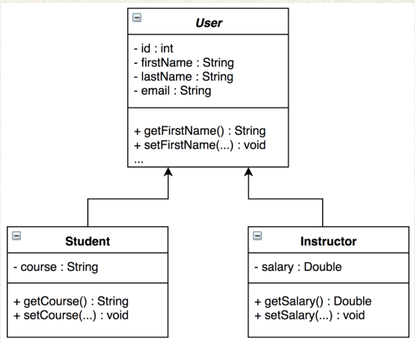
3. In `User` superclass, update the ID generation strategy to `TABLE`

4. Make updates to Hibernate configuration file

5. Develop main application

Step 1: Superclass - Inheritance strategy

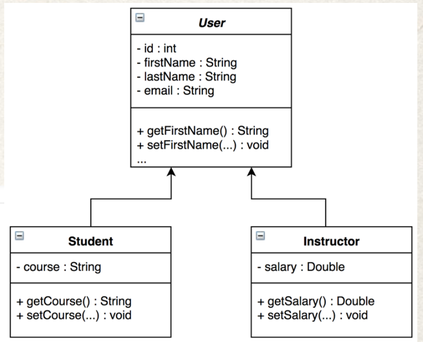


Step 1: Superclass - Inheritance strategy

```
@Entity
@Table(name="user")
@Inheritance(strategy = InheritanceType.TABLE_PER_CLASS)
public abstract class User {

...

}
```



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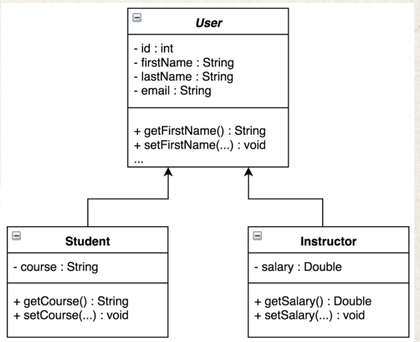
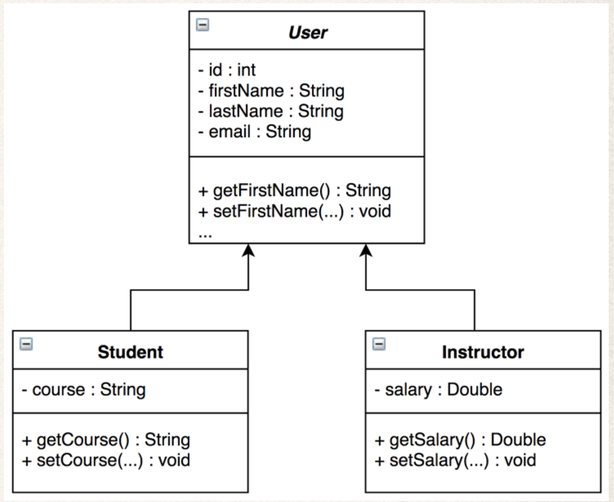


Map fields to table per class (concrete classes)

Step 2: Remove annotations for Discriminator



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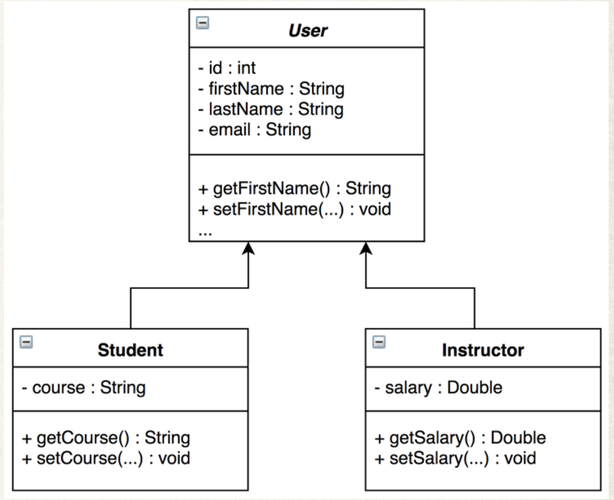
  ...
}
```



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@Entity
@Table(name="user")
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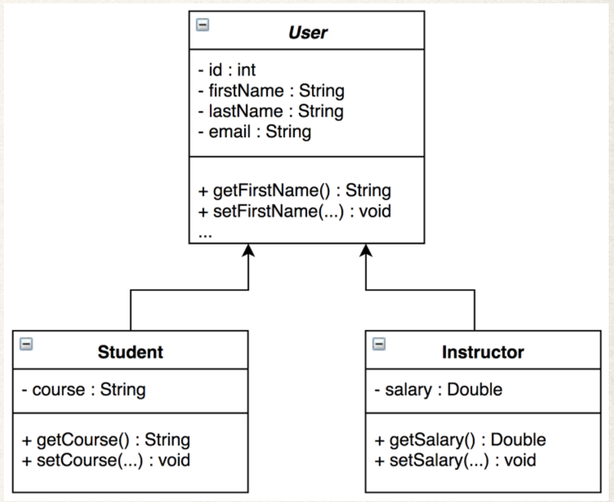
public abstract class User {
  ...
}
```

No need for discriminator columns or values



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```
@Entity
@Table(name="user")
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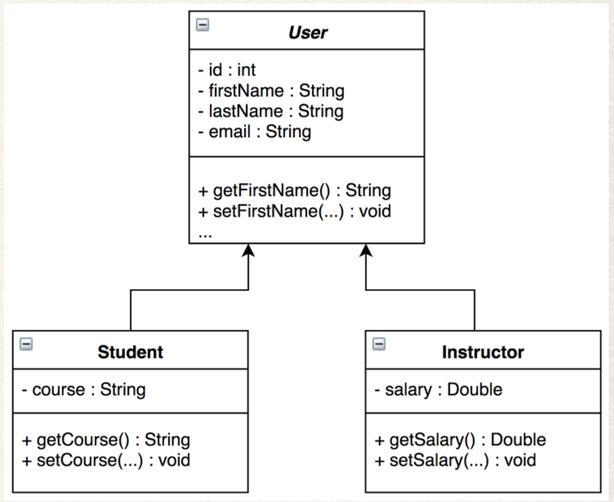
public abstract class User {
  ...
}
```

