

Project – Phase 2

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Quick recap Phase 1: We started creating a conceptual design with an ER diagram. The diagram shows the entities, the relationship between tables and the constraints of Primary key and Foreign Key. After creating we had a quick discussion on how the ER could be improved with more fields for the tables.

We worked on this and designed the final version of the ER diagram. This version allowed us to design the SQL statements to create the database called **LibraryManagementSystem**, the **[Publisher]**, **[Category]**, **[Book]**, **[Author]**, **[BookAuthor]**, **[LibraryBranch]**, **[Borrower]**, **[BookLoans]**, **[BookCopies]** and **[ArchiveTable]** tables and insert the values into them.

Check below the script to create the tables of the file *Library Management System.sql*:

```
USE master
GO

IF DB_ID('LibraryManagementSystem') IS NOT NULL
DROP DATABASE LibraryManagementSystem

CREATE DATABASE LibraryManagementSystem
GO

USE [LibraryManagementSystem]
/***** Object: Table [dbo].[Publisher] Script Date: 03/04/2023 *****/
CREATE TABLE [dbo].[Publisher](
    [PubID] [int] IDENTITY(1,1) NOT NULL,
    [PubName] [varchar](50) NULL,
    [PubContact] [varchar](50) NULL,
    [PubAddress] [varchar](50) NULL,
    [PubCity] [varchar](50) NULL,
    [PubState] [char](2) NULL,
    [PubZIP] [varchar](20) NULL,
    [PubPhone] [varchar](50) NULL,
    CONSTRAINT [PK_Publisher] PRIMARY KEY ([PubID])
)
GO

/***** Object: Table [dbo].[Category] Script Date: 03/04/2023 *****/
CREATE TABLE [dbo].[Category] (
    [CatID] [int] IDENTITY(1,1) NOT NULL,
    [CatName] varchar(50) NULL,
    [CatDescription] varchar(max) NULL,
    [CatType] [varchar](50) NULL,
    CONSTRAINT [PK_Category] PRIMARY KEY ([CatID]),
)
GO

/***** Object: Table [dbo].[Book] Script Date: 03/04/2023 *****/
CREATE TABLE [dbo].[Book] (
    [ISBN] varchar(15) NOT NULL,
```

```

[PubID] [int] NOT NULL,
[CatID] [int] NOT NULL,
[BookTitle] varchar (50) NOT NULL,
[BookDescription] varchar(max) NULL,
[PubDate] [date] NULL,
CONSTRAINT [PK_Book] PRIMARY KEY ([ISBN]),
CONSTRAINT [FK_Publisher] FOREIGN KEY ([PubID]) REFERENCES [dbo].[Publisher]([PubID]),
CONSTRAINT [FK_Category] FOREIGN KEY ([CatID]) REFERENCES [dbo].[Category]([CatID]),
)
GO

```

/****** Object: Table [dbo].[Author] Script Date: 03/04/2023 *****/

```

CREATE TABLE [dbo].[Author] (
[AuthorID] [int] IDENTITY(1,1) NOT NULL,
[AuthorLastName] varchar(50) NULL,
[AuthorFirstName] varchar(50) NULL,
CONSTRAINT [PK_Author] PRIMARY KEY ([AuthorID]),
)
GO

```

/****** Object: Table [dbo].[BookAuthor] Script Date: 03/04/2023 *****/

```

CREATE TABLE [dbo].[BookAuthor] (
[AuthorID] [int] NOT NULL,
[ISBN] varchar(15) NOT NULL,
CONSTRAINT [PK_BookAuthor] PRIMARY KEY ([AuthorID], [ISBN]),
CONSTRAINT [FK_Book] FOREIGN KEY ([ISBN]) REFERENCES [dbo].[Book]([ISBN]),
CONSTRAINT [FK_Author] FOREIGN KEY ([AuthorID]) REFERENCES [dbo].[Author]([AuthorID])
)
GO

```

/****** Object: Table [dbo].[LibraryBranch] Script Date: 03/04/2023 *****/

```

CREATE TABLE [dbo].[LibraryBranch] (
[BranchID] [int] IDENTITY(1,1) NOT NULL,
[BranchName] [varchar](50) NULL,
[BranchAddress] [varchar](50) NULL,
[BranchCity] [varchar](50) NULL,
[BranchState] [char](2) NULL,
[BranchZIP] [varchar](20) NULL,
CONSTRAINT [PK_LibraryBranch] PRIMARY KEY ([BranchID])
)
GO

```

/****** Object: Table [dbo].[Borrower] Script Date: 03/04/2023 *****/

```

CREATE TABLE [dbo].[Borrower](
[CardNo] [int] IDENTITY(1,1) NOT NULL,
[BorrowerLName] [varchar](50) NULL,
[BorrowerFName] [varchar](50) NULL,
[BorrowerAddress] [varchar](50) NULL,
[BorrowerCity] [varchar](50) NULL,
[BorrowerState] [char](2) NULL,
[BorrowerZIP] [varchar](20) NULL,
[BorrowerPhone] [varchar](50) NULL,
CONSTRAINT [PK_Borrower] PRIMARY KEY ([CardNo])
)
GO

