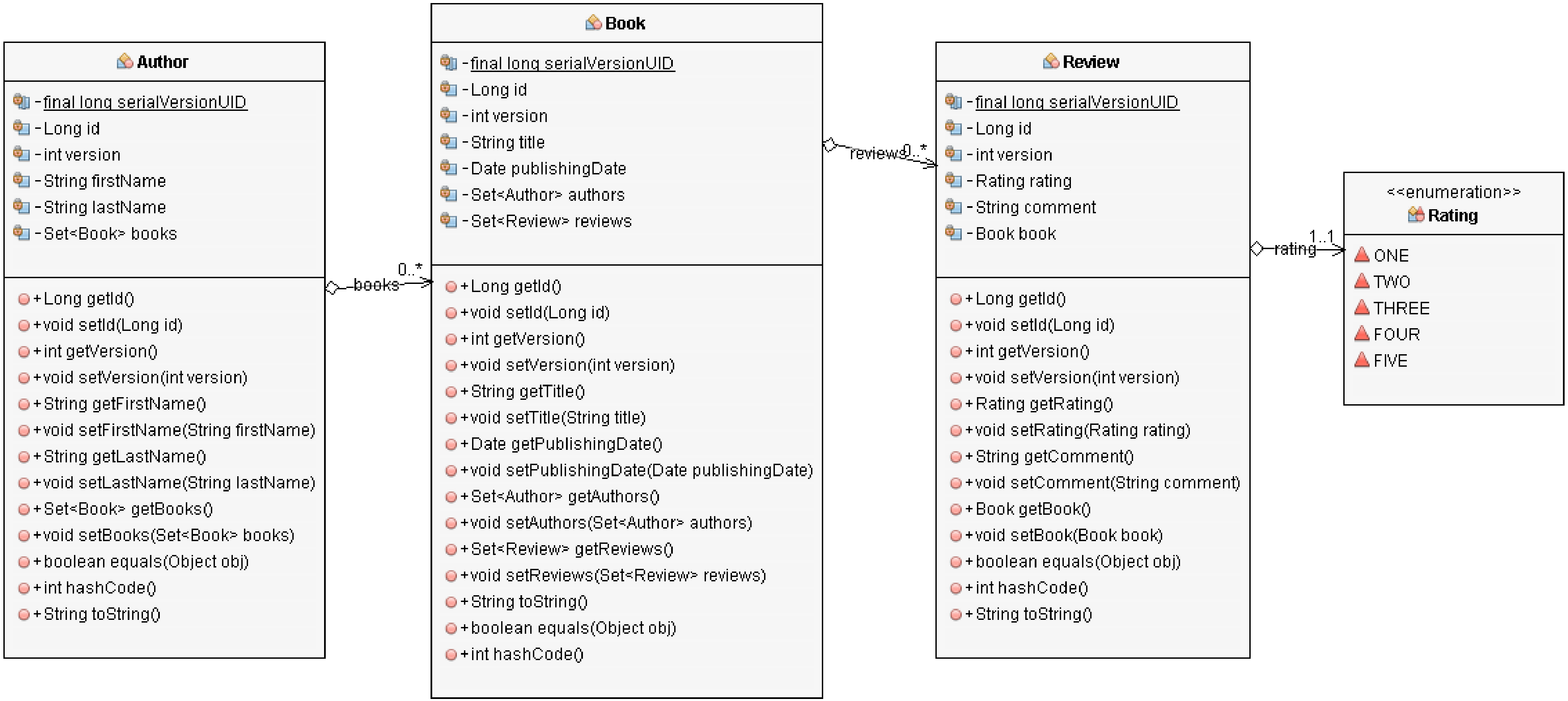
How to find and fix N+1 Select Issues with Hibernate

Part 1:
What is the n+1 select issue and how to find it?

Course Structure

- Part 1:
  - What is the n+1 select issue?
  - How to find it in your project?
- Part 2:
  - Solving n+1 select issues with @NamedEntityGraphs
- Part 3:
  - Solving n+1 select issues with dynamic EntityGraphs

Application



Author

- final long serialVersionUID
- Long id
- int version
- String firstName
- String lastName
- Set<Book> books

+Long getId()
+void setId(Long id)
+int getVersion()
+void setVersion(int version)
+String getFirstName()
+void setFirstName(String firstName)
+String getLastName()
+void setLastName(String lastName)
+Set<Book> getBooks()
+void setBooks(Set<Book> books)
+boolean equals(Object obj)
+int hashCode()
+String toString()

Book

- final long serialVersionUID
- Long id
- int version
- String title
- Date publishingDate
- Set<Author> authors
- Set<Review> reviews

+Long getId()
+void setId(Long id)
+int getVersion()
+void setVersion(int version)
+String getTitle()
+void setTitle(String title)
+Date getPublishingDate()
+void setPublishingDate(Date publishingDate)
+Set<Author> getAuthors()
+void setAuthors(Set<Author> authors)
+Set<Review> getReviews()
+void setReviews(Set<Review> reviews)
+String toString()
+boolean equals(Object obj)
+int hashCode()

Review

- final long serialVersionUID
- Long id
- int version
- Rating rating
- String comment
- Book book

+Long getId()
+void setId(Long id)
+int getVersion()
+void setVersion(int version)
+Rating getRating()
+void setRating(Rating rating)
+String getComment()
+void setComment(String comment)
+Book getBook()
+void setBook(Book book)
+boolean equals(Object obj)
+int hashCode()
+String toString()

<<enumeration>>
Rating

ONE
TWO
THREE
FOUR
FIVE

What Is The N+1 Select Issue?

N+1 Select?

- Most common cause for performance problems
- Lazy fetching of related entities creates too many queries

```
List<Author> authors = this.em.createQuery("SELECT a FROM Author a",
                                                    Author.class).getResultList();

for (Author a : authors) {
        System.out.println("Author " + a.getFirstName() + " " + a.getLastName()
                              + " wrote " + a.getBooks().size() + “ Books.”));
}
```

How To Find N+1 Select Issues?

Hibernate Statistics

- Activate via system property
  - *hibernate.generate_statistics = true*
- Configure logging
  - *org.hibernate.stat = DEBUG*

Hibernate Statistics

```
20:20:33,611 DEBUG ConcurrentStatisticsImpl:412 - HHH000117: HQL:
SELECT a FROM Author a, time: 71ms, rows: 11
```

Time spend for this query

Number of selected rows

Hibernate Statistics

```
20:20:33,840  INFO StatisticalLoggingSessionEventListener:275 - Session
Metrics {
    23327 nanoseconds spent acquiring 1 JDBC connections;
    0 nanoseconds spent releasing 0 JDBC connections;
    6971380 nanoseconds spent preparing 12 JDBC statements;
    4711970 nanoseconds spent executing 12 JDBC statements;
    0 nanoseconds spent executing 0 JDBC batches;
    0 nanoseconds                                    uts;
    0 nanoseconds                                    its;
    0 nanoseconds                                    nisses;
    81382687 nanoseconds spent executing 1 flushes (flushing a total of 17
entities and 23 collections);
    77911 nanoseconds spent executing 1 partial-flushes (flushing a total of 0
entities and 0 collections)
}
```

Time spend to execute SQL statements

Number of SQL statements