Solution to Review Problems
Library ER Diagram

- **Library**
  - Libnum
  - Capacity

- **Copy**
  - Copynum
  - Price

- **Book**
  - Booknum
  - Title
  - Pages

- **Has**
  - (1,1)

- **Houses**

- **Author**
  - Aid
  - First
  - Last

- **Percent**
  - (0,M)

- **Writes**
  - (0,M)
• CREATE TABLE Author(aid int primary key, first VARCHAR(30), last VARCHAR(30));
• CREATE TABLE Book(booknum int primary key, title VARCHAR(50), pages int);
• CREATE TABLE Library(libnum int primary key, capacity int);
• CREATE TABLE Writes(aid int references Author(aid), booknum int references Book(booknum), percent int, primary key(aid, booknum));
• CREATE TABLE Copy(copynum int primary key, booknum int references Book(booknum), price decimal(8,2), libnum int references Library(libnum));
Query Problems

• Find the number of pages in *War and Peace*
• Select pages from Book where title = ‘War and Peace’
Query Problems

- Find the titles of books written by Anton Chekhov
- Select title from Author natural join Writes natural join Book where first = ‘Anton’ and last = ‘Chekhov’
- Select title from Author A join Writes W on A.aid = W.aid join Book B on W.booknum = B.booknum where first = ‘Anton’ and last = ‘Chekhov’
- Select title from Author A, Writes W, Book B where A.aid = W.aid and W.booknum = B.booknum and first = ‘Anton’ and last = ‘Chekhov’
Query Problems Problems

• Find the names of the authors of books with more than 600 pages.
• Select first, last from Author natural join Writes natural join Book where pages > 600
Query Problems Problems

• Find the price of each copy of *Middlemarch*
• Select price from Copy natural join Book where title = ‘Middlemarch’
• Select price from Copy join Book using booknum where title = ‘Middlemarch’
Query Problems Problems

• Find the number of books written by each author.
• Select aid, Count(booknum) from Writes group by aid
• Select aid, first, last, Count(booknum) from Author natural join Writes group by aid, first, last
• Select aid, first, last, Count(booknum) AS NumBooks from Author natural join Writes group by aid
Query Problems Problems

- Find the average copy price for each book.
- Select booknum \( \text{AVG}(\text{price}) \) from Copy group by booknum
- Select booknum, title, \( \text{AVG}(\text{price}) \) from Book natural join Copy group by booknum, title
Query Problems Problems

• Find the library with the largest capacity.
• Select libnum from Library where capacity = (select Max(capacity) from Library)
Query Problems Problems

• Find the unused capacity for each library.
• select libnum, Count(copynum) as used from Copy group by libnum
• Select libnum, capacity-used as unused from Library natural join (select libnum, Count(copynum) as used from Copy group by libnum)
Query Problems Problems

• Find the libraries with copies of books by every author
• Select libnum from Library L1 where Not Exists ( (select aid from Author) Except (select aid from Writes natural join Book natural join Copy join Library L2 using libnum where L1.libnum = L2.libnum))
• Select aid from Author
• Select aid from Writes natural join Book natural join Copy join Library L2 using libnum where L1.libnum = L2.libnum
Query Problems

• Find the libraries with copies of books by every author that has at least one book in the database

• Select libnum from Library L1 where Not Exists ( select aid from Author where aid in (select aid from Writes)) Except (select aid from Writes natural join Book natural join Copy join Library L2 using libnum where L1.libnum = L2.libnum)