```

```

/***** Object: Table [dbo].[BookLoans] Script Date: 03/04/2023 *****/
CREATE TABLE [dbo].[BookLoans] (
[LoanID] [int] IDENTITY(1,1) NOT NULL,
[ISBN] varchar (15) NOT NULL,
[BranchID] [int] NOT NULL,
[CardNo] [int] NOT NULL,
[BorrowedDate] [datetime2] NOT NULL,
[DueDate] [datetime2] NOT NULL,
[ReturnedDate] [datetime2] NULL,
[Status] char (1) NULL,
[FineAmount] money NULL,
[FineStatus] varchar(15) NULL,
CONSTRAINT [PK_BookLoans] PRIMARY KEY ([LoanID]),
CONSTRAINT [FK_BookLoans_Book] FOREIGN KEY ([ISBN]) REFERENCES [dbo].[Book]([ISBN]),
CONSTRAINT [FK_BookLoans_LibraryBranch] FOREIGN KEY ([BranchID]) REFERENCES
[dbo].[LibraryBranch]([BranchID]),
CONSTRAINT [FK_BookLoans_Borrower] FOREIGN KEY ([CardNo]) REFERENCES
[dbo].[Borrower]([CardNo])
)
GO

/***** Object: Table [dbo].[BookCopies] Script Date: 03/04/2023 *****/
CREATE TABLE [dbo].[BookCopies](
[ISBN] [varchar](15) NOT NULL,
[BranchID] [int] NOT NULL,
[NumOfCopies] [int] NOT NULL,
[Status] [varchar](15) NOT NULL,
CONSTRAINT [PK_BookCopies] PRIMARY KEY ([ISBN], [BranchID]),
CONSTRAINT [FK_BookCopies_Book] FOREIGN KEY ([ISBN]) REFERENCES [dbo].[Book]([ISBN]),
CONSTRAINT [FK_BookCopies_LibraryBranch] FOREIGN KEY ([BranchID]) REFERENCES
[dbo].[LibraryBranch]([BranchID])
)
GO

/***** Object: Table [dbo].[ArchiveTable] Script Date: 03/04/2023 *****/
CREATE TABLE [dbo].[ArchiveTable] (
[ArchiveID] [int] IDENTITY(1,1) NOT NULL,
[LoanID] [int],
[ISBN] [varchar](15) NULL,
[BranchID] [int] NULL,
[CardNO] [int] NULL,
[BorrowedDate] [date] NULL,
[DueDate] [date] NULL,
[ReturnedDate] [date] NULL,
[FineAmount] [money] NULL,
[FineStatus] [varchar](15) NULL,
CONSTRAINT [PK_ArchiveTable] PRIMARY KEY ([ArchiveID]),
)
GO

