## The Book Shop Constraints and Denormalization

From the class presentation, you know that there are 4 constraint types. Three can be modeled in the ER diagram and the fourth cannot.

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| **CONSTRAINT TYPES** | |
| Entity Integrity | No part of a primary key can be NULL |
| Referential Integrity | A foreign key must match an existing primary key value (or else be NULL) |
| Column Integrity | A column must contain only values consistent with the defined data format of the column |
| User-Defined Integrity | The data stored in a database must comply with the rules of the business |

**Constraints for the Book Shop**

Identify and describe all the Constraints that cannot be modeled in the ER Diagram from the Book Shop Scenario.

User-Defined Integrity (Check Constraint) - If the year a book was published is available, the year will never be before 1600. In the TITLE table, the PublicationDate > 1600.

User-Defined Integrity (Check Constraint) - The publication date will never fall after 2099. In the TITLE table, the PublicationDate < 2099.

User-Defined Integrity (Trigger) – Either the First Name or the Last Name for the CUSTOMER must be filled in. The trigger occurs on Insert and Update.

User-Defined Integrity (Trigger) – An ORDER is tracked through changing ORDER\_STATUS from Order Taken to Complete. The trigger occurs on an Insert and an Update.

User-Defined Integrity(DBA) – The manager and Assistant manager only must have SELECT, UPDATE, INSERT, DELETE privileges on EMPLOYEE, EMPLOYEE\_POSITION, POSITION, SECURITY\_LEVEL

User-Defined Integrity(DBA) – All Employees need INSERT, UPDATE, SELECT on ORDER and ORDER\_LINE\_ITEM

User-Defined Integrity(DBA) - The Managers need UPDATE privileges for AUTHOR, TITLE, AUTHOR\_TITLE, BOOK, RATING, CUSTOMER, PAYMENT\_METHOD, ORDER\_STATUS

User-Defined Integrity(DBA) – All Employees need SELECT on AUTHOR, TITLE, BOOK, AUTHOR\_TITLE, CUSTOMER

User-Defined Integrity() – A book can’t be removed from the store until it’s been marked paid. So the Status won’t change to completed until the payment date has been filled in.

**Denormalization for the Book Shop**

Identify the Denormalization, **if any**, need to meet the customer requirements in the Book Shop Scenario.

TotalSale in ORDER – This is a calculated field. A trigger needs to be added to the ORDER\_LINE\_ITEM table so each time an order is inserted, updated, or deleted. The TotalSale in Order is recalculated.

ORDERID in the BOOK table – This is a derived field to set the status of the BOOK. If it is NULL, the book is available, if it is NOT NULL then the book has been sold.