Scenario

Your town has a library that wants to keep track of its business in a database, and you have been called in to build the database. You talk to the town librarian, review the old paper-based records, and watch people use the library for a few days. You learn these things about the library:

1. Anyone who lives in the town can get a library card if they ask for one. The library considers each person who gets a card a “member” of the library.
2. The librarian wants to be able to contact members by telephone and by mail. She calls members when their books are overdue or when requested materials become available. She likes to mail a thank-you note to each patron on his or her anniversary of becoming a member of the library. Without a database, contacting members can be difficult to do efficiently; for example, there could be more than one member by the name of Martha Jones. Also, a parent and a child can have the same first name and last name, live at the same address, and share a phone.
3. The librarian tries to keep track of each member's reading interests. When new books come in, the librarian alerts members whose interests match those books. For example, long-time member Sue Doaks is interested in reading Western novels, growing orchids, and baking bread. There must be some way to match her interests with available books. One complication is that although the librarian wants to track all of a member's reading interests, she wants to classify each book as being in just one category of interest. For example, the classic gardening book Orchids of France would be classified as a book about orchids or a book about France but not both.
4. The library stocks many books. Each book has a title and any number of authors. Also, there could conceivably be more than one book in the library titled History of the United States. Similarly, there could be more than one author with the same name.
5. A writer could be the author of more than one book.
6. A book could be checked out repeatedly as time goes on. For example, Orchids of France could be checked out by one member in March, another member in July, and yet another member in September.
7. The library must be able to identify whether a book is checked out.
8. A member can check out any number of books in a visit. It's also conceivable that a member could visit the library more than once a day to check out books – some members do.

The library would like the following queries:

* All books that are checked out are due back in two weeks, with no exceptions. The late fee is 50 cents per day. The librarian would like to have a query that generates an overdue book list each day so she can telephone the miscreants.
* The library would like a query to search for a book by its title and see if it is currently checked out. Sometimes members can’t remember the full name of the book so the query needs to be able to search by a part of the title.
* The library would like a query that can show them the Top 10 most popular books checked out over a particular date range.
* The library would like to know the most popular day of the week for library members to visit the library and check out books.
* The library would like to know which book categories are the most popular among members.

Design the library's database following the guidance set forth in this scenario. Here are a few hints in the form of questions:

* A book can have more than one author. An author can write more than one book. How would you describe the relationship between books and authors?
* A member can borrow any number of books at a checkout. A book can be checked out more than once. How would you describe the relationship between checkouts and books?