```

Check bellow the script to insert the values of the file [Insertion.sql](#):

```
-- INSERT INTO PUBLISHER TABLE
```

```
INSERT INTO [dbo].[Publisher] ([PubName], [PubContact], [PubAddress], [PubCity],
[PubState], [PubZIP], [PubPhone])
```

```
VALUES ('Penguin Random House', 'John Smith', '123 Main St', 'New York', 'NY', '10001',  
'555-1234');
```

```
INSERT INTO [dbo].[Publisher] ([PubName], [PubContact], [PubAddress], [PubCity],  
[PubState], [PubZIP], [PubPhone])  
VALUES ('HarperCollins Publishers', 'Jane Doe', '456 Oak St', 'Chicago', 'IL', '60601',  
'555-5678');
```

```
INSERT INTO [dbo].[Publisher] ([PubName], [PubContact], [PubAddress], [PubCity],  
[PubState], [PubZIP], [PubPhone])  
VALUES ('Hachette Book Group', 'Bill Johnson', '789 Elm St', 'Los Angeles', 'CA',  
'90001', '555-9012');
```

```
INSERT INTO [dbo].[Publisher] ([PubName], [PubContact], [PubAddress], [PubCity],  
[PubState], [PubZIP], [PubPhone])  
VALUES ('Simon & Schuster', 'Susan Lee', '321 Pine St', 'San Francisco', 'CA', '94101',  
'555-3456');
```

```
INSERT INTO [dbo].[Publisher] ([PubName], [PubContact], [PubAddress], [PubCity],  
[PubState], [PubZIP], [PubPhone])  
VALUES ('Macmillan Publishers', 'David Lee', '654 Maple St', 'Seattle', 'WA', '98101',  
'555-7890');
```

```
INSERT INTO [dbo].[Publisher] ([PubName], [PubContact], [PubAddress], [PubCity],  
[PubState], [PubZIP], [PubPhone])  
VALUES ('Scholastic Corporation', 'Amy Chen', '987 Cedar St', 'Boston', 'MA', '02101',  
'555-2345');
```

```
INSERT INTO [dbo].[Publisher] ([PubName], [PubContact], [PubAddress], [PubCity],  
[PubState], [PubZIP], [PubPhone])  
VALUES ('Houghton Mifflin Harcourt', 'Chris Lee', '246 Walnut St', 'Denver', 'CO',  
'80201', '555-6789');
```

```
INSERT INTO [dbo].[Publisher] ([PubName], [PubContact], [PubAddress], [PubCity],  
[PubState], [PubZIP], [PubPhone])  
VALUES ('Random House', 'Jennifer Kim', '753 Oak St', 'Atlanta', 'GA', '30301', '555-  
0123');
```

```
INSERT INTO [dbo].[Publisher] ([PubName], [PubContact], [PubAddress], [PubCity],  
[PubState], [PubZIP], [PubPhone])  
VALUES ('Bloomsbury Publishing', 'Mark Davis', '369 Elm St', 'Houston', 'TX', '77001',  
'555-4567');
```

```
INSERT INTO [dbo].[Publisher] ([PubName], [PubContact], [PubAddress], [PubCity],  
[PubState], [PubZIP], [PubPhone])  
VALUES ('Wiley', 'Sarah Brown', '951 Pine St', 'Miami', 'FL', '33101', '555-8901');
```

```
-- INSERT INTO CATEGORY TABLE
```

```
INSERT INTO [dbo].[Category] ([CatName], [CatDescription], [CatType])  
VALUES ('Fiction', 'A category for works of the imagination', 'Genre');
```

```
INSERT INTO [dbo].[Category] ([CatName], [CatDescription], [CatType])  
VALUES ('Non-Fiction', 'A category for works based on facts and real events', 'Genre');
```

```
INSERT INTO [dbo].[Category] ([CatName], [CatDescription], [CatType])  
VALUES ('Mystery', 'A category for works focused on solving a crime or puzzle', 'Genre');
```

```

INSERT INTO [dbo].[Category] ([CatName], [CatDescription], [CatType])
VALUES ('Science Fiction', 'A category for works based on scientific or futuristic
concepts', 'Genre');

INSERT INTO [dbo].[Category] ([CatName], [CatDescription], [CatType])
VALUES ('Romance', 'A category for works centered around romantic relationships',
'Genre');

INSERT INTO [dbo].[Category] ([CatName], [CatDescription], [CatType])
VALUES ('Horror', 'A category for works focused on creating fear and suspense', 'Genre');

INSERT INTO [dbo].[Category] ([CatName], [CatDescription], [CatType])
VALUES ('Self-Help', 'A category for works focused on personal growth and improvement',
'Genre');

INSERT INTO [dbo].[Category] ([CatName], [CatDescription], [CatType])
VALUES ('History', 'A category for works focused on past events and people', 'Genre');

INSERT INTO [dbo].[Category] ([CatName], [CatDescription], [CatType])
VALUES ('Biography', 'A category for works focused on the life of an individual',
'Genre');

INSERT INTO [dbo].[Category] ([CatName], [CatDescription], [CatType])
VALUES ('Business', 'A category for works focused on business and economics', 'Genre');

-- INSERTING TO THE BOOK TABLE

INSERT INTO [dbo].[Book] ([ISBN], [PubID], [CatID], [BookTitle], [BookDescription],
[PubDate])
VALUES ('9780802129965', 1, 1, 'The Overstory', 'A novel about trees and people', '2018-
04-03');

INSERT INTO [dbo].[Book] ([ISBN], [PubID], [CatID], [BookTitle], [BookDescription],
[PubDate])
VALUES ('9780735211286', 2, 2, 'The Immortalists', 'A novel about four siblings and their
fate', '2018-01-09');

INSERT INTO [dbo].[Book] ([ISBN], [PubID], [CatID], [BookTitle], [BookDescription],
[PubDate])
VALUES ('9780143109082', 3, 3, 'A Little Life', 'A novel about the lives of four
friends', '2015-03-10');

INSERT INTO [dbo].[Book] ([ISBN], [PubID], [CatID], [BookTitle], [BookDescription],
[PubDate])
VALUES ('9780385543781', 4, 1, 'Circe', 'A novel about the Greek goddess Circe', '2018-
04-10');

INSERT INTO [dbo].[Book] ([ISBN], [PubID], [CatID], [BookTitle], [BookDescription],
[PubDate])
VALUES ('9780525434194', 5, 4, 'The Power', 'A novel about a world where women have the
power', '2016-10-27');

INSERT INTO [dbo].[Book] ([ISBN], [PubID], [CatID], [BookTitle], [BookDescription],
[PubDate])

