Developer diary:

**18.06.2025:**

* Starting to split it into enitities.
* Newly learned self join
* Get into crows notation

**26.06.2025:**

Using jakarta.validation-api, contributes the interfaces, with the Hibernate implementation , Hibernate- validator fully programmed annotations. Since this is a bean validation I made a DTO Object Login Request, which I use to run the validation on. Jakarta Expression Language depndency is needed for dynamic String interpolation and without it, it didn’t work in my programm.

**xx.xx.2025:**

Discovered that if you use static methods of a class. Then you can use it through the whole application like a Java Bean in the Spring Context.

**05.07.2025:**

Discovered extra line of defense with a private constructor in a utility class to prevent instantion.

Still need the Throw for clarity, but it is not strictly needed.

private SceneManager() {  
 throw new UnsupportedOperationException(" This is meant as a utility class only.");  
}

**06.07.2025:**

Sets up Hibernate with the important points in plain Java:

1. In die POM

* Jakarte Persistance
* Hibernate-core
* Postgres

2. In die Resources eine Java Persistence XML:

is the central piece of configuration. That makes it one of the most important files of your persistence layer.

Hier wird auch die Persistance Unit bennant.

A **persistence unit** defines a set of configuration and metadata for managing entities and connecting to the database. It is declared here in the persistence.xml.

<persistence xmlns="http://xmlns.jcp.org/xml/ns/persistence"

version="2.2">

**<persistence-unit name="my-persistence-unit">**

<class>com.example.model.User</class>

<class>com.example.model.Order</class>

<properties>

<property name="javax.persistence.jdbc.url" value="jdbc:postgresql://localhost:5432/mydb"/>

<property name="javax.persistence.jdbc.user" value="postgres"/>

<property name="javax.persistence.jdbc.password" value="password"/>

<property name="javax.persistence.jdbc.driver" value="org.postgresql.Driver"/>

Ich muss sie dann verbinden wenn ich die Entity Manager Factory erstelle:

EntityManagerFactory emf = Persistence.createEntityManagerFactory("my-persistence-unit");

3. Die Entity Manager Factory erstellen.

Zum Beispiel vorläufig in der Main:

*//TIP To <b>Run</b> code, press <shortcut actionId="Run"/> or  
// click the <icon src="AllIcons.Actions.Execute"/> icon in the gutter.*public class Main {  
 public static void main(String[] args) {  
 try {  
 EntityManagerFactory emf = Persistence.*createEntityManagerFactory*("wifi-persistence-unit");  
 emf.close(); *// enough to trigger schema creation* } catch (Exception e) {  
 e.printStackTrace();  
 }  
  
 LoginView.*launch*(LoginView.class, args);  
 }  
}

Ohne dem erstellt er mir nicht die DB im PostgreSQL.

4. Die Klassen entsprechend annotieren.

**08.07.2025:**

Done self – referencing column in person entity.

CascadeType.PERSIST and CascadeType.MERGE. First means that the entity gets saved also the connected entitiy gets saved. Merge means the same with updated.

@ManyToOne  
@JoinColumn(name = "superior\_id")  
private Person superior;  
*//TODO try the subordinates with a set*@OneToMany(mappedBy = "superior", cascade = {CascadeType.*PERSIST*, CascadeType.*MERGE*})  
private List<Person> subordinates = new ArrayList<>();

Saving a Collection in the PostgresDatabase and the collection is also of enum elements:

Still person entity:

@ElementCollection(targetClass = Role.class)  
@Enumerated(EnumType.*STRING*)  
@CollectionTable(  
 name = "roles",  
 joinColumns = @JoinColumn(name = "person\_id")  
)  
@Column(name = "role")  
private Set<Role> roles;

@ElementCollection kennzeichnet mir das ganze als Collection vom Typ. In dem Fall role.

@Enumerated sagt speichere das als String.

@CollectionTable damit stelle ich die Normalform sicher. Hierin speichert er die Collection Elements. Ist eine eigene Tablle.

