

Course: IST-659
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Homework #4
Due Date: 4/22/2020
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Topic: Lab04 – Normalization

Part-1

Case Study 2 - More Bicycles

Pre-3NFifying relationship is as follows:

OrderItem(Order Num, Line, Item Number, Description, Qty Ordered, Price Each)

Process of 3NFifying:

Identify the Transitive Functional Dependencies (TFDs) from the data. From the table, filtering on non-key attribute Item Number based on a few instances shows a clear TFD between Item Number and Description:

Order Num	Line	Item Number	Description	Qty Ordered	Price Each
106	1	FA-10000	Bicycle Model 30,26"	100	\$280.00
110	1	FA-10000	Bicycle,Model-30,26"	250	\$280.00
116	1	FA-10000	Bicycle,Model-30,26"	100	\$290.00

Order Num	Line	Item Number	Description	Qty Ordered	Price Each
109	2	CP-15000	Seat,Deluxe	1,500	\$8.00
110	4	CP-15000	Seat,Deluxe	100	\$4.00
116	3	CP-15000	Seat,Deluxe	50	\$5.00

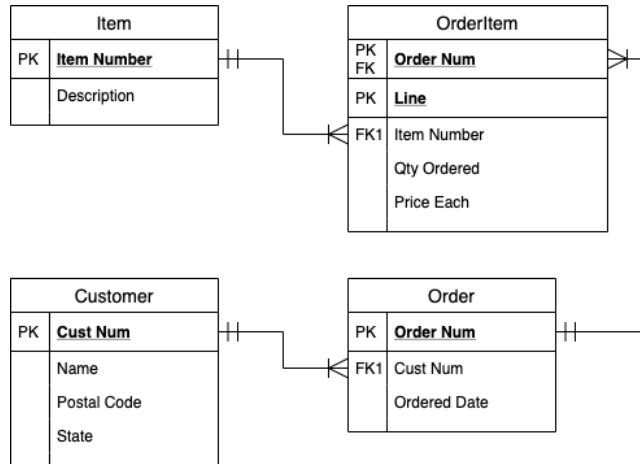
We could therefore create a new relation Item as below with Item Number as the Primary Key (PK) in the new table Item which exists as a Foreign Key (FK) in the parent table OrderItem:

- Item(Item Number, Description)
- OrderItem(Order Num, Line, Item Number, Qty Ordered, Price Each)

Existing relationships are already in 3NF form:

Order (Order Num, Cust Num, Ordered Date)
Customer (Cust Num, Name, Postal Code, State)

The corresponding E-ERD can be represented by:



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Case Study 3 – Books Again

PublisherID	PublisherName	BookID	BookTitle	Authors	PublishedYear
1	Pearson	2	Modern Database Management	Hoffer, Kamesh, Topi	2015
3	Data Structures and Algorithm Analysis in C++	Weiss		2014	
2	Addison Wesley	1	Languages and Machines	Sudkamp	1997

The Books table comprises multi-values in the Authors column for BookID = 2. This means it is in ONF form.

Step-1: Converting to 1NF form, the Books table should look like this

BookID	BookTitle	Authors	Published Year	PublisherName
1	Languages and Machines	Sudkamp	1997	Addison Wesley
2	Modern Database Management	Hoffer	2015	Pearson
2	Modern Database Management	Kamesh	2015	Pearson
2	Modern Database Management	Topi	2015	Pearson

3	Data Structures and Algorithm Analysis in C++	Weiss	2014	Pearson
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Step-2: Converting to 2NF form

Identifying **Candidate Keys**: BookID, Authors

At the outset, the relationship is:

- Books(BookID, BookTitle, Authors, PublishedYear, PublisherName)

Identify and resolve PFD between non-key attributes & candidate keys - BookTitle, Published Year and PublisherName and are partially dependent on BookID, the resultant relationships are:

- BooksInfo(BookID, BookTitle, PublishedYear, PublisherName)
- Books(BookID, Authors)

Step-3: Converting to 3NF form

Identifying and resolving TFD in table BooksInfo & Books:

BookID	BookTitle	Published Year	Publisher Name
1	Languages and Machines	1997	Addison Wesley
2	Modern Database Management	2015	Pearson
3	Data Structures and Algorithm Analysis in C++	2014	Pearson

BookID	Authors
1	Sudkamp
2	Hoffer
2	Kamesh
2	Topi
3	Weiss

Since no TFDs exist the tables are in 3NF with relationships:

- BooksInfo(BookID, BookTitle, PublishedYear, PublisherName)
- Books(BookID, Authors)

Part-2

Initial relationship:

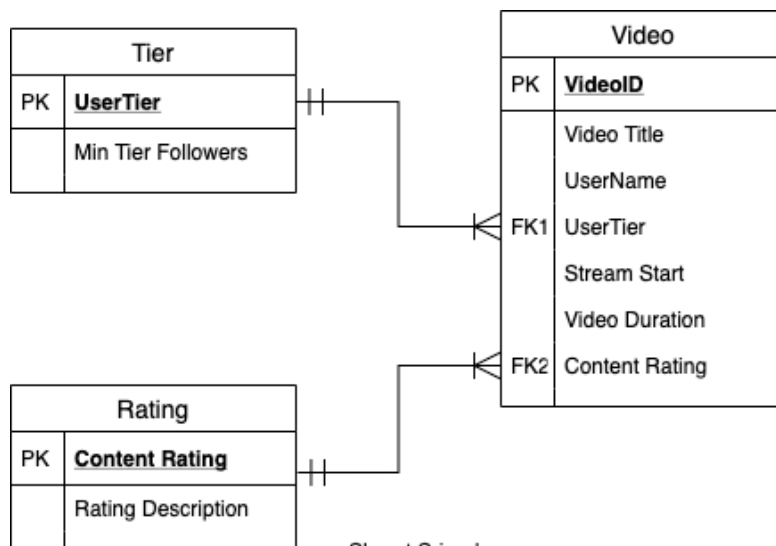
Video(VideoID, Video Title, UserName, UserTier, Min Tier Followers, Stream Start, Video Duration(mins), Content Rating, Rating Description)

After 3NFifying:

Non-key attributes TFD exists between UserTier & Min Tier Followers + Content Rating & Rating Description). The relationships therefore can be represented as:

- Tier(UserTier, Min Tier Followers)
- Rating(Content Rating, Rating Description)
- Video(VideoID, Video Title, UserName, *UserTier*, Stream Start, Video Duration(mins), *Content Rating*)

The corresponding E-ERD can be represented by:



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