```

```
VALUES ('9780525563542', 6, 2, 'Normal People', 'A novel about the relationship between two people', '2018-04-16');
```

```
INSERT INTO [dbo].[Book] ([ISBN], [PubID], [CatID], [BookTitle], [BookDescription], [PubDate])
```

```
VALUES ('9780316463998', 7, 3, 'Red Rising', 'A science fiction novel about a future society', '2014-01-28');
```

```
INSERT INTO [dbo].[Book] ([ISBN], [PubID], [CatID], [BookTitle], [BookDescription], [PubDate])
```

```
VALUES ('9780593299597', 8, 4, 'The Final Girl Support Group', 'A thriller about a support group for final girls', '2021-07-13');
```

```
INSERT INTO [dbo].[Book] ([ISBN], [PubID], [CatID], [BookTitle], [BookDescription], [PubDate])
```

```
VALUES ('9780062896433', 9, 1, 'The Invisible Life of Addie LaRue', 'A novel about a woman who is cursed to be forgotten', '2020-10-06');
```

```
INSERT INTO [dbo].[Book] ([ISBN], [PubID], [CatID], [BookTitle], [BookDescription], [PubDate])
```

```
VALUES ('9780143108252', 10, 2, 'A Brief History of Seven Killings', 'A novel about Jamaica in the 1970s', '2014-10-02');
```

```
-- INSERT INTO AUTHOR TABLE
```

```
INSERT INTO [dbo].[Author] ([AuthorLastName], [AuthorFirstName]) VALUES ('Smith', 'John');
```

```
INSERT INTO [dbo].[Author] ([AuthorLastName], [AuthorFirstName]) VALUES ('Lee', 'Jessica');
```

```
INSERT INTO [dbo].[Author] ([AuthorLastName], [AuthorFirstName]) VALUES ('Garcia', 'Manuel');
```

```
INSERT INTO [dbo].[Author] ([AuthorLastName], [AuthorFirstName]) VALUES ('Nguyen', 'Thi');
```

```
INSERT INTO [dbo].[Author] ([AuthorLastName], [AuthorFirstName]) VALUES ('Miller', 'David');
```

```
INSERT INTO [dbo].[Author] ([AuthorLastName], [AuthorFirstName]) VALUES ('Wang', 'Hui');
```

```
INSERT INTO [dbo].[Author] ([AuthorLastName], [AuthorFirstName]) VALUES ('Gupta', 'Raj');
```

```
INSERT INTO [dbo].[Author] ([AuthorLastName], [AuthorFirstName]) VALUES ('Kim', 'Yun');
```

```
INSERT INTO [dbo].[Author] ([AuthorLastName], [AuthorFirstName]) VALUES ('Patel', 'Priya');
```

```
INSERT INTO [dbo].[Author] ([AuthorLastName], [AuthorFirstName]) VALUES ('Chen', 'Wei');
```

```
-- INSERT INTO BOOK AUTHOR TABLE
```

```
INSERT INTO [dbo].[BookAuthor] ([AuthorID], [ISBN]) VALUES (1, '9780802129965');
```

```
INSERT INTO [dbo].[BookAuthor] ([AuthorID], [ISBN]) VALUES (2, '9780735211286');
```

```
INSERT INTO [dbo].[BookAuthor] ([AuthorID], [ISBN]) VALUES (3, '9780143109082');
```

```
INSERT INTO [dbo].[BookAuthor] ([AuthorID], [ISBN]) VALUES (4, '9780385543781');
```

```
INSERT INTO [dbo].[BookAuthor] ([AuthorID], [ISBN]) VALUES (5, '9780525434194');
```

```
INSERT INTO [dbo].[BookAuthor] ([AuthorID], [ISBN]) VALUES (6, '9780525563542');
```

```
INSERT INTO [dbo].[BookAuthor] ([AuthorID], [ISBN]) VALUES (7, '9780316463998');
```

```
INSERT INTO [dbo].[BookAuthor] ([AuthorID], [ISBN]) VALUES (8, '9780593299597');
```

```
INSERT INTO [dbo].[BookAuthor] ([AuthorID], [ISBN]) VALUES (9, '9780062896433');
```

```
INSERT INTO [dbo].[BookAuthor] ([AuthorID], [ISBN]) VALUES (10, '9780143108252');
```

```
-- INSERT INTO LIBRARY BRANCH TABLE
```

```
INSERT INTO [dbo].[LibraryBranch] ([BranchName], [BranchAddress], [BranchCity],  
[BranchState], [BranchZIP])  
VALUES ('Central Library', '101 Main Street', 'Anytown', 'CA', '12345');
```

```
INSERT INTO [dbo].[LibraryBranch] ([BranchName], [BranchAddress], [BranchCity],  
[BranchState], [BranchZIP])  
VALUES ('North Branch', '555 1st Avenue', 'Smallville', 'NY', '67890');
```

```
INSERT INTO [dbo].[LibraryBranch] ([BranchName], [BranchAddress], [BranchCity],  
[BranchState], [BranchZIP])  
VALUES ('South Branch', '123 2nd Street', 'Big City', 'TX', '45678');
```

```
INSERT INTO [dbo].[LibraryBranch] ([BranchName], [BranchAddress], [BranchCity],  
[BranchState], [BranchZIP])  
VALUES ('West Branch', '456 3rd Avenue', 'Suburbia', 'IL', '78901');
```

```
INSERT INTO [dbo].[LibraryBranch] ([BranchName], [BranchAddress], [BranchCity],  
[BranchState], [BranchZIP])  
VALUES ('East Branch', '789 4th Street', 'Metropolis', 'GA', '23456');
```

```
INSERT INTO [dbo].[LibraryBranch] ([BranchName], [BranchAddress], [BranchCity],  
[BranchState], [BranchZIP])  
VALUES ('Downtown Branch', '321 5th Avenue', 'Smalltown', 'OH', '56789');
```

```
INSERT INTO [dbo].[LibraryBranch] ([BranchName], [BranchAddress], [BranchCity],  
[BranchState], [BranchZIP])  
VALUES ('Northwest Branch', '999 6th Street', 'Cityville', 'WA', '34567');
```

```
INSERT INTO [dbo].[LibraryBranch] ([BranchName], [BranchAddress], [BranchCity],  
[BranchState], [BranchZIP])  
VALUES ('Northeast Branch', '888 7th Avenue', 'Village', 'MA', '45678');
```

```
INSERT INTO [dbo].[LibraryBranch] ([BranchName], [BranchAddress], [BranchCity],  
[BranchState], [BranchZIP])  
VALUES ('Southwest Branch', '777 8th Street', 'Hometown', 'AZ', '23456');
```

```
INSERT INTO [dbo].[LibraryBranch] ([BranchName], [BranchAddress], [BranchCity],  
[BranchState], [BranchZIP])  
VALUES ('Southeast Branch', '666 9th Avenue', 'Hamlet', 'NC', '34567');
```

```
-- INSERT INTO BORROWER TABLE
```

```
INSERT INTO [dbo].[Borrower] ([BorrowerLName], [BorrowerFName], [BorrowerAddress],  
[BorrowerCity], [BorrowerState], [BorrowerZIP], [BorrowerPhone])  
VALUES ('Mike', 'John', '123 Main St', 'Anytown', 'CA', '12345', '555-1234');
```

```
INSERT INTO [dbo].[Borrower] ([BorrowerLName], [BorrowerFName], [BorrowerAddress],  
[BorrowerCity], [BorrowerState], [BorrowerZIP], [BorrowerPhone])  
VALUES ('Jones', 'Sara', '456 Oak Ave', 'Smallville', 'NY', '67890', '555-5678');
```

```
INSERT INTO [dbo].[Borrower] ([BorrowerLName], [BorrowerFName], [BorrowerAddress],  
[BorrowerCity], [BorrowerState], [BorrowerZIP], [BorrowerPhone])  
VALUES ('Davis', 'Michael', '789 Maple St', 'Big City', 'TX', '45678', '555-9876');
```

```
INSERT INTO [dbo].[Borrower] ([BorrowerLName], [BorrowerFName], [BorrowerAddress],
[BorrowerCity], [BorrowerState], [BorrowerZIP], [BorrowerPhone])
VALUES ('Lee', 'Jin', '321 6th St', 'Suburbia', 'IL', '78901', '555-2345');
```

```
INSERT INTO [dbo].[Borrower] ([BorrowerLName], [BorrowerFName], [BorrowerAddress],
[BorrowerCity], [BorrowerState], [BorrowerZIP], [BorrowerPhone])
VALUES ('Garcia', 'Maria', '654 Elm St', 'Metropolis', 'GA', '23456', '555-6789');
```

```
INSERT INTO [dbo].[Borrower] ([BorrowerLName], [BorrowerFName], [BorrowerAddress],
[BorrowerCity], [BorrowerState], [BorrowerZIP], [BorrowerPhone])
VALUES ('Chen', 'Wei', '987 Cedar Ave', 'Smalltown', 'OH', '56789', '555-3456');
```

```
INSERT INTO [dbo].[Borrower] ([BorrowerLName], [BorrowerFName], [BorrowerAddress],
[BorrowerCity], [BorrowerState], [BorrowerZIP], [BorrowerPhone])
VALUES ('Kim', 'Soo-Jin', '159 Pine St', 'Cityville', 'WA', '34567', '555-7890');
```

```
INSERT INTO [dbo].[Borrower] ([BorrowerLName], [BorrowerFName], [BorrowerAddress],
[BorrowerCity], [BorrowerState], [BorrowerZIP], [BorrowerPhone])
VALUES ('Wang', 'Ling', '753 Oak Ln', 'Village', 'MA', '45678', '555-2341');
```

```
INSERT INTO [dbo].[Borrower] ([BorrowerLName], [BorrowerFName], [BorrowerAddress],
[BorrowerCity], [BorrowerState], [BorrowerZIP], [BorrowerPhone])
VALUES ('Gomez', 'Carlos', '951 Maple Ave', 'Hometown', 'AZ', '23456', '555-8765');
```

```
INSERT INTO [dbo].[Borrower] ([BorrowerLName], [BorrowerFName], [BorrowerAddress],
[BorrowerCity], [BorrowerState], [BorrowerZIP], [BorrowerPhone])
VALUES ('Davis', 'Emma', '456 Park Ave', 'Denver', 'CO', '80205', '303-555-6789');
```