@Colum ist der Name der Tabelle

**14.07.2025:**

Habe mich bei dem Context für eine Singelton Klasse entschieden weil ich dann einfach klarere Dependencies in den einzelnen Klassen habe:

package org.fabianandiel.context;  
  
import org.fabianandiel.constants.Role;  
  
import java.util.Set;  
  
public class UserContext {  
 private static UserContext *instance*;  
 private String username;  
 private Set<Role> roles;  
  
 private UserContext() {  
 }  
  
 public static UserContext getInstance() {  
 if (*instance* == null) {  
 *instance* = new UserContext();  
 }  
 return *instance*;  
 }  
  
 public void initSession(String username, Set<Role> roles) {  
 this.username = username;  
 this.roles = roles;  
 }  
  
 public String getUsername() {  
 return username;  
 }  
  
 public Set<Role> getRoles() {  
 return roles;  
 }  
  
 public boolean hasRole(String role) {  
 return roles != null && roles.contains(role);  
 }  
  
 public void clearSession() {  
 this.username = null;  
 this.roles = null;  
 }  
  
}

No Eager when I do self reference in Hibernate:

Bescause then he goes into an infinte loop of loading data

Hibernate doesn't know that you only want to stop at **one level**. So:

1. It loads Person A
2. Sees EAGER → loads subordinates B and C
3. B and C are also Person → Hibernate sees EAGER on **their** subordinates fields
4. Hibernate now tries to load **B’s subordinates**, even though you never asked for it
5. That starts a **chain** (possibly infinite if the data structure is deep)

This is called **cascading eager loading** — and it happens **automatically** unless stopped.

…..

@Id  
@GeneratedValue(strategy = GenerationType.*UUID*)  
@Column(name="person\_id",nullable = false,updatable = false)  
private UUID id;  
@Column(name="firstname",nullable = false)  
private String firstname;  
@Column(name="lastname",nullable = false)  
private String lastname;  
@ManyToOne  
@JoinColumn(name = "address\_id")  
private Address address;  
@Column(name="telephone",nullable = false)  
private int telephone;  
@Column(name="email",nullable = false,unique = true)  
private String email;  
@Column(name="username",nullable = false,unique = true)  
private String username;  
@Column(name="password",nullable = false)  
private String password;  
@ManyToOne  
@JoinColumn(name = "superior\_id")  
private Person superior;  
  
**@OneToMany(mappedBy = "superior", cascade = {CascadeType.*PERSIST*, CascadeType.*MERGE*})  
private Set<Person> subordinates = new HashSet<>();  
  
@ElementCollection(targetClass = Role.class, fetch = FetchType.*EAGER*)  
@Enumerated(EnumType.*STRING*)  
@CollectionTable(  
 name = "roles",  
 joinColumns = @JoinColumn(name = "person\_id")  
)**  
@Column(name = "role")  
private Set<Role> roles;

…..

Why doesn’t this happen with the role table? Because it is a separate table and here he goes person->role

Great — let’s break it down clearly.

**❗What is a LazyInitializationException?**

It's a common Hibernate error:

org.hibernate.LazyInitializationException: could not initialize proxy - no Session

**✅ Meaning:**

You're trying to access a **lazy-loaded field** (like a Set<Person> or a List<Role>) **after the database session is already closed**.

Hibernate says:

"You asked me to delay loading this data (LAZY), but now I don’t have access to the database anymore — so I can't get it for you."

**🔍 When it happens:**

@OneToMany(mappedBy = "superior", fetch = FetchType.LAZY)

private Set<Person> subordinates;

Person person = personDAO.findById(id); // session is open here

System.out.println(person.getUsername()); // works

entityManager.close(); // session closed

System.out.println(person.getSubordinates()); // ❌ LazyInitializationException

**✅ The fix: JOIN FETCH**

**🛠️ What it means:**

A **JOIN FETCH query** tells Hibernate:

“Even if the field is lazy, **load it now while the session is still open**.”

