

Links

Wednesday, July 24, 2024 10:39 AM

This Notebook: <https://1drv.ms/o/s!AknT1SrRpCz-xvJQXWnhOEQjO7vKwA?e=Vz65A7>

GitHub: [vivekduttamishra/202407-g7cr-sqlserver \(github.com\)](https://github.com/vivekduttamishra/202407-g7cr-sqlserver)

Assignments

Thursday, July 25, 2024

11:35 AM

Assingmnet 2.1

Lalit
John
Naveen
Saifulla

Assignment 2.2

1. Vamsi
2. Prasad
3. Sathish
4. John
5. Keerthana
6. Shiva Krishna
7. Tejashwani
8. Nagasritha
9. Jahnavi
10. Prasanna
11. xx

DBMS

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Creating Table

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The screenshot shows the SQL Server Enterprise Manager interface. On the left, the Object Explorer displays the 'new_db2' database under 'Databases'. The 'Tables' folder is expanded, showing a table named 'dbo.Books'. On the right, the SQL Query window shows the following SQL command:

```
CREATE TABLE new_db2.dbo.Books(  
    TITLE VARCHAR(100)  
);
```

Below the SQL command, the Messages pane shows the following output:

```
Commands completed successfully.  
Completion time: 2024-07-24T14:34:56.8582139+05:30
```

Green arrows indicate the flow from the Object Explorer to the SQL command and the Messages pane.

Schema

- Groups related items together.
- It groups similar items
- The default schema is dbo
- Can group
 - Table
 - View
 - StoredProc-

Creating Table With Fields

```
CREATE TABLE books(  
    TITLE VARCHAR(200) NOT NULL,  
    AUTHOR VARCHAR(200) NOT NULL,  
    PRICE DECIMAL NOT NULL CHECK(PRICE>=0),  
    RATING DECIMAL CHECK(RATING>=1 AND RATING<=5),  
    COVER VARCHAR(512) DEFAULT(' /unknown.png')  
);
```

Column Names

- Represents Object Properties

Data types associated with the field

- Includes data types and precessions

Constraints (additional validation properties)

- NOT NULL
- CHECK for conditions

Azure Studio Notebook

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- A Jupyter style notebook for SqlSever
 - Jupyter is quite popular with Python developers
- Allows us to record
 - Notes
 - Codes
 - Code Output

The screenshot displays the Azure Studio Notebook interface. At the top, there's a header bar with 'Notebook-1', a 'Welcome' tab, and a 'SQLQuery_1 - disconnected' tab. Below this is a toolbar with a '+ Cell' button, a 'Run all' button, a 'Kernel' dropdown set to 'SQL', and an 'Attach to' dropdown set to 'localhost\SQLEXPRESS, <def'. The main content area is titled 'Creating a New Database' and contains a bullet point: 'We can create a database using **CREATE DATABASE** command'. Below this is a code cell with the SQL command: `[1] 1 CREATE DATABASE books_db_g7cr_202407;`. To the right of the code cell is a label 'SQL Code'. Below the code cell is an output box containing the text: 'Commands completed successfully.' and 'Total execution time: 00:00:00.133'. To the right of the output box is a label 'Output of the command is also recorded'. A blue arrow points from the title 'Creating a New Database' to the 'Notes' label on the right. An orange arrow points from the SQL code to the 'SQL Code' label. A green arrow points from the output text to the 'Output of the command is also recorded' label.

Notebook-1 • Welcome SQLQuery_1 - disconnected X

+ Cell ▾ ▶ Run all Kernel SQL ▾ Attach to localhost\SQLEXPRESS, <def ▾

Creating a New Database

- We can create a database using **CREATE DATABASE** command

```
[1] 1 CREATE DATABASE books_db_g7cr_202407;
```

SQL Code

Commands completed successfully.