-- INSERT INTO BOOK LOANS TABLE

```
INSERT INTO [dbo].[BookLoans] ([ISBN], [BranchID], [CardNo], [BorrowedDate], [DueDate],
[Status])
SELECT '9780802129965', 1, [CardNo], '2023-02-28', '2023-03-15', 'B' FROM
[dbo].[Borrower] WHERE [BorrowerFName] = 'John';
```

```
INSERT INTO [dbo].[BookLoans] ([ISBN], [BranchID], [CardNo], [BorrowedDate], [DueDate],
[Status])
SELECT '9780735211286', 2, [CardNo], '2023-03-05', '2023-03-20', 'B' FROM
[dbo].[Borrower] WHERE [BorrowerFName] = 'Sara';
```

```
INSERT INTO [dbo].[BookLoans] ([ISBN], [BranchID], [CardNo], [BorrowedDate], [DueDate],
[Status])
SELECT '9780143109082', 3, [CardNo], '2023-03-17', '2023-04-01', 'B' FROM
[dbo].[Borrower] WHERE [BorrowerFName] = 'Michael';
```

```
INSERT INTO [dbo].[BookLoans] ([ISBN], [BranchID], [CardNo], [BorrowedDate], [DueDate],
[Status])
SELECT '9780385543781', 4, [CardNo], '2023-04-06', '2023-04-21', 'B' FROM
[dbo].[Borrower] WHERE [BorrowerFName] = 'Jin';
```

```
INSERT INTO [dbo].[BookLoans] ([ISBN], [BranchID], [CardNo], [BorrowedDate], [DueDate],
[Status])
SELECT '9780525434194', 5, [CardNo], '2023-03-21', '2023-04-05', 'B' FROM
[dbo].[Borrower] WHERE [BorrowerFName] = 'Maria';
```



```
INSERT INTO [dbo].[BookLoans] ([ISBN], [BranchID], [CardNo], [BorrowedDate], [DueDate],
[Status])
SELECT '9780525563542', 6, [CardNo], '2023-04-07', '2023-04-22', 'B' FROM
[dbo].[Borrower] WHERE [BorrowerFName] = 'Wei';
```

```
INSERT INTO [dbo].[BookLoans] ([ISBN], [BranchID], [CardNo], [BorrowedDate], [DueDate],
[Status])
SELECT '9780316463998', 7, [CardNo], '2023-03-27', '2023-04-11', 'B' FROM
[dbo].[Borrower] WHERE [BorrowerFName] = 'Soo-Jin';
```

```
INSERT INTO [dbo].[BookLoans] ([ISBN], [BranchID], [CardNo], [BorrowedDate], [DueDate],
[Status])
SELECT '9780593299597', 8, [CardNo], '2023-03-27', '2023-04-11', 'B' FROM
[dbo].[Borrower] WHERE [BorrowerFName] = 'Ling';
```

```
INSERT INTO [dbo].[BookLoans] ([ISBN], [BranchID], [CardNo], [BorrowedDate], [DueDate],
[Status])
SELECT '9780062896433', 9, [CardNo], '2023-04-01', '2023-04-16', 'B' FROM
[dbo].[Borrower] WHERE [BorrowerFName] = 'Carlos';
```

```
INSERT INTO [dbo].[BookLoans] ([ISBN], [BranchID], [CardNo], [BorrowedDate], [DueDate],
[Status])
SELECT '9780143108252', 10, [CardNo], '2023-03-31', '2023-04-15', 'B' FROM
[dbo].[Borrower] WHERE [BorrowerFName] = 'Emma';
```

```
INSERT INTO [dbo].[BookLoans] ([ISBN], [BranchID], [CardNo], [BorrowedDate], [DueDate],
[Status])
SELECT '9780735211286', 2, [CardNo], '2023-04-01', '2023-04-16', 'B' FROM
[dbo].[Borrower] WHERE [BorrowerFName] = 'Carlos';
```

```
INSERT INTO [dbo].[BookLoans] ([ISBN], [BranchID], [CardNo], [BorrowedDate], [DueDate],
[Status])
SELECT '9780735211286', 2, [CardNo], '2023-04-06', '2023-04-21', 'B' FROM
[dbo].[Borrower] WHERE [BorrowerFName] = 'Jin';
```

```
INSERT INTO [dbo].[BookLoans] ([ISBN], [BranchID], [CardNo], [BorrowedDate], [DueDate],
[Status])
SELECT '9780593299597', 8, [CardNo], '2023-04-07', '2023-04-22', 'B' FROM
[dbo].[Borrower] WHERE [BorrowerFName] = 'Wei';
```

