Final Project: Part 1

Jesse Roberts

Step 1 - Business Rules:

* A title may have one, or two ISBNs, an ISBN may only have one title
* An ISBN may be 10 digits
* A title may have one or many authors
* A title usually has one publisher, a publisher can have one or many books
* An author may have one or many books (authors with zero books are not relevant to this library)
* A title may have one or many pages, pages may only have one title
* A title can only belong to one category, a category can have many books
* A book can only be donated by one friend
* A title can only have been purchased for one price
* A title can have one or many subject matters, and a subject matter zero or many books
* A title/ISBN can only have one year, but a year many titles
* A friend may have zero or many books, a book can only be checked out by one friend at a time
* A book can only be borrowed (checked out, in, length of time) once at a time

Step 2 – Relational Schema



Diagram

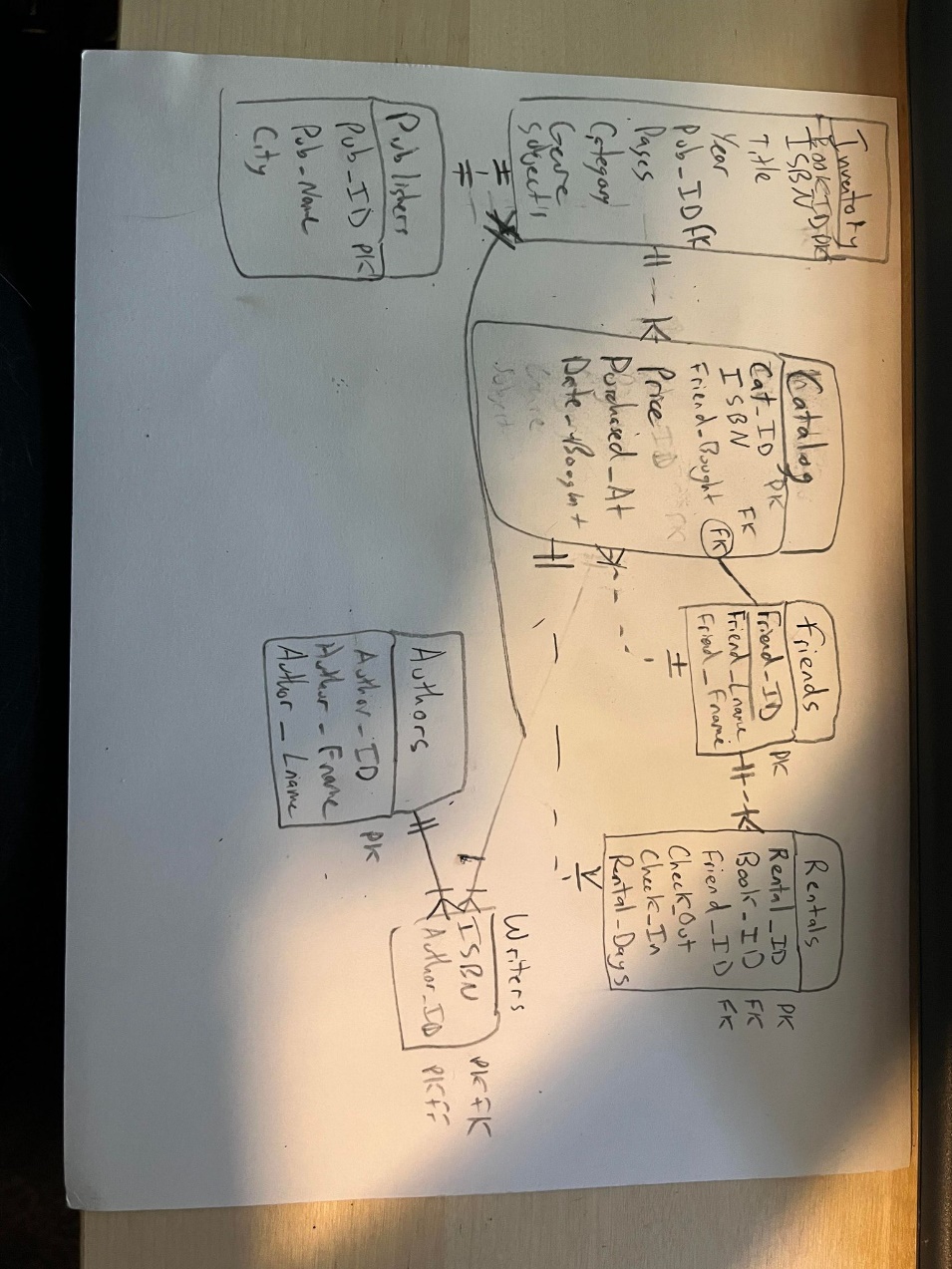
Description automatically generated with medium confidence

Diagram

Description automatically generated

Step 3 – Entity Relationship Model

I edited this for part two because I realized my friends table didn’t make sense, so this resembles your example more.



Step 4: Data Dictionary

A screenshot of a computer

Description automatically generated with low confidence

5.