Total execution time: 00:00:00.133

Output of the command is also recorded

Notes

Insert

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Approach #1 Provide Column Name And values

- Values must be provided in the same order as column name

```
[4] 1  INSERT
    2  INTO BOOKS(TITLE,AUTHOR,PRICE,RATING,COVER)
    3  VALUES ('The Accursed God','Vivek Dutta Mishra',299, 4.7, 'tag.png');
```

SQL

(1 row affected)

Success

Approach #2 Provide Only Values

```
[5] 1  INSERT
    2  INTO BOOKS
    3  VALUES ('Manas','Vivek Dutta Mishra',199, 4.6, 'manas.png');
```

(1 row affected)

- Column Name will be in the same order as Create Table definition

```
CREATE TABLE books(
  TITLE VARCHAR(200) NOT NULL,
  AUTHOR VARCHAR(200) NOT NULL,
  PRICE DECIMAL NOT NULL CHECK(PRICE>=0),
  RATING DECIMAL CHECK(RATING>=1 AND RATING<=5),
  COVER VARCHAR(512) DEFAULT('/unknown.png')
);
```

Insert with constraint failure results in error

```
[19] 1  INSERT
    2  INTO BOOKS(TITLE,PRICE,RATING)
    3  VALUES ('Rashmirathi',299, 4.7);
```

SQL

Msg 515, Level 16, State 2, Line 1
Cannot insert the value NULL into column 'AUTHOR' table 'books_db_g7cr_202407.dbo.books'; column does not allow nulls. INSERT fails.

The statement has been terminated.

Total execution time: 00:00:00.003

```
+ ↓ ↑ ☐ ☒ ...
1  INSERT
2  INTO BOOKS(TITLE,AUTHOR,PRICE,RATING)
3  VALUES ('Rashmirathi','Ramdhari Singh Dinkar',299, 10);
```

SQL

Msg 547, Level 16, State 0, Line 1
The INSERT statement conflicted with the CHECK constraint "CK_books_RATING_5165187F". The conflict occurred in database "books_db_g7cr_202407", table "dbo.books", column 'RATING'.

The statement has been terminated.

"dbo.books", column "RATING".

The statement has been terminated.

Total execution time: 00:00:00.004

Group By Query

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- Group By Splits The Given Table into multiple Sub Tables based on a Unique Key
- For Example
 - We can group our Books By Author
 - Now our table will logically split into multiple tables one for each author
- Now We return result that will have
 - 1 row information for each group.

	TITLE	AUTHOR	PRICE	RATING	COVER
1	The Count of Monte Cristo	Alexandre Dumas	499.00	4.80	cristo.jpg
2	The man in the Iron Mask	Alexandre Dumas	299.00	3.80	iron.jpg
3	Ajaya	Anant Neelkanthan	299.00	3.10	ajaya.jpg
4	Asura	Anant Neelkanthan	199.00	2.80	asura.jpg
5	Harry Potter and the Philosophers Stone	JK Rowling	299.00	4.50	hp01.jpg
6	Harry Potter and the and the Chamber of Secrets	JK Rowling	199.00	4.40	hp02.jpg
7	Harry Potter and the Prisoner of Askaban	JK Rowling	499.00	4.20	hp03.jpg
8	Harry Potter and the Goblet of Fire	JK Rowling	599.00	4.20	hp04.jpg
9	Harry Potter and the Order of Phoenix	JK Rowling	399.00	4.70	hp05.jpg
10	Harry Potter and the Half-blood Prince	JK Rowling	599.00	4.50	hp06.jpg
11	Harry Potter and the Deathly Hollows	JK Rowling	499.00	4.70	hp07.jpg
12	The Accursed Gild	JK Rowling	399.00	4.10	tac.jpg
13	Rashmirathi	Ramdhari Singh Dinkar	299.00	4.70	/unknown.png
14	Kurukshetra	Ramdhari Singh Dinkar	99.00	4.50	kurukshetra.jpg
15	The Accursed God	Vivek Dutta Mishra	299.00	4.70	tag.png
16	Manas	Vivek Dutta Mishra	199.00	4.60	manas.png

Group By Author

- There will be one group of rows per distinct author
- The Query will return a result where each group will be represented by a single row
 - Irrespective of the number of rows present in the group

What Can I Represent in a single Row about a Group of Rows

Alexandre Dumas						
Anant Neelkanthan						
JK Rowling						
Ramdhari Singh Dinkar						
Vivek Dutta Mishra						

- We can't add anything which has multiple values
 - Example
 - Title
 - Each group has more than 1 title. We can't include in a single row
 - Same goes for
 - Price, Cover, Rating
- We can Include Author (Group Key)
 - All Rows have same Author.