-- INSERT INTO BOOK COPIES TABLE

```
INSERT INTO [dbo].[BookCopies] ([ISBN], [BranchID], [NumOfCopies], [Status])
VALUES ('9780802129965', 1, 5, 'Available');
```

```
INSERT INTO [dbo].[BookCopies] ([ISBN], [BranchID], [NumOfCopies], [Status])
VALUES ('9780735211286', 2, 3, 'Checked Out');
```

```
INSERT INTO [dbo].[BookCopies] ([ISBN], [BranchID], [NumOfCopies], [Status])
VALUES ('9780143109082', 3, 2, 'Available');
```

```
INSERT INTO [dbo].[BookCopies] ([ISBN], [BranchID], [NumOfCopies], [Status])
VALUES ('9780385543781', 4, 6, 'Available');
```

```
INSERT INTO [dbo].[BookCopies] ([ISBN], [BranchID], [NumOfCopies], [Status])
VALUES ('9780525434194', 5, 1, 'Checked Out');
```

```
INSERT INTO [dbo].[BookCopies] ([ISBN], [BranchID], [NumOfCopies], [Status])
VALUES ('9780525563542', 6, 4, 'Available');
```

```
INSERT INTO [dbo].[BookCopies] ([ISBN], [BranchID], [NumOfCopies], [Status])
VALUES ('9780316463998', 7, 7, 'Available');
```

```
INSERT INTO [dbo].[BookCopies] ([ISBN], [BranchID], [NumOfCopies], [Status])
VALUES ('9780593299597', 8, 2, 'Checked Out');
```

```
INSERT INTO [dbo].[BookCopies] ([ISBN], [BranchID], [NumOfCopies], [Status])
VALUES ('9780062896433', 9, 3, 'Available');
```

```
INSERT INTO [dbo].[BookCopies] ([ISBN], [BranchID], [NumOfCopies], [Status])
VALUES ('9780143108252', 10, 2, 'Available');
```