**Example:**

SELECT DISTINCT p

FROM Person p

LEFT JOIN FETCH p.subordinates

WHERE p.id = :id

Now when you do:

Person person = personDAO.findByIdWithSubordinates(id);

System.out.println(person.getSubordinates()); // ✅ Works, because they were preloaded

**✅ Why it works**

| **Without JOIN FETCH** | **With JOIN FETCH** |
| --- | --- |
| Hibernate waits until you access the field | Hibernate loads it immediately in the same query |
| May fail if the session is closed | Works even after session closes |
| LazyInitializationException | ❌ |

**📦 Summary**

| **Term** | **What it means** |
| --- | --- |
| LazyInitializationException | You accessed a LAZY field after the session closed |
| JOIN FETCH | A query that tells Hibernate to load lazy fields immediately |
| Best Practice | Keep fields LAZY in the entity, and load them with JOIN FETCH only when needed |

Let me know if you want a utility method that safely fetches a person with roles and subordinates in one go!

**🔍 What is JOIN FETCH?**

JOIN FETCH is a special JPQL (Java Persistence Query Language) keyword that tells Hibernate:

"Join this related entity and load its data **immediately**, even if it’s marked as LAZY."

Trotzdem kann man sich nicht zu 100% drauf verlassen. Keine lazy geloadeden Fields in hash code and equals.

**16.07.2025:**

Wichtig bei den Annotations ist das jenachdem was ich von wo aus ansprechen will. Welche Direktionalität zwischen den Entitäten ob ich many to one und one to Many auf beiden Seiten mache?

**26.07.2025:**

Bei toEpochDay wird den Tagen einfach eine Nummer zugeordnet wieiviele Tage seit dem 01.01.1970 und dann kann man die Tage voneinander abziehen:

private long calculateDaysOfPastRequests(List<Request> pastRequests) {  
 return pastRequests.stream()  
 .mapToLong(req -> req.getEndDate().toEpochDay() - req.getStartDate().toEpochDay() + 1)  
 .sum();  
}

Das eine ist 23tsdm das andere 23100.

MapToLong:

long total = requests.stream()

.mapToLong(req -> req.getEndDate().toEpochDay() - req.getStartDate().toEpochDay() + 1)

.sum();

This means:

Take each Request object from the list.

Calculate how many days the request lasts.

Convert that value into a long.

Sum() adds everything together.

28.07.2025:

Effectively final.

Great question! Let's go deeper into that sentence:

**“Because Java remembers the value of the variable at the time the lambda is written.”**

That’s actually a simplified way to explain how **closures** work in Java.

**🔧 What really happens?**

When you use a variable inside a **lambda**, Java *captures* that variable’s **value** — **not** the variable itself.

**📦 Example:**

String message = "Hello";

Runnable r = () -> System.out.println(message);

Here’s what Java does:

* It copies the **value** "Hello" into the lambda when it’s created.
* It does **not** keep a reference to the message variable.
* So if message changes later, the lambda wouldn’t know.

**❌ Problem if changes were allowed:**

String message = "Hello";

Runnable r = () -> System.out.println(message); // lambda "remembers" message

message = "Goodbye"; // changing message

r.run(); // Which value should it print?

You might expect "Goodbye" — but Java already *copied* "Hello" into the lambda earlier.

→ This could lead to bugs if Java allowed it.

**✅ That’s why Java says:**

“Only allow variables in lambdas if they’re **not going to change** — i.e., if they are **effectively final**.”

This makes the lambda predictable and safe.

Would you like to see how this works in memory or how other languages (like JavaScript) handle this differently?

07.08.2025:

Throws only for checked Exception

11.08.2025:

JPQL

JPQL stands for “Java Persistence Query Language.” It is a platform-independent object-oriented query language used in the Java Persistence API (JPA) to perform database operations on Java objects. JPQL is similar in syntax and purpose to SQL (Structured Query Language), but it operates on Java objects and is specifically designed for use with JPA, which is a Java specification for managing relational data in applications.