```
@Entity
public class Student extends User {
  ...
}
```

No need for discriminator columns or values



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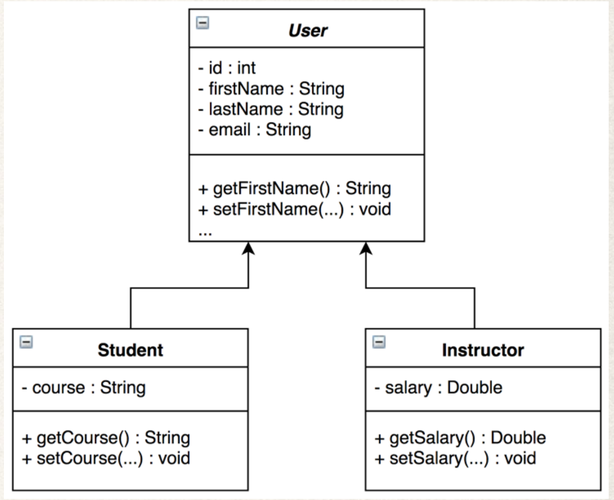
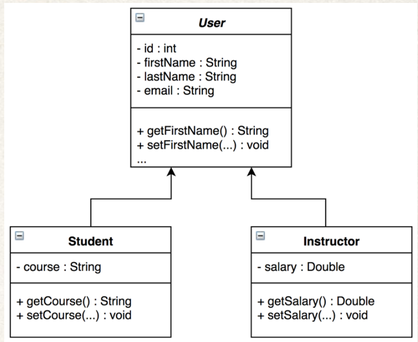



```
@Entity
public class Student extends User {
  ...
}
```

```
@Entity
public class Instructor extends User {
  ...
}
```

Step 3: Update ID generation strategy



Step 3: Update ID generation strategy

```
@Entity
@Table(name="user")
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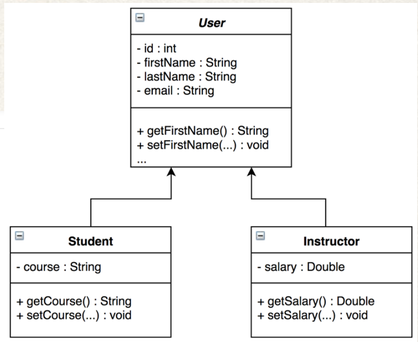
public abstract class User {

  @Id
  @GeneratedValue(strategy=GenerationType.TABLE)
  @Column(name="id")
  private int id;

