INFO 6210 Academic Library Database
Database Specification: Purpose, Business Problems
Addressed and Business Rules
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Database Purpose:
The purpose of this database is to maintain the data used to
generate and support school library operations. It will be used
in all its features by library staff, with limited access for patrons such as searching
titles and authors as well as course reserves lists and placing holds.

Business Problems Addressed:
- Allow library staff and patrons to search the catalog using multiple criteria (by author, genre, collections, title, etc) and provide information to help patrons find particular items in the library stacks
- Help library staff facilitate acquisitions by tracking orders and vendor relationships
- Allow faculty and students to view reserves lists for their courses and identify the location of the course reserves.
- Allow patrons to check out items and place holds, as well as view the items they currently have checked out or on hold and their existing fines
- Allow library staff to define different borrowing privileges based on patron types (student, faculty, auditor, etc)
- Facilitate library staff contacting patrons about overdue items and holds that are ready for pick-up
- Balancing operational needs with protecting patron confidentiality under the US Patriot Act

Business Rules:
- Each edition may have more than one copies
- A copy can only be associated with one edition, and an edition with only one title
- An author can have many titles, and a title many authors
- A copy can belong to only one collection at any one time, a collection can have many copies
- Each edition can have only one publisher/imprint
- Each copy can only have one active checkout transaction
- Each course can have many copies on its reserves list and each copy may be on zero or more reserves list.
- Each copy can have zero or more holds on it
- Each patron has one patron type
- Each patron can have zero or more copies checked out
- Each patron can have zero or more fines
- Each title can have many subjects and each subject can have many titles
- No history is kept of past checkout transactions, holds, or fines. When a copy is checked in, when a hold is picked up through a checkout transaction or canceled, or when a fine is paid that entry is deleted from the relevant table

Design Requirements (Credit to Prof. Simon Wang):

- Use Crow's Foot Notation
- Specify the primary key fields in each table by specifying PK beside the fields.
- Draw a line between the fields of each table to show the relationship between each table. This line should be pointed directly to the fields in each table that are used to form the relationship
- Specify which table is on the one side of the relationship by placing a one next to the field where the line starts.
- Specify which table is on the many side of the relationship by placing a crow's feet symbol next to the field where the line ends.

Design Decisions:

Entity Name	Why Entity Included	How Entity is Related to Other Entities
Title	Patrons are usually more concerned with a title than a particular edition or individual copy. The database must be able to record identifying information associated with titles both old and new, and to update this list as new titles are published. Patrons should also be able to view important information pertaining to a title such as the author, description, and genre. Each title has a unique TitleID identifying number that is not edited when new editions are published.	As a title can have multiple authors it is associated with the author entity in a many to many relationship, mediated through an associative entity. It also has a many to many relationship with subject, as a title can fall within multiple genres. Finally a title is associated with editions in a one to one or many relationship. A title must have at least one edition, but an edition cannot be associated with multiple titles.
Subject	Patrons may also be interested in particular genres and not an individual title. Including a subject entity allows the database to categorize books by their subject area and thereby help users find related titles. Users can also search for titles by performing a keyword search of the subject. To minimize confusion each subject is given a unique category code.	Subject is associated with titles in a many to many relationship through an associative entity. Books can span multiple genres, and a subject can contain a very large number of titles.

Edition	The database must be able to provide patrons and librarians with information on which editions of a title are available among all existing editions. It is at the edition-level that one of the most important identifying attributes is stored- the Library of Congress call number. It also provides valuable information about the product code (ISBN13), publisher, edition year, language, and format of each available edition for a particular title.	The edition is associated with individual copies in a one to zero or many relationship. The library may not possess a copy for a particular edition, yet the edition will still be included in the database. Edition is also associated with titles in a one or many to one relationship. A title may have many editions, but an edition can be associated with just one title. Finally each edition is associated through an imprint with a publisher in a zero or many to one relationship.
Author	Database users may also be interested in the body of work associated with a particular author. To facilitate this the database will	Authors are associated with titles in a many to many relationship intermediated by an associative entity. Not only can an author be associated

	include a separate author entity with relevant biographic information on the authors which ties into their body of work. This will be continuously updated as new titles are published and new authors emerge, while granting users the ability to search by author or view tables of works related to a particular author.	with many titles, but titles can have multiple authors. It is not necessary to associate authors with individual editions or copies as these do not change with updates to the title.
Imprint	Recording an edition's publisher can be important for facilitating citations and research. It also helps distinguish different editions and track a title's publishing history, as well as facilitate new purchases by library staff.	A publisher is not related to an individual title as a single title may undergo many iterations in its history, especially for older works. Instead publishers are related to edition in a one to many relationship. A single edition can have only one publisher, but publishers are usually associated with many different works. This is tracked through the imprintID and not the individual publisher as individual publishers may be operating under several different brand names and divisions.