*/\*\*  
 \* Gets all the persons who have at least the role  
 \* @param role role that persons at least have to have  
 \* @return a list of persons that at least have that role  
 \*/*public List<Person> getPersonsByRole(Role role) {  
 String jpql = "SELECT p FROM Person p WHERE :param MEMBER OF p.roles";  
 return DAOService.*findItemsWithPropertyOrProperties*(jpql,Person.class,EntityManagerProvider.*getEntityManager*(),role);  
}

MEMBER OF tests is value you provided to query (or defined with expression) member of values in some collection in your entity.

JOINS AND LEFT JOIN:

A **join** in database terms is simply a way to combine rows from two (or more) tables based on a related column.

Think of it like this:

* You have a **Person** table.
* You have a **Roles** table (or roles collection table in your case) linked to Person via person\_id.
* If you want both the person’s data **and** their roles in one query, you need to “join” those tables.

Warum ein left Join:

Weil ich alles von der ursprünglichen Tabelle haben will egal ob die gejointe Tabelle Werte hat oder nicht.

Bei join fetch habe ich das left rausgenommen, da jeder mindestens eine Rolle hat andere rausgenommen.

13.08.2025:

public void clockOut() {  
 if (!timeBookingStartTime.getText().isEmpty() && timeBookingEndTime.getText().isEmpty() && this.currentTimeStamp.getTimeBookingEndTime() == null) {  
 this.executorService.submit(() -> {  
 EntityManager em = EntityManagerProvider.*getEntityManager*();  
 try {  
 em.getTransaction().begin();  
 LocalTime time = LocalTime.*now*();  
 this.currentTimeStamp.setTimeBookingEndTime(time);  
 this.updateWorkedHours(this.currentTimeStamp);  
 em.merge(this.currentTimeStamp);

**LOAD THE USER INSTANCE – NOT FROM THE CONTEXT TO PREVENT MULTIPLE ACCESSES**

UUID userId = UserContext.*getInstance*().getId();  
 Person currentUser = em.find(Person.class, userId);  
 currentUser.setStatus(Status.*ABSENT*);  
 em.merge(currentUser);  
 em.getTransaction().commit();  
 Platform.*runLater*(() -> {

**SINCE THE JAVAFX THREAD IS THE OWNER OF THE UI – THE CONTEXT FUELS THE UI I UPDATE IT HERE**

UserContext.*getInstance*().getPerson().setStatus(Status.*ABSENT*);  
 this.timeBookingEndTime.setText(time.toString());  
 this.timeBookingClockOut.setDisable(true);  
 this.initializeActualHours();  
 this.initializeDifferenceBetweenActualAndTarget();  
 });  
 } catch (RuntimeException e) {  
 e.printStackTrace();  
 if (em.getTransaction().isActive()) {  
 em.getTransaction().rollback();  
 }  
 Platform.*runLater*(()->{  
 GUIService.*setErrorText*(Constants.*PLEASE\_CONTACT\_SUPPORT*, this.timeBookingErrorText);  
 this.currentTimeStamp.setTimeBookingEndTime(null);  
 this.timeBookingEndTime.clear();  
 this.timeBookingClockOut.setDisable(false);  
 });  
 } finally {  
 em.close();  
 }  
 });  
 }  
}

Brauche auch kein em.merge:

*/\*\*  
 \* writes the clock in time in the DB and disables button  
 \*/*public void clockIn() {  
 if (timeBookingStartTime.getText().isEmpty() && this.currentTimeStamp.getTimeBookingStartTime() == null) {  
 this.executorService.submit(() -> {  
 EntityManager em = EntityManagerProvider.*getEntityManager*();  
 try {  
 em.getTransaction().begin();  
  
 LocalTime time = LocalTime.*now*();  
 UUID currentTimeStampId = this.currentTimeStamp.getId();  
 *//No em.merge() because I alredy have the entity with em.find* TimeStamp currentTimeStamp = em.find(TimeStamp.class, currentTimeStampId);  
 currentTimeStamp.setTimeBookingStartTime(time);  
  