}
```



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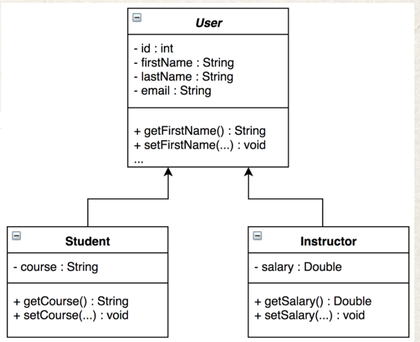

When using TABLE_PER_CLASS strategy, it is required to use TABLE generation strategy

Step 3: Update ID generation strategy

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@Entity
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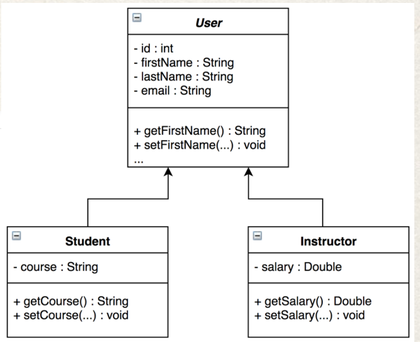


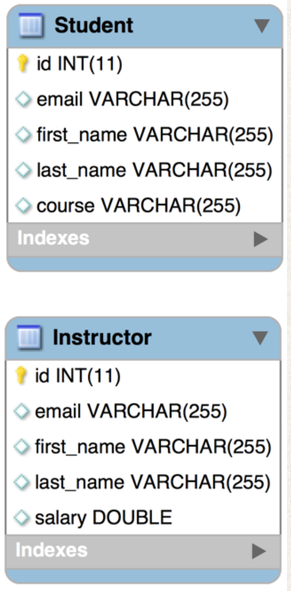
When using TABLE_PER_CLASS strategy, it is required to use TABLE generation strategy

Since entities span multiple tables, the next generated ID value can be maintained in a separate table

Step 3: Update ID generation strategy

Step 3: Update ID generation strategy

- Each table has an ID field



Step 3: Update ID generation strategy

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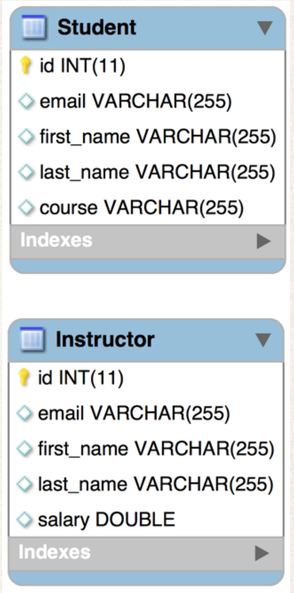
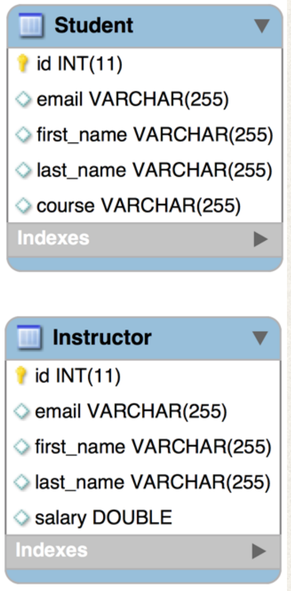


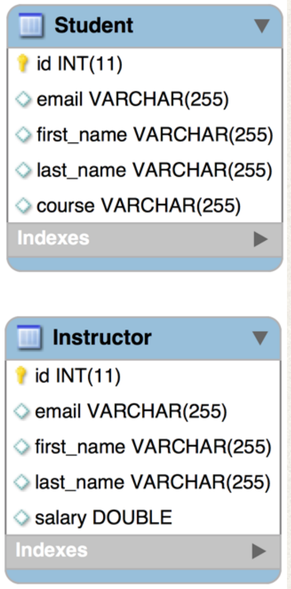
Step 3: Update ID generation strategy

- Each table has an ID field

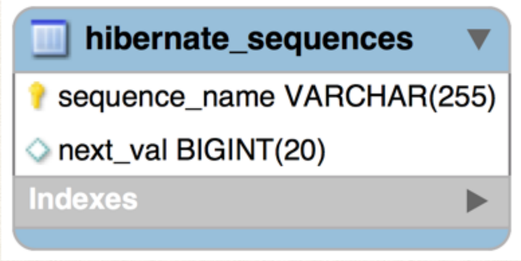
- When we add an entity, we need the next generated ID



Step 3: Update ID generation strategy



- Each table has an ID field
- When we add an entity, we need the next generated ID
- The next generated ID value can be maintained in a separate table
- Known as a “sequence table”



Step 3: Update ID generation strategy

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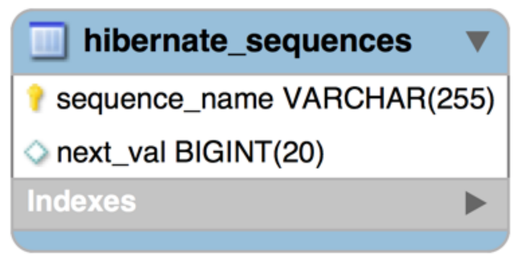

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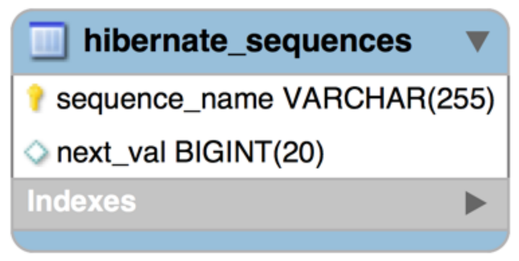

**Behind the scenes,
Hibernate will get the next value
from the sequence table**

**and then increment it by 1
(thread-safe)**

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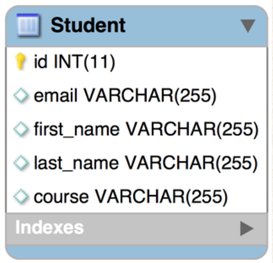

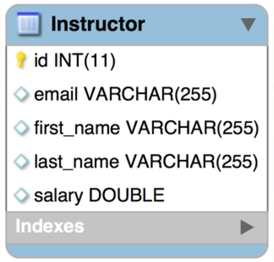

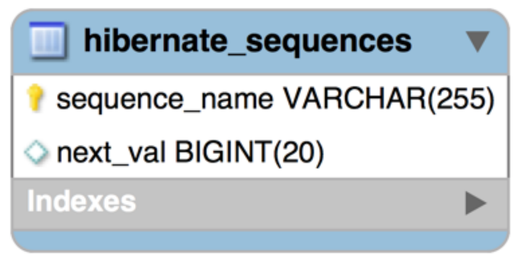

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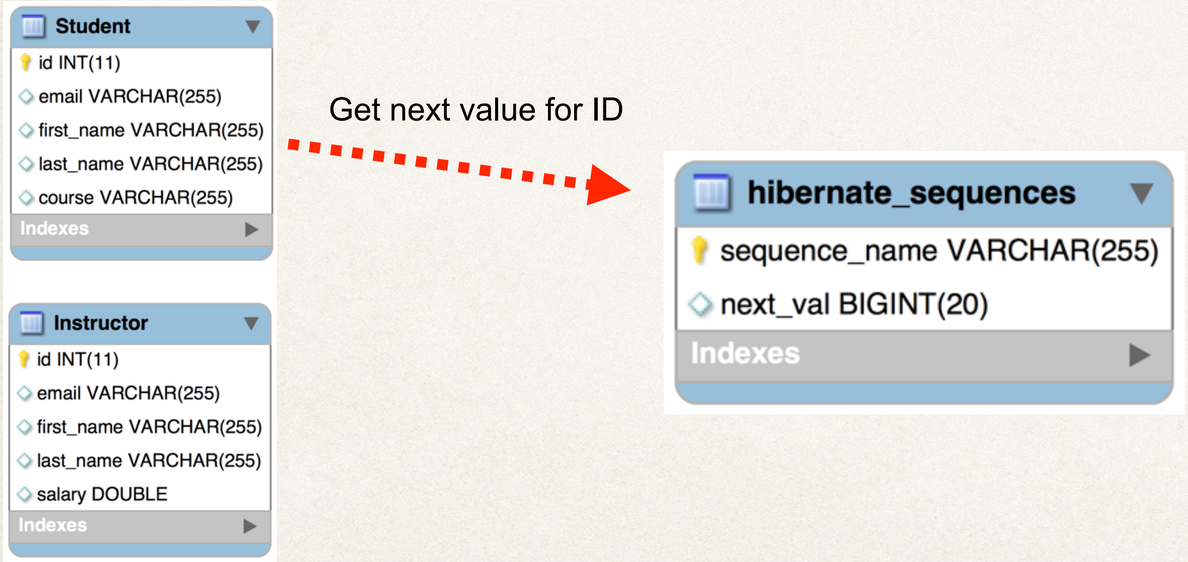

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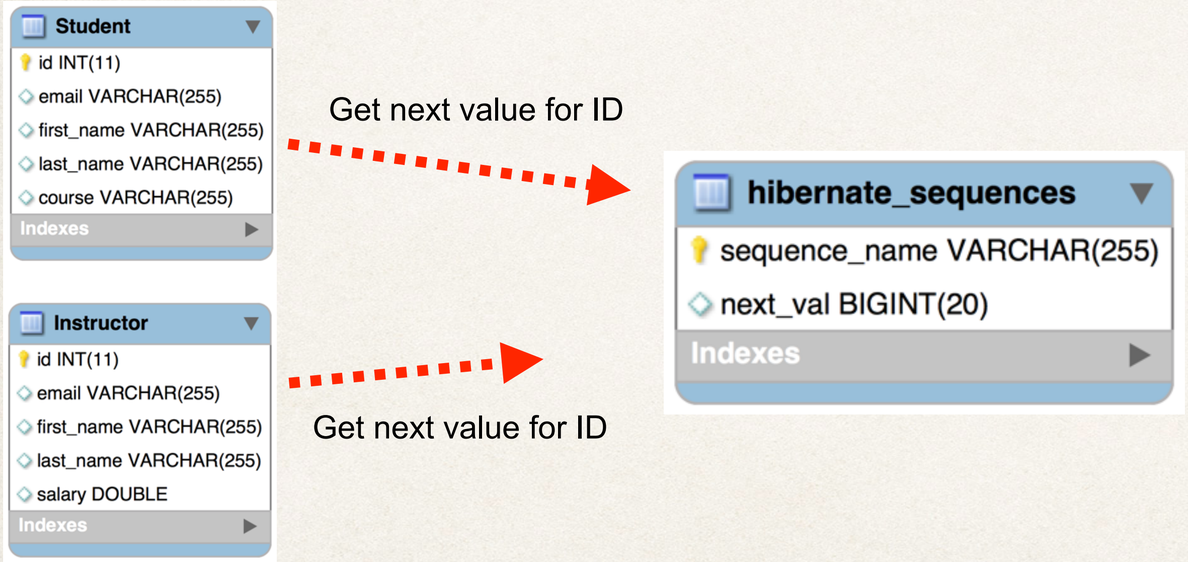

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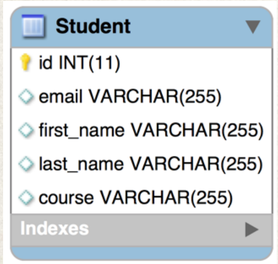
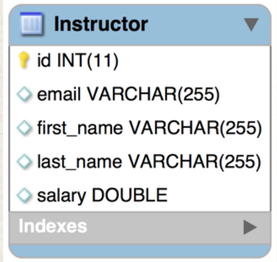


Get next value for ID



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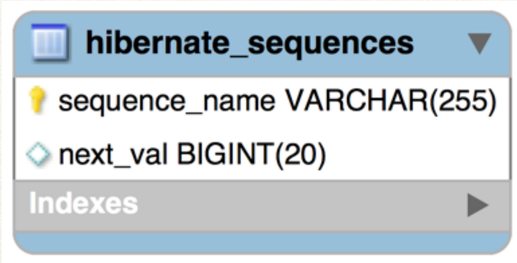