Vendor	New materials for the library, as well as replacement copies, are ordered from multiple vendors. Vendor information needs to be tracked for placing the orders and checking on order statuses.	Vendors are associated with acquisition orders in a one to many relationship. An acquisition order can only be associated with one vendor, but a single vendor is likely to have been involved in many purchase orders at one time or another. Vendors are identified with a unique VendorID to reduce confusion in the event of similar vendor names. For donated copies a generic vendor will be created.
AcquisitionOrder	New materials are purchased based on patron suggestions and the recommendations of subject specialist librarians. The orders are tracked in the library system database both for reference information and so that holds can easily be placed when it arrives if a particular patron requested the item be purchased.	An order is placed for a particular Edition, and once it is arrived it is added to the database as a new Copy. Every order has a Vendor, while a vendor can have many orders in a one to many relationship.
Copy	Individual copies of materials are the center of all transactions that occur in a library database. Metadata is stored at higher levels (e.g. Title, Edition) but a patron	An individual item is a copy of an Edition. A copy belongs to a Collection that determines its location in the library, it has a BorrowingPolicy that determines whether it has a special borrowing

	checks out a copy, holds are placed on the next available copy, individual copies are put on course reserve, etc.The number of times a copy is checked out and the last check-out date are tracked to facilitate collections management.	period, and it has a status to determine its availability based on CheckoutTransactions. A copy can also be put on a ReservesList.
BorrowingPolicies	Most items in the collection can have a default borrowing policy in which the patron type defines how long the item can be checked out. However specialty items (e.g. CDs, videos, books on course reserve) have specially defined borrowing terms.	Copies are assigned BorrowingPolicies. All copies on reserve lists for Courses are associated with a specific borrowing policy. Every copy must have one borrowing policy, while a specific borrowing policy can be associated with many different copies.

Collections	A university may have multiple speciality branches in addition to the main branch. It can also have distinct collections within the main branch (e.g. bestsellers, display cases, archives). This information is tracked through the Collections entity to make it easier for patrons to find the items they are looking for. Some collections (e.g. display cases, course reserves) may have beginning and end dates.	Collections are related to individual copies of books and not editions or titles as not every title or edition may be removed from general circulation and added to the collection. At times only a few copies of many may be added. For this reason collections are associated with individual copies in a zero or one to one or many relationship. Collections must contain at least one book but usually have many, while an individual copy may or may not be part of a collection, but cannot be in multiple collections simultaneously.
Courses	In an academic library courses offered at the university can put books on reserve. For reserve lists it is useful to track the course and instructor information to make it easier for students to search the library catalog for them. Every book put on reserve has a special borrowing policy assigned and its location changed to make it easier for students taking the class to access it. These policies are tracked at the course level.	Courses are associated with reserve requests in a one to many relationship. A reserve can only be associated with one course, although a course can have multiple reserves. However not all courses place reserve requests.
ReserveLists	ReservesList is an associative entity between courses and copies since any number of books can be put on a particular course's list, and a copy may be on reserve for more than one course.	The Reserve list is similar to an associative entity and has a zero or one to one or many relationship with copies via the barcode. Its composite key is also related to individual courses via the CourseID in a one to many relationship. A reserved book can only be associated with one course, while courses can be associated with multiple reserve books.
Patrons	An important function of a library database is knowing who has checked out a book for the purposes of renewals, overdue books and holds.	Every patron has a PatronType to determine their borrowing privileges. A Patron is associated with checkout transactions, hold requests, and fines in a one to many relationship. For example, a patron can have many fines but a fine can only be associated with one patron.

PatronTypes	In an academic library where different patron types have different borrowing privileges, the policies for those privileges need to be defined. Example policies would be student - 28 days and faculty - 90 days.	Patron types are associated with patrons in a one to many relationship. A patron can have only one type, while a type can include many different patrons.
CheckoutTransactions	When a patron borrows a book from a library it corresponds to a checkout transaction in the database. These transactions are used to calculate due dates, determine whether a book can be renewed, set fines if the book is overdue, and set a copy's availability status. When the book is returned the checkout transaction is deleted from the database due to record keeping requirements under the Patriot Act.	Every transaction is associated with a Patron and a Copy. In both cases it is a one to many relationship. A copy can be associated with many transactions (although only one at a time), and a patron can have multiple transactions.
Holds	Holds allow a patron to request an item currently checked out. The hold is automatically assigned to the copy with the nearest due date and that copy cannot be renewed by whomever currently has it checked out. Once checked out, a hold is deleted from the database due to record keeping requirements under the Patriot Act.	Every hold is associated with a Patron and a Copy. A checkout transaction for that copy by that patron will trigger deletion of the hold.
Fines	When a book is overdue it generates a fine. Depending on how much a patron owes in fines they may be blocked from checking out books until the fine is paid. Once paid a fine is deleted from the database due to record keeping requirements under the Patriot Act.	Every fine is associated with a Patron and a Copy. An overdue status in the checkout transaction will trigger creation of a fine and the fine will accumulate until checked in.
Address	It is necessary to record the addresses of patrons, publishers, and vendors to conduct basic library operations. Among these are sending out fine notices to patrons, maintaining contact information with publishers for inquiries, and likewise with vendors. Address type is an important row to establish whether	Addresses have a one-to-many relationship with vendors and publishers yet a many-to-many relationship with patrons. A patron can have multiple addresses, and an address can be associated with multiple patrons. This is especially true for student patrons who may have both a campus and residential address. The many-to-many relationship is mediated through the associative

	a student address is a residential or campus address.	entity PatronAddress with a composite primary key by addresstype and PatronID. This allows students to have both a home address and a campus address.