  
 UUID userId = UserContext.*getInstance*().getId();  
 *//No em.merge() because I alredy have the entity with em.find* Person currentUser = em.find(Person.class, userId);  
 currentUser.setStatus(Status.*PRESENT*);  
 em.getTransaction().commit();  
 Platform.*runLater*(  
 () -> {  
 UserContext.*getInstance*().getPerson().setStatus(Status.*PRESENT*);  
 this.currentTimeStamp.setTimeBookingStartTime(time);  
 this.timeBookingClockIn.setDisable(true);  
 this.timeBookingStartTime.setText(time.toString());  
 }  
 );  
 } catch (RuntimeException e) {  
 e.printStackTrace();  
 if (em.getTransaction().isActive()) {  
 em.getTransaction().rollback();  
 }  
 Platform.*runLater*(()->{  
 GUIService.*setErrorText*(Constants.*PLEASE\_CONTACT\_SUPPORT*, this.timeBookingErrorText);  
 this.currentTimeStamp.setTimeBookingStartTime(null);  
 this.timeBookingStartTime.clear();  
 this.timeBookingClockIn.setDisable(false);  
 });  
 } finally {  
 em.close();  
 }  
 });  
 }  
}  
  
  
*/\*\*  
 \* writes the clock out time in the DB and disables button  
 \*/*public void clockOut() {  
 if (!timeBookingStartTime.getText().isEmpty() && timeBookingEndTime.getText().isEmpty() && this.currentTimeStamp.getTimeBookingEndTime() == null) {  
 this.executorService.submit(() -> {  
 EntityManager em = EntityManagerProvider.*getEntityManager*();  
 try {  
 em.getTransaction().begin();  
  
 LocalTime time = LocalTime.*now*();  
  
 UUID currentTimeStampId = this.currentTimeStamp.getId();  
 *//No em.merge because I alredy have the entity with em.find* TimeStamp currentTimeStamp = em.find(TimeStamp.class, currentTimeStampId);  
 currentTimeStamp.setTimeBookingEndTime(time);  
 double hours = calculateWorkedHours(currentTimeStamp);  
 currentTimeStamp.setWorkedHours(hours);  
  
 UUID userId = UserContext.*getInstance*().getId();  
 *//No em.merge because I alredy have the entity with em.find* Person currentUser = em.find(Person.class, userId);  
 currentUser.setStatus(Status.*ABSENT*);  
   
 em.getTransaction().commit();  
  
 Platform.*runLater*(() -> {  
 this.currentTimeStamp.setTimeBookingEndTime(time);  
 this.currentTimeStamp.setWorkedHours(hours);  
 UserContext.*getInstance*().getPerson().setStatus(Status.*ABSENT*);  
 this.timeBookingEndTime.setText(time.toString());  
 this.timeBookingClockOut.setDisable(true);  
 this.initializeActualHours();  
 this.initializeDifferenceBetweenActualAndTarget();  
 });  
 } catch (RuntimeException e) {  
 e.printStackTrace();  
 if (em.getTransaction().isActive()) {  
 em.getTransaction().rollback();  
 }  
 Platform.*runLater*(() -> {  
 GUIService.*setErrorText*(Constants.*PLEASE\_CONTACT\_SUPPORT*, this.timeBookingErrorText);  
 this.currentTimeStamp.setTimeBookingEndTime(null);  
 this.timeBookingEndTime.clear();  
 this.timeBookingClockOut.setDisable(false);  
 });  
 } finally {  
 em.close();  
 }  
 });  
 }

14.08.2024:

Es geht darum dass Lambdas nur finale oder effektiv finale Variablen akzeptieren.

**🧠 The Problem in Plain Words**

Java **doesn't let lambdas change local variables** from outside the lambda, because:

💬 **Lambdas take a *copy* of the variable's value — not a live reference to it.**  
So if the original variable later changes, the lambda won’t see the change.