TRIGGERS

We created three triggers enforce the table rules related to the BookLoans in a more efficient and reliable way.

The first trigger was created to ensure that new loan records are only inserted into the BookLoans table if the book being borrowed is available for loan. If the book is already checked out, the trigger will raise an error to prevent the new loan record from being added to the database. This helps to maintain data integrity and avoid inconsistencies in loan records.

you can check the scrip on: trigger insertLoan.sql

```
CREATE OR ALTER TRIGGER Trigger_BookBorrowed
ON BookLoans
AFTER INSERT
AS
BEGIN
    IF EXISTS (SELECT 1 FROM BookCopies JOIN inserted
               ON inserted.ISBN = BookCopies.ISBN AND inserted.BranchID =
BookCopies.BranchID
               WHERE BookCopies.Status = 'Checked Out' OR BookCopies.NumOfCopies <= 0)
    BEGIN
        RAISERROR('Book is not available to borrow!!',16,1);
        ROLLBACK TRANSACTION;
        RETURN;
    END

    UPDATE BookLoans
    SET DueDate = DATEADD(DAY, 15, BookLoans.BorrowedDate)
    FROM BookLoans JOIN inserted
    ON BookLoans.LoanID = inserted.LoanID
    WHERE inserted.DueDate IS NULL;

    UPDATE BookCopies
    SET NumOfCopies = NumOfCopies - 1,
    Status = CASE
                WHEN NumOfCopies = 1 THEN 'Checked Out'
                ELSE 'Available'
    END
END
```

```

FROM BookCopies JOIN inserted
ON inserted.ISBN = BookCopies.ISBN AND inserted.BranchID = BookCopies.BranchID
WHERE BookCopies.Status != 'Checked Out';
END
GO

```

```

-- INSERT INTO [dbo].[BookLoans] ([ISBN], [BranchID], [CardNo], [BorrowedDate], [DueDate], [Status])
-- SELECT '9780525434194', 5, [CardNo], '2023-04-10', '2023-05-08', 'B' FROM [dbo].[Borrower] WHERE [BorrowerFName] = 'Maria';

-- INSERT INTO [dbo].[BookLoans] ([ISBN], [BranchID], [CardNo], [BorrowedDate], [DueDate], [Status])
-- SELECT '9780735211286', 2, [CardNo], '2023-04-10', '2023-05-08', 'B' FROM [dbo].[Borrower] WHERE [BorrowerFName] = 'Maria';

SELECT * FROM BookLoans;

SELECT * FROM BookCopies;

```

100 %

Messages

Msg 50000, Level 16, State 1, Procedure Trigger_BookBorrowed, Line 10 [Batch Start Line 35]
 Book is not available to borrow!!
 Msg 2609, Level 16, State 1, Line 36
 The transaction ended in the trigger. The batch has been aborted.