- Returns rows in a given group and not in entire Books table

1 SELECT

2 AUTHOR,

3 COUNT(*) AS BOOKS_WRITTEN,

4 AVG(RATING) AS AVG_RATING

5 FROM

6 BOOKS

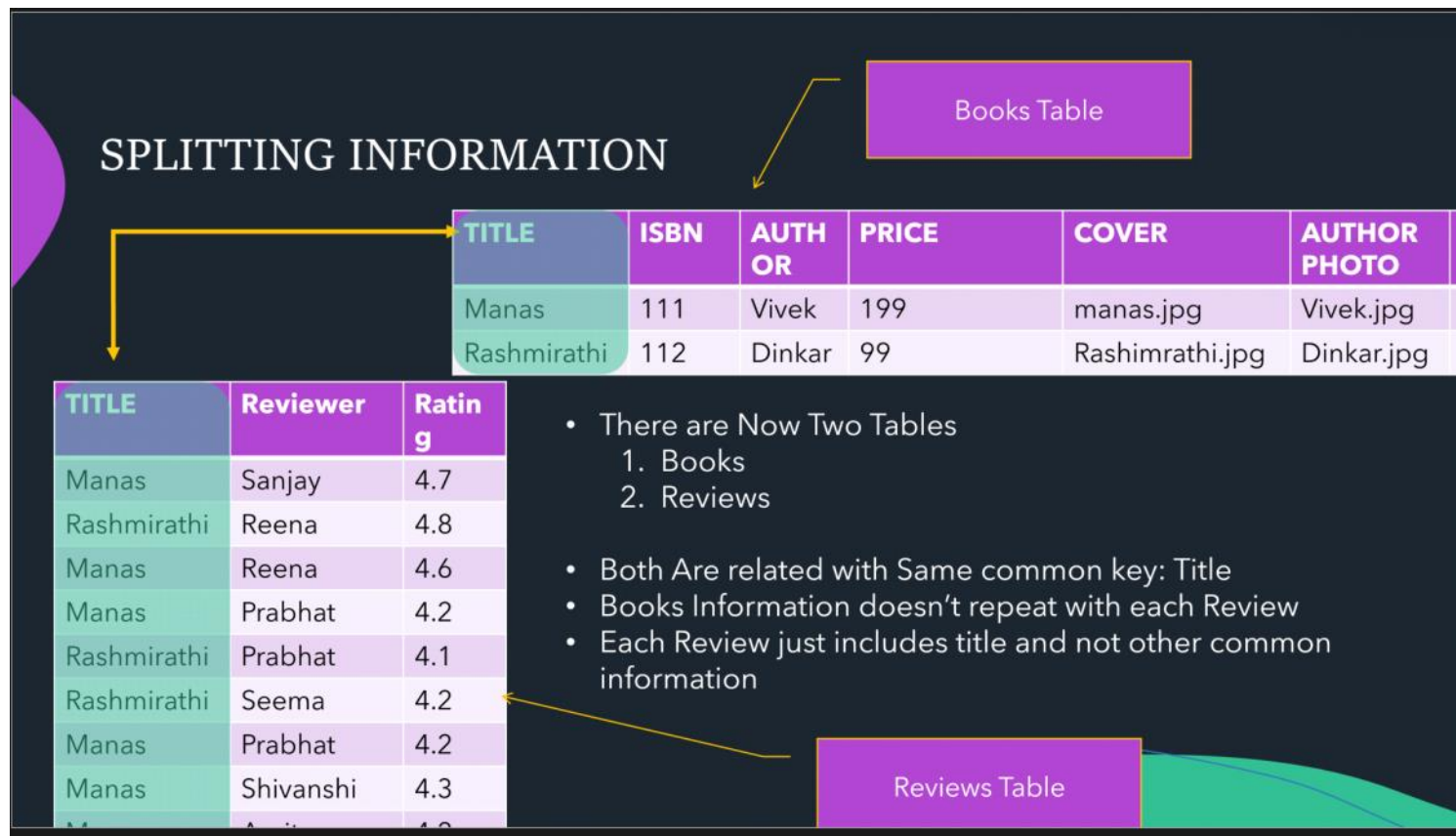
7 GROUP BY

8 AUTHOR

Operates on the rows
Within the group and not on the entire table

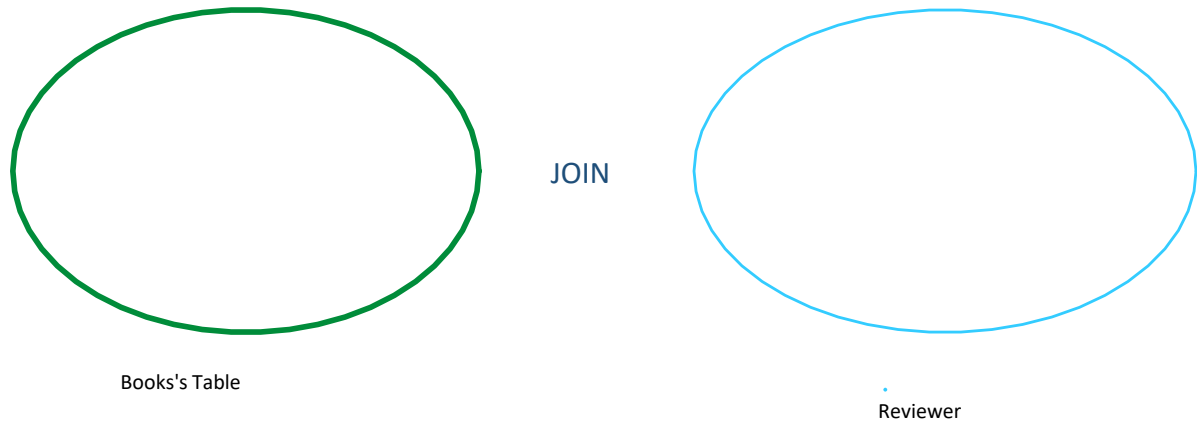
Assignment 01.01

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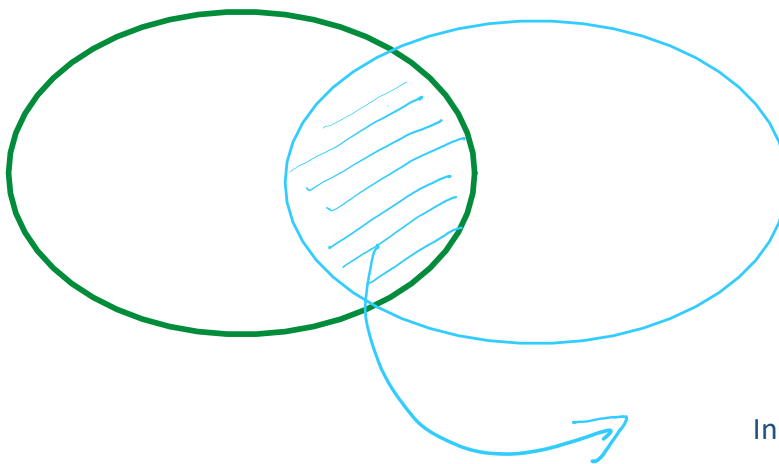
Joints

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Default Result without Join is Cartisian Product of two

We want to join overlapping (related data)

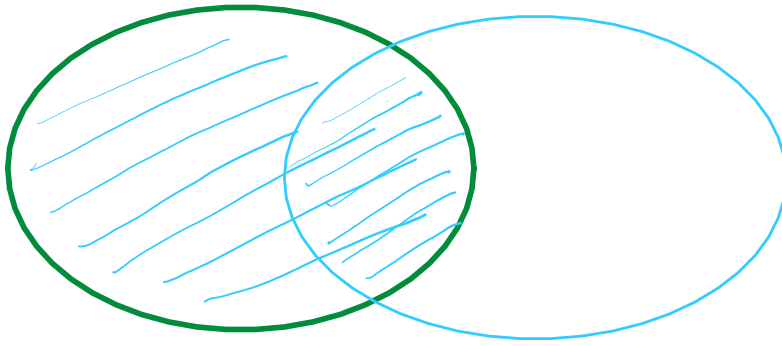


Inner Join

- Take only those rows from both sides which are related
- The relating values should be present in both sides
- ANY ROW IN EITHER TABLE WITHOUT A CORRESPONDENCE IN ANOTHER IS IGNORED.
- This behavior is similar to what we get with WHERE CLAUSE