```
@Id
@GeneratedValue(strategy=GenerationType.TABLE)
@Column(name="id")
private int id;
```

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Step 4: Update Hibernate Config file

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```
<!-- JDBC connection pool settings ... using built-in test pool -->
<property name="connection.pool_size">10</property>

<!-- Select our SQL dialect -->
<property name="dialect">org.hibernate.dialect.MySQL8Dialect</property>
```

Step 4: Update Hibernate Config file

Increase pool size since additional connections are needed for accessing sequence table

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```

Upgrade to MySQL 8 dialect since we are using MySQL 8 database

Needed for creation of sequence table

Step 5: Develop the main application

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Student's course

```
// create the objects
Student tempStudent = new Student("Mary", "Public", "mary@luv2code.com", "Hibernate");
Instructor tempInstructor = new Instructor("John", "Doe", "john@luv2code.com", 20000.00);
```

Instructor's salary

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// start a transaction
session.beginTransaction();

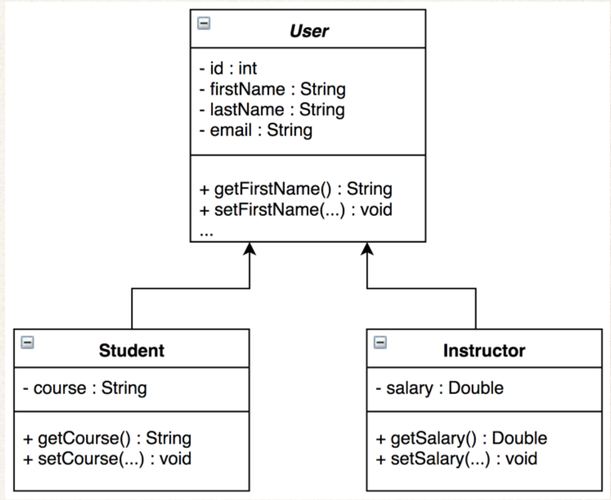
// save the objects
System.out.println("Saving the student and instructor...");
session.save(tempStudent);
session.save(tempInstructor);