That would cause confusing bugs.  
To prevent that, Java **requires variables to be final or *effectively final*.**

**Lambdas get compiled to inner classes:**

String name = "Fabian";

Runnable r = () -> System.out.println(name);

under the hood, Java turns that into something like (simplified):

java

Kopieren

Bearbeiten

class MyLambda implements Runnable {

private final String capturedName;

MyLambda(String name) {

this.capturedName = name; // copy

}

@Override

public void run() {

System.out.println(capturedName);

}

}

That’s almost exactly how an inner class works when it captures a variable from the outer method — it copies the value into a field in the generated class.

Because this copy is made when the lambda (or inner class) is created, the variable has to be final or effectively final — otherwise, the captured copy could get out of sync with the real variable.

**🎒 Real-world metaphor: The sealed envelope**

Imagine:

* You write a note (“Use version 1”) and put it in an envelope.
* You give that envelope to your friend to read later (like a lambda running later).
* Then *you* change your mind and write a new note: “Use version 2”.
* But your friend already left with the **sealed envelope** — they still have version 1.

That’s what Java lambdas do.  
They **get a copy** of the value when they are created — not the latest live value.

**💻 Code Example**

String name = "Fabian";

Runnable r = () -> {

System.out.println(name); // OK ✅ name is not changed later

};

name = "Andiel"; // ❌ Now name is no longer effectively final

r.run(); // ERROR at compile time

**❓Why is this an error?**

Because the lambda got a **copy** of "Fabian" when it was created.  
But now "name" is changed to "Andiel" — so if the lambda still prints "Fabian", that would be confusing and **not what you expect**.

So Java says: **“No, only final (unchanging) variables allowed.”**

Ausgangslage:

Wollte verhindern, dass 2 Threads auf dieseleben Felder zugreifen. Das wollte ich ursprünglich über die Felder in der Klasse lösen. Leider habe ich dann das Problem dass 2 Threads diese beschreiben bzw. lesen und das ist nicht gut.

Wenn es sicherer sein soll.

**1️⃣ Why your current structure prevents “reading too early”**

You have:

executorService.submit(() -> {

List<Person> personsWithoutSuperiorTemp = null;

try {

personsWithoutSuperiorTemp = this.personController.getEmployeesWithoutSuperior();

} catch (...) { ... }

final List<Person> personsWithoutSuperior = personsWithoutSuperiorTemp;

Platform.runLater(() -> {

initializeEmployeeTableViewAccordingToAuthorization(personsWithoutSuperior);

});

});

Here’s what happens step-by-step:

1. executorService.submit(...) schedules a background task.
2. That background task **runs completely** up to the point where you call Platform.runLater(...).
   * In that same background thread, you **first** initialize personsWithoutSuperiorTemp.
   * Then you copy it to personsWithoutSuperior (final local variable).
3. Platform.runLater(...) schedules the UI update for *later* on the JavaFX Application Thread.
4. The personsWithoutSuperior you pass into Platform.runLater is **a copy of the fully-initialized value** from the background thread.
5. When the FX thread runs your lambda, it **uses that exact copy** — there’s no way for it to get there before initialization.

**2️⃣ Why it’s safe here, but unsafe with fields**

If you instead did:

this.personsWithoutSuperiorList = this.personController.getEmployeesWithoutSuperior();

Platform.runLater(() -> {

initializeEmployeeTableViewAccordingToAuthorization(this.personsWithoutSuperiorList);

});

That’s **not guaranteed safe** by the Java Memory Model, because:

* You’re writing to a **field** in one thread, and reading it from another thread.
* Without proper synchronization (like volatile or synchronized blocks), there’s *theoretical* risk of the FX thread reading a stale or partially constructed object.

**3️⃣ Key difference**

* **Local final variables captured in a lambda** → Java ensures safe publication, so the FX thread always sees the correct value.
* **Instance fields written in one thread and read in another** → no safe publication guarantee unless you synchronize.