Left Outer Join

LEFT TABLE → MENTIONED IN FROM CLAUSE
RIGHT TABLE → MENTIONED BY THE JOIN CLAUSE



- We take all Rows from
 - the Left Table
 - Mentioned in FROM CLAUSE
 - And match It with corresponding rows in
 - the right table
 - MENTIONED BY JOIN
- If there is No correspondence in the right table the right table cells are filled with NULL VALUE
- Any row in right table that is not present in left is IGNORED

Sql for books

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Composite Keys

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- Sometimes we can't uniquely identify a record (object) based on a single field
- We may have multiple information to identify a unique Value

In our example

- Book title is not guaranteed to be unique
 - Different authors can write books with same title
- ISBN is also not guaranteed to be unique
 - Same book may have different ISBN
- To find out all the details of a book, we can identify with a combination of these two fields

	TITLE	ISBN	AUTHOR	DESCRIPTION	PRICE	COVER	AUTHOR_PHOTO	AUTHOR_BIOGRAPHY	Format
1	The Accursed God	111	Vivek Dutta Mishra	NULL	299.00	tag.png	vivek.png	NULL	PB
2	Manas	112	Vivek Dutta Mishra	NULL	199.00	manas.png	vivek.png	NULL	PB
3	Rashmirathi	113	Ramdhari Singh Dinkar	NULL	99.00	rashmirath.png	dinkar.png	NULL	PB
4	The Count of Monte Cristo	114	Alexandre Dumas	NULL	499.00	cristo.png	dumas.png	NULL	PB
5	The Accursed God	115	Vivek Dutta Mishra	NULL	99.00	tag.png	vivek.png	NULL	EB
6	Manas	116	Vivek Dutta Mishra	NULL	99.00	manas.png	vivek.png	NULL	EB
7	Rashmirathi	117	Ramdhari Singh Dinkar	NULL	99.00	rashmirath.png	dinkar.png	NULL	EB
8	The Count of Monte Cristo	118	Alexandre Dumas	NULL	199.00	cristo.png	dumas.png	NULL	EB
9	The Accursed God	119	Vivek Dutta Mishra	NULL	499.00	tag.png	vivek.png	NULL	HB
10	Rashmirathi	120	Ramdhari Singh Dinkar	NULL	199.00	rashmirath.png	dinkar.png	NULL	HB

Composite Key.

- They together identify the entire row.
- Combination will create unique row

We still have Redundant Data in our application

- We have a combination title*isbn rows
- It causes a problem

Problem:


- What should the Review Depend on?
 - Title?
 - Different books may have same title
 - ISBN?
 - Same book may have different title
 - Reviews for one ISBN will not reflect in other ISBN or same book
 - Title+ISBN?
 - That is same as ISBN

Normalization #2

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Problem that 2NF solves

- All non identity column must depend on the entire key
 - No non-identity column should depend on partial key
- In our example our identity is based on
 - Title
 - ISBN
- But some information are based only on
 - ISBN
 - Format
 - Price
 - Cover
 - Title
 - Author
 - Description
 - Reviews



	TITLE	ISBN	AUTHOR	DESCRIPTION	PRICE	COVER	AUTHOR_PHOTO	AUTHOR_BIOGRAPHY	Format
1	The Accursed God	111	Vivek Dutta Mishra	NULL	299.00	tag.png	vivek.png	NULL	PB
2	Manas	112	Vivek Dutta Mishra	NULL	199.00	manas.png	vivek.png	NULL	PB
3	Rashmirathi	113	Ramdhari Singh Dinkar	NULL	99.00	rashmirath.png	dinkar.png	NULL	PB
4	The Count of Monte Cristo	114	Alexandre Dumas	NULL	499.00	cristo.png	dumas.png	NULL	PB
5	The Accursed God	115	Vivek Dutta Mishra	NULL	99.00	tag.png	vivek.png	NULL	EB
6	Manas	116	Vivek Dutta Mishra	NULL	99.00	manas.png	vivek.png	NULL	EB
7	Rashmirathi	117	Ramdhari Singh Dinkar	NULL	99.00	rashmirath.png	dinkar.png	NULL	EB
8	The Count of Monte Cristo	118	Alexandre Dumas	NULL	199.00	cristo.png	dumas.png	NULL	EB
9	The Accursed God	119	Vivek Dutta Mishra	NULL	499.00	tag.png	vivek.png	NULL	HB
10	Rashmirathi	120	Ramdhari Singh Dinkar	NULL	199.00	rashmirath.png	dinkar.png	NULL	HB