// commit the transaction
session.getTransaction().commit();
```

Instructor's salary

All of this code is the same

Run the App



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Hibernate: insert into Student (email, first_name, last_name, course, id) values (?, ?, ?, ?, ?)
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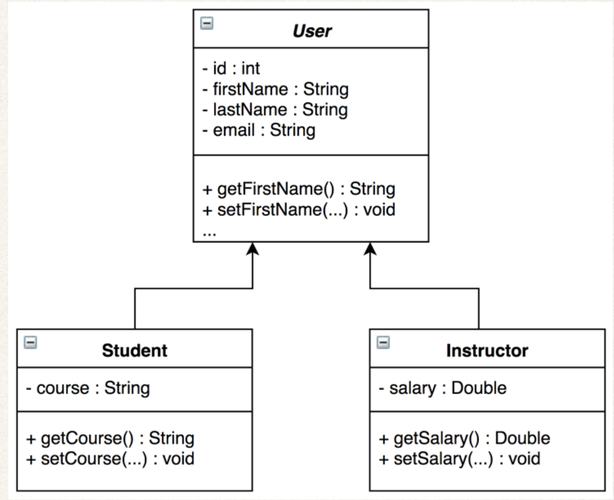

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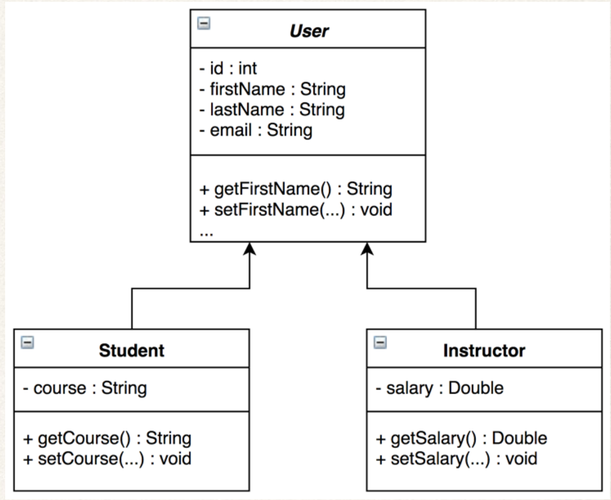
```

Table: Student

id	email	first_name	last_name	course
1	mary@luv2code.com	Mary	Public	Hibernate



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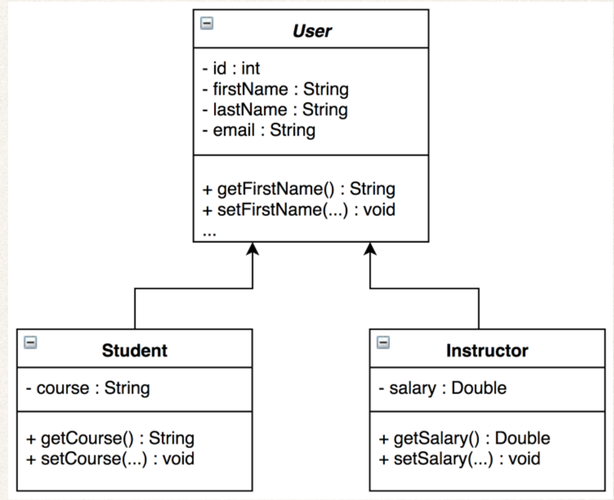

Includes fields defined in subclass and fields inherited from superclass

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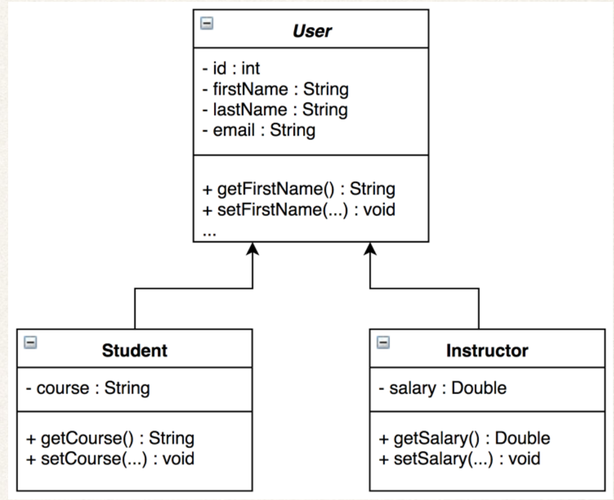
User



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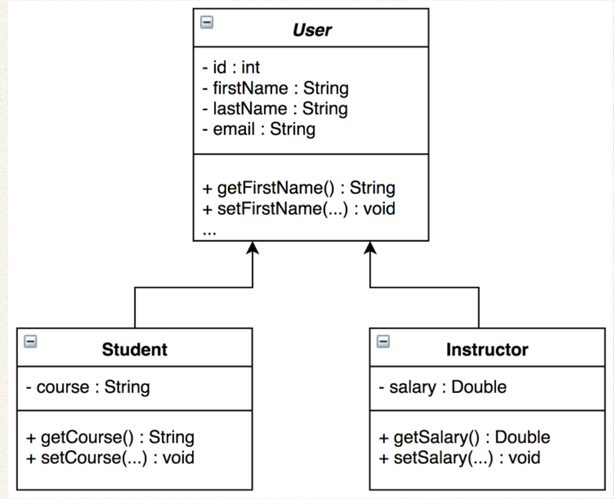

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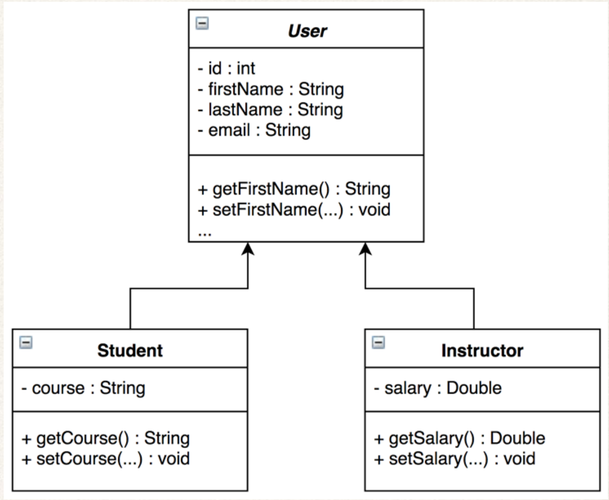