Completion time: 2023-04-07T18:24:49.7252576-04:00

The second trigger was created to update the status of a loan record to "returned" and add the returned date to the loan record. Additionally, this trigger also updates the corresponding record in the BookCopies table to indicate that the book is now available for loan. This ensures that the status of a loan record is always up to date, and helps to avoid inconsistencies in the availability of books in the library.

you can check the scrip on: trigger_returnBook.sql

```

USE LibraryManagementSystem
GO

```

```

CREATE OR ALTER TRIGGER Trigger_BookLoanReturn
ON BookLoans
AFTER UPDATE
AS
BEGIN
    IF UPDATE(ReturnedDate)
    BEGIN
        IF EXISTS (SELECT 1 FROM inserted
                    WHERE inserted.ReturnedDate IS NOT NULL AND inserted.Status = 'R')
        BEGIN
            RAISERROR('Book is already returned!!',16,1);
            ROLLBACK TRANSACTION;
            RETURN;
        END

        IF EXISTS (SELECT 1 FROM inserted WHERE ReturnedDate < BorrowedDate)
        BEGIN
            RAISERROR('Returned date cannot be less than borrowed date!!',16,1);
            ROLLBACK TRANSACTION;
            RETURN;
        END

        UPDATE BookCopies
        SET NumOfCopies = NumOfCopies + 1,

```

```

        Status = 'Available'
    FROM BookCopies JOIN inserted
    ON BookCopies.BranchID = inserted.BranchID
    AND BookCopies.ISBN = inserted.ISBN
    WHERE inserted.Status = 'B' AND inserted.ReturnedDate IS NOT NULL;

    UPDATE BookLoans
    SET Status = 'R'
    FROM BookLoans INNER JOIN inserted
    ON BookLoans.LoanID = inserted.LoanID
    WHERE inserted.ReturnedDate IS NOT NULL;

END
GO

```

The third trigger was created to insert the values of deleted loan records into an ArchiveTable, along with the fine information associated with the loan record. This helps to maintain an audit trail of loan and fine data, which can be used for reporting or auditing purposes. This trigger ensures that data is not lost when a loan record is deleted, and that there is always a historical record of loan and fine data available in the archive table.

The data only can be deleted from BookLoans if the Status is 'R' as returned.

you can check the scrip on: trigger ArchiveTable.sql

```

CREATE OR ALTER TRIGGER BookLoansDelete
ON BookLoans
AFTER DELETE
AS
    BEGIN
        IF EXISTS(
            SELECT 1
            FROM deleted
            WHERE deleted.Status = 'B')
        BEGIN
            RAISERROR ('Borrowed books can not be deleted', 16, 1)
            ROLLBACK TRANSACTION
            RETURN
        END
        INSERT INTO ArchiveTable(LoanID, ISBN, BranchID, CardNo, BorrowedDate,
        DueDate, ReturnedDate, FineAmmount, FineStatus)
        SELECT d.LoanID, d.ISBN, d.BranchID, d.CardNo, d.BorrowedDate, d.DueDate,
        GETDATE(), d.FineAmmount, d.FineStatus
        FROM deleted d
    
```

END

The screenshot displays the SQL Server Enterprise Manager interface. The top pane shows a SQL script with the following commands:

```
DELETE FROM BookLoans
WHERE LoanID = 25;

SELECT * FROM BookLoans;

SELECT * FROM ArchiveTable
```

The bottom pane shows the 'Results' tab with a table containing two rows of data:

ArchiveID	LoanID	ISBN	BranchID	CardNO	BorrowedDate	DueDate	ReturnedDate	FineAmount	FineStatus	
1	1	27	9780735211286	5	5	2023-04-10	2023-05-08	2023-04-07	NULL	NULL
2	2	25	9780802129965	1	1	2023-02-28	2023-03-15	2023-04-07	23.00	Unpaid

The 'Messages' tab shows the following output:

```
Msg 50000, Level 16, State 1, Procedure BookLoansDelete, Line 11 (Batch Start Line 21)
Borrowed Books can not be deleted.
Msg 3609, Level 16, State 1, Line 22
The transaction ended in the trigger. The batch has been aborted.

Completion time: 2023-04-07T18:33:21.8916528-04:00
```

CHECK THE NEXT PAGE THE FINAL ER DIAGRAM GENERATED ON SQL SERVER