2NF

- Make sure non-identity column should depend on entire identity value

Phase #1

- To do this we can split the whole code in two table and move identity column in different tables
 - Avoid composite key

	TITLE	DESCRIPTION	AUTHOR	AUTHOR_PHOTO	AUTHOR_BIOGRAPHY
1	Manas	NULL	Vivek Dutta Mishra	vivek.png	NULL
2	Rashmirathi	NULL	Ramdhari Singh Dinkar	dinkar.png	NULL
3	The Accursed God	NULL	Manoj Kumar	manoj.png	NULL
4	The Accursed God	NULL	Vivek Dutta Mishra	vivek.png	NULL
5	The Count of Monte Cristo	NULL	Alexandre Dumas	dumas.png	NULL

	ISBN	PRICE	FORMAT	COVER	Book_ID
					4
1	111	299.00	PB	tag.png	1
2	112	199.00	PB	manas.png	2
3	113	99.00	PB	rashmirath.png	5
4	114	499.00	PB	cristo.png	4
5	115	99.00	EB	tag.png	1
6	116	99.00	EB	manas.png	2

What is the link/join between these two tables?

- We can't link it on
 - ISBN
 - Title
- Sometimes we may not have a natural (real-world) column to link the details

4	114	499.00	PB	cristo.png	4
5	115	99.00	EB	tag.png	1
6	116	99.00	EB	manas.png	2
7	117	99.00	EB	rashmirath.png	4
8	118	199.00	EB	cristo.png	4
9	119	499.00	HB	tag.png	1
10	120	199.00	HB	rashmirath.png	3
11	121	299.00	PB	cover.png	3
12	122	299.00	PB	cover-2.png	

- We can't link it on
 - ISBN
 - Title
- Sometimes we may not have a natural (real-world) column to link the details
- In such cases we can create a synthetic key to uniquely identify the details of
 - It could be a simple numerical id.

Phase #2 Add a Synthetic Column to Master

Normalization#3

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1. For a database to be in 3NF

- There should be no transitive dependency
- All non-primary columns should depend on the primary column only
- It shouldn't depend on any other column

	TITLE	DESCRIPTION	AUTHOR	AUTHOR_PHOTO	AUTHOR_BIOGRAPHY
1	Manas	NULL	Vivek Dutta Mishra	vivek.png	NULL
2	Rashmirathi	NULL	Ramdhari Singh Dinkar	dinkar.png	NULL
3	The Accursed God	NULL	Manoj Kumar	manoj.png	NULL
4	The Accursed God	NULL	Vivek Dutta Mishra	vivek.png	NULL
5	The Count of Monte Cristo	NULL	Alexandre Dumas	dumas.png	NULL

Solution

- Any column that doesn't depend on the primary key (key column) doesn't belong to this table
- We can Isolate interdependent columns in a separate table and link them

Phase #1

	TITLE	DESCRIPTION	AUTHOR	AUTHOR_PHOTO	AUTHOR_BIOGRAPHY
1	Manas	NULL	Vivek Dutta Mishra	vivek.png	NULL
2	Rashmirathi	NULL	Ramdhari Singh Dinkar	dinkar.png	NULL
3	The Accursed God	NULL	Manoj Kumar	manoj.png	NULL
4	The Accursed God	NULL	Vivek Dutta Mishra	vivek.png	NULL
5	The Count of Monte Cristo	NULL	Alexandre Dumas	dumas.png	NULL

Authors

ID	TITLE	DESCRIPTION	AUTHOR_ID
1	Manas	NULL	1
2	Rashmirathi	NULL	2
3	The Accursed God	NULL	1
4	The Accursed God	NULL	3
5	The Count of Monte Cristo	NULL	4

ID	AUTHOR	AUTHOR_PHOTO	AUTHOR_BIOGRAPHY
1	Vivek Dutta Mishra	vivek.png	NULL
2	Ramdhari Singh Dinkar	dinkar.png	NULL
3	Manoj Kumar	manoj.png	NULL
4	Alexandre Dumas	dumas.png	NULL

Phase 2: JOIN them on PK/FK

Assignment 2

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6:03 PM

- Implement all tables needed as per 3NF
 - Books
 - ISBNs
 - Authors
 - Reviews
- Add some data as per the current code.