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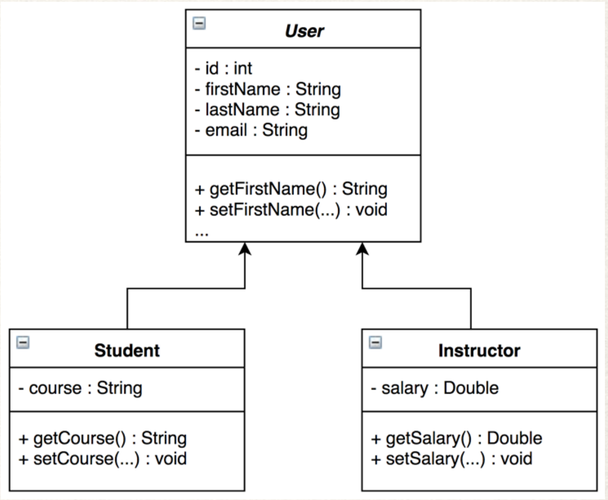

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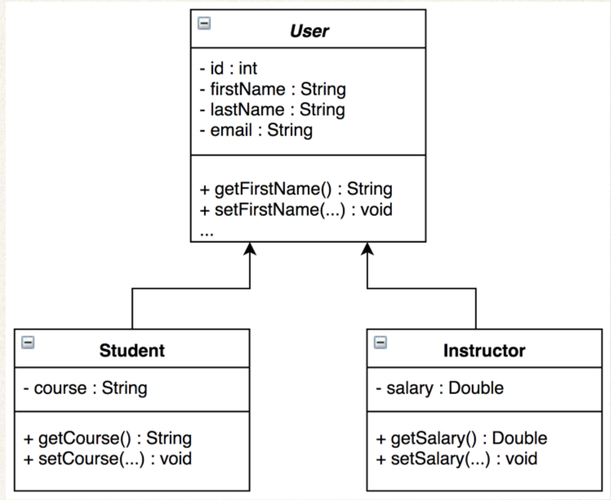
Table: Instructor

id	email	first_name	last_name	salary
2	john@luv2code.com	John	Doe	20000



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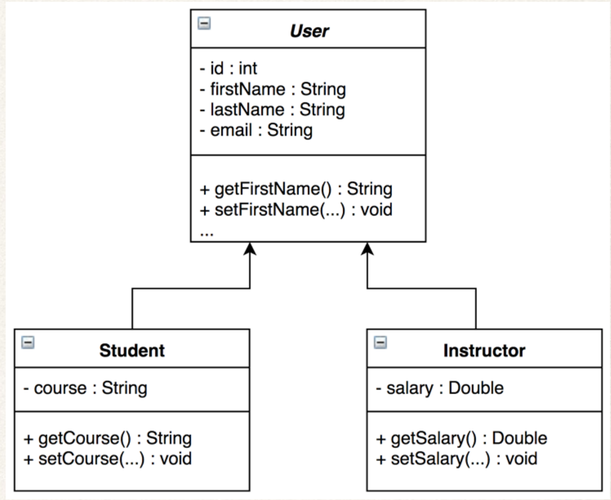

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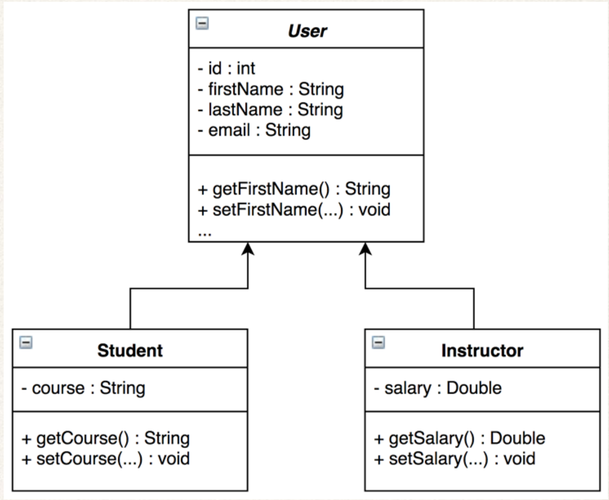

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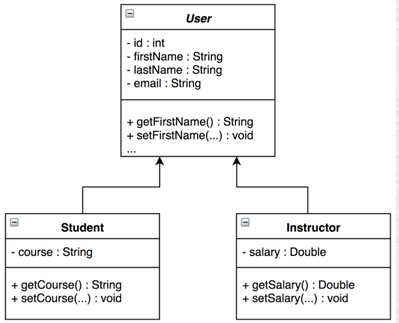
ID from the Sequence Table



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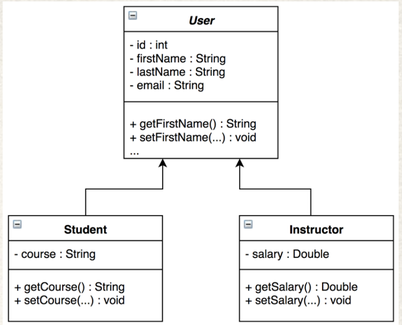

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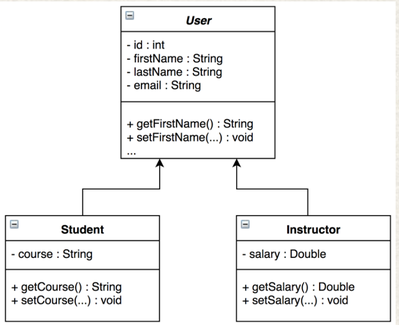

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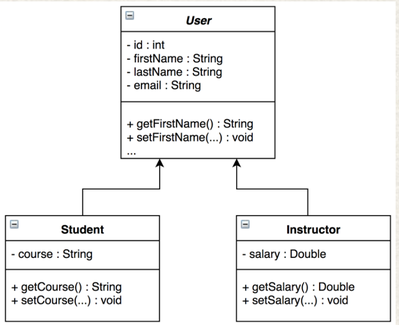