Indexes:

1. ISBN (unique to each book, would work for catalog and inventory)
2. Friend\_ID (Need to easily query which friend belongs to which ID in case of rentals)
3. Book\_ID (unique to each copy of a book, in case a copy gets lost or its sticker comes off)
4. Rental\_ID (quickly discover what books were checked out in a rental
5. Author\_ID (quickly determine who wrote a specific book to seek out more books by same author)

Part 6:

CREATE TABLE `authors` (

  `Author\_ID` varchar(3) NOT NULL,

  `Author\_Fname` varchar(20) DEFAULT NULL,

  `Author\_Lname` varchar(20) DEFAULT NULL,

  PRIMARY KEY (`Author\_ID`),

  UNIQUE KEY `Author\_ID\_UNIQUE` (`Author\_ID`)

)

CREATE TABLE `catalog` (

  `Cat\_ID` int NOT NULL,

  `ISBN` char(10) NOT NULL,

  `Friend\_Bought` varchar(2) NOT NULL,

  `Price` double(5,2) DEFAULT NULL,

  `Purchased\_At` varchar(20) DEFAULT NULL,

  `Date\_Bought` date DEFAULT NULL,

  PRIMARY KEY (`Cat\_ID`),

  UNIQUE KEY `Cat\_ID\_UNIQUE` (`Cat\_ID`),

  UNIQUE KEY `ISBN\_UNIQUE` (`ISBN`),

  KEY `Friend\_Bought\_idx` (`Friend\_Bought`),

  CONSTRAINT `Friend\_Bought` FOREIGN KEY (`Friend\_Bought`) REFERENCES `friends` (`Friend\_ID`),

  CONSTRAINT `ISBN` FOREIGN KEY (`ISBN`) REFERENCES `inventory` (`ISBN`)

)

CREATE TABLE `friends` (

  `Friend\_ID` varchar(2) NOT NULL,

  `Friend\_Lname` varchar(20) NOT NULL,

  `Friend\_Fname` varchar(20) NOT NULL,

  PRIMARY KEY (`Friend\_ID`),

  UNIQUE KEY `Friend\_ID\_UNIQUE` (`Friend\_ID`)

)

CREATE TABLE `inventory` (

  `Book\_ID` varchar(4) NOT NULL,

  `ISBN` char(10) NOT NULL,

  `Title` varchar(30) NOT NULL,

  `Year` int DEFAULT NULL,

  `Pub\_ID` varchar(3) NOT NULL,

  `Pages` int NOT NULL,

  `Category` varchar(20) NOT NULL,

  `Genre` varchar(10) DEFAULT NULL,

  `Subject` varchar(15) DEFAULT NULL,

  PRIMARY KEY (`Book\_ID`),

  UNIQUE KEY `Book\_ID\_UNIQUE` (`Book\_ID`),

  UNIQUE KEY `ISBN\_UNIQUE` (`ISBN`),

  KEY `Pub\_ID\_idx` (`Pub\_ID`),

  CONSTRAINT `Pub\_ID` FOREIGN KEY (`Pub\_ID`) REFERENCES `publishers` (`Pub\_ID`)

)

CREATE TABLE `publishers` (

  `Pub\_ID` varchar(3) NOT NULL,

  `Pub\_Name` varchar(20) NOT NULL,

  `City` varchar(20) NOT NULL,

  PRIMARY KEY (`Pub\_ID`),

  UNIQUE KEY `Pub\_ID\_UNIQUE` (`Pub\_ID`)

)

CREATE TABLE `rentals` (

  `Rental\_ID` varchar(4) NOT NULL,

  `Book\_ID` varchar(4) NOT NULL,

  `Friend\_ID` varchar(2) NOT NULL,

  `Check\_Out` date DEFAULT NULL,

  `Check\_In` date DEFAULT NULL,

  `Rental\_Days` int DEFAULT NULL,

  PRIMARY KEY (`Rental\_ID`),

  UNIQUE KEY `Rental\_ID\_UNIQUE` (`Rental\_ID`),

  KEY `Book\_ID\_idx` (`Book\_ID`),

  KEY `Friend\_ID\_idx` (`Friend\_ID`),

  CONSTRAINT `Book\_ID` FOREIGN KEY (`Book\_ID`) REFERENCES `inventory` (`Book\_ID`),

  CONSTRAINT `Friend\_ID` FOREIGN KEY (`Friend\_ID`) REFERENCES `friends` (`Friend\_ID`)

)

CREATE TABLE `writers\_written` (

  `ISBN` char(10) NOT NULL,

  `Author\_ID` varchar(3) NOT NULL,

  PRIMARY KEY (`ISBN`,`Author\_ID`),

  KEY `Author\_ID\_idx` (`Author\_ID`),

  CONSTRAINT `Author\_ID` FOREIGN KEY (`Author\_ID`) REFERENCES `authors` (`Author\_ID`),

  CONSTRAINT `ISBN(10)` FOREIGN KEY (`ISBN`) REFERENCES `inventory` (`ISBN`)

)