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session.save(tempStudent);
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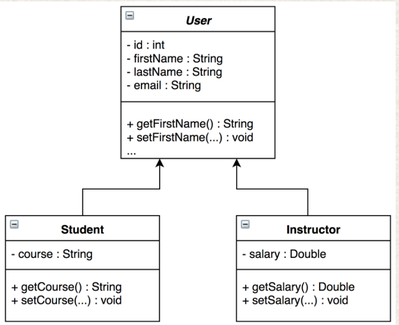

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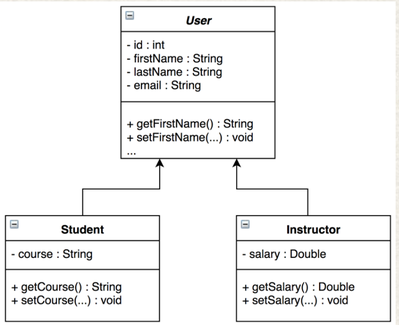

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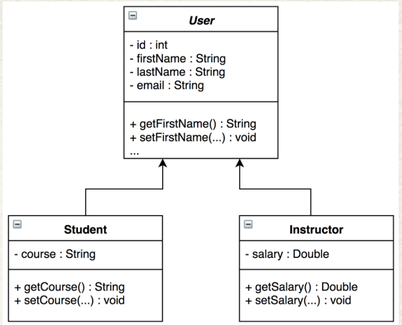

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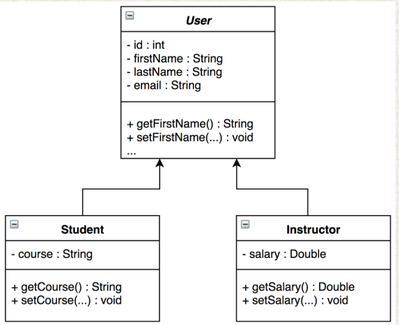

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1	mary@luv2code.com	Mary	Public	Hibernate

Table: Instructor

id	email	first_name	last_name	salary
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```
// save the objects
System.out.println("Saving the student and instructor...");
session.save(tempStudent);
session.save(tempInstructor);
```

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@Id
@GeneratedValue(strategy=GenerationType.TABLE)
@Column(name="id")
private int id;
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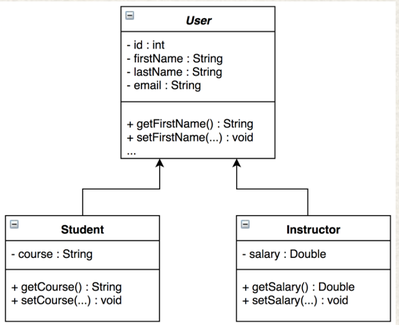
ID from the Sequence Table



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2 •  SELECT * FROM hb_student_tracker.hibernate_sequences;
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100% 1:2

Result Grid | Filter Rows: Search | Edit: | Export/Import:

sequence_name	next_val
default	2

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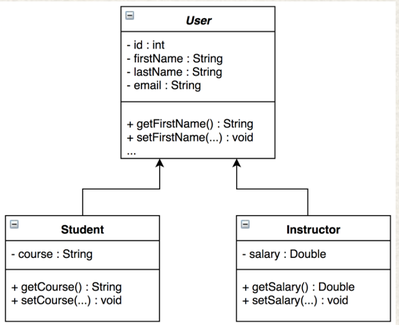

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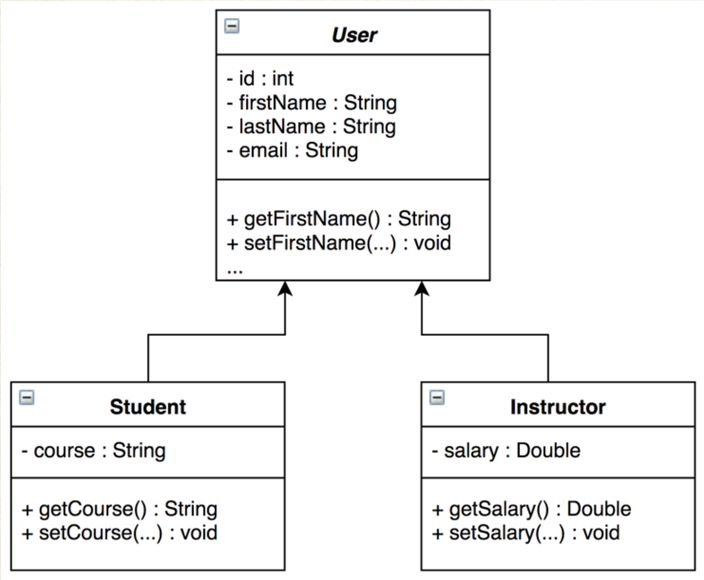
**Behind the scenes,
Hibernate will get the next value
from the sequence table**

**and then increment it by 1
(thread-safe)**

Inheritance Strategy - Table per Class



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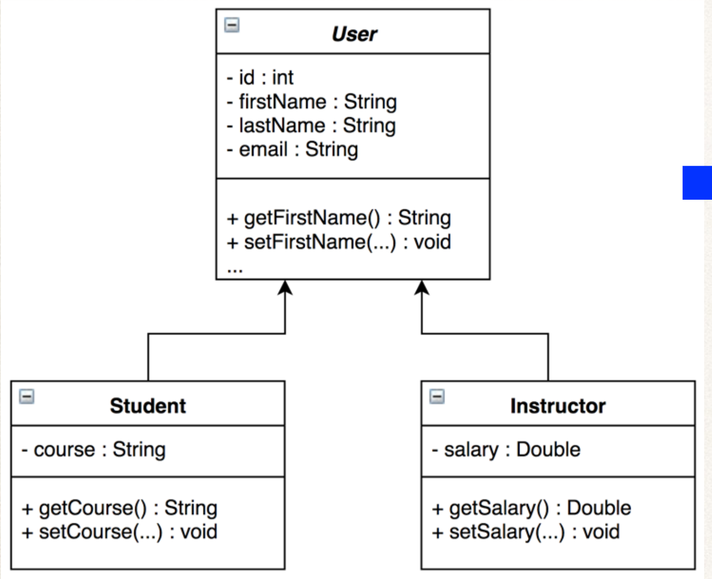

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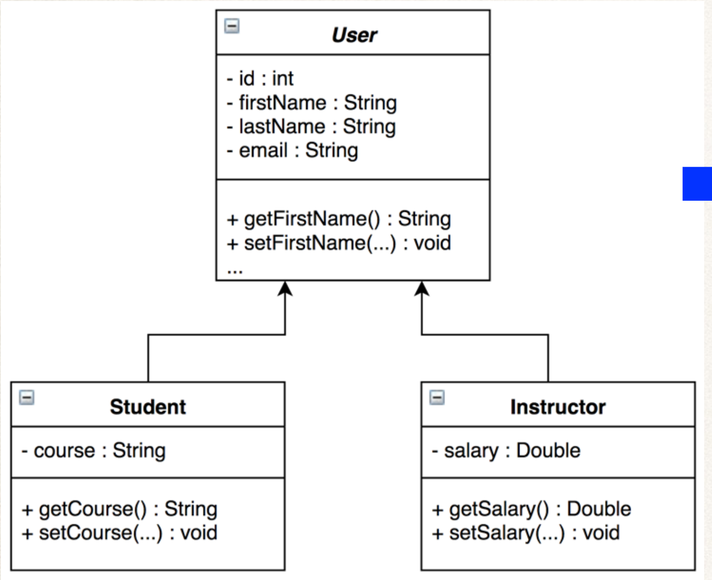
Table per class for the concrete classes



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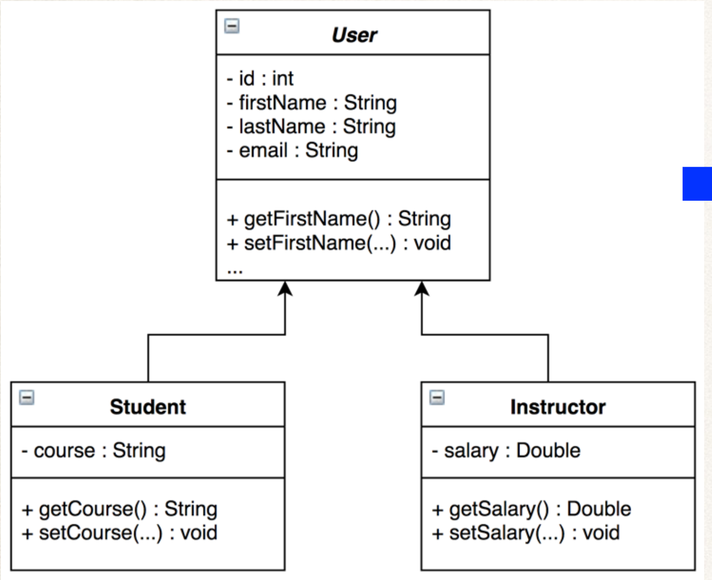

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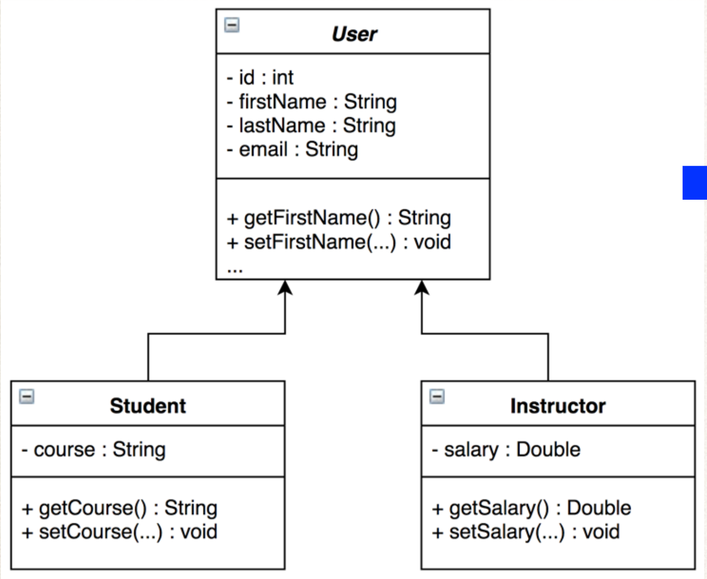

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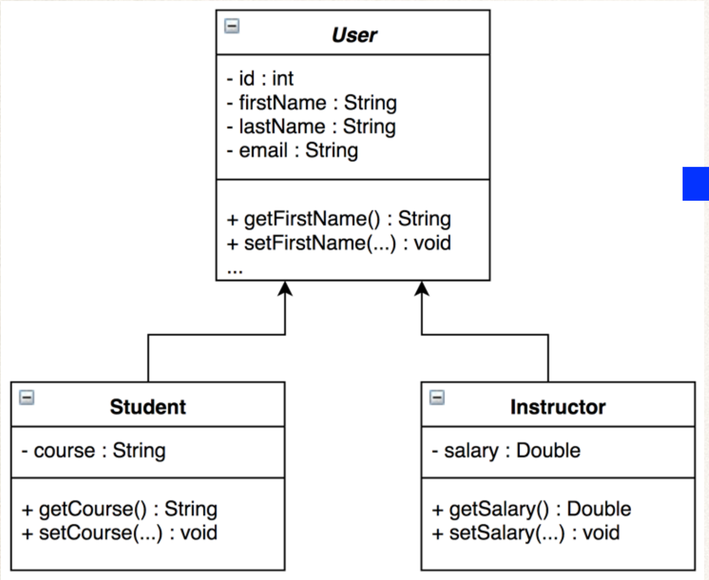

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Note: Only the related fields
No extra columns

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  - Query performance slows down for very deep inheritance trees
  - ID generation with sequence tables in a high-volume multi-threaded environment is slow