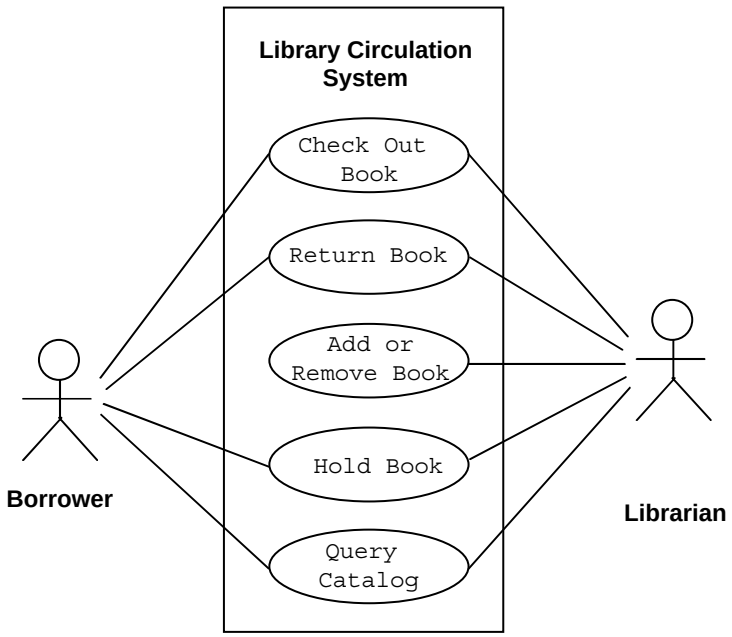

Figure 10.3. The use-case diagram for the library circulation system.

10.14 The use-case diagram for the library appears in Figure 10.3.
The descriptions of the use cases are shown in Figures 10.4 though 10.8.

Brief Description:
The Check Out Book use case enables a borrower to check out a book with the aid of a librarian.
Step-by-Step Description:
The borrower hands the book and his or her card to the librarian.
1 The librarian enters `C` at the computer terminal, and then scans the bar code on the book and on the borrower's card.
2. If the book has a hold on it for another borrower, the librarian does not allow the borrower to check that book out.
3. If the book has a hold on it for that borrower, the system clears the hold and then updates the relevant book data.
4. If there was no hold on the book, the system updates the relevant book data.
Unless there was a hold on the book for another borrower, the librarian stamps the book and hands it to the borrower.
The librarian returns the card to the borrower.

Figure 10.4. The `Check Out Book` use case.

Brief Description:

The `Return Book` use case enables a borrower to return a book with the aid of a librarian.

Step-by-Step Description:

The borrower hands the book to the librarian.

1 The librarian enters `R` at the computer terminal, and then scans the bar code on the book.

2. The system updates the relevant book data.

The librarian sets the book aside to be returned to the book stacks.

Figure 10.5. The `Return Book` use case.

Brief Description:

The `Add or Remove Book` use case enables a librarian to add a book to or remove it from the library collection.

Step-by-Step Description:

1.1 To add a book, the librarian enters `+` at the computer terminal, and then scans the bar code on the new book.

1.2 To delete a book, the librarian enters `–` at the computer terminal, and then scans the bar code on the book.

2. The system updates the relevant book data.

The librarian sets the book aside to be placed in the book stacks.

Figure 10.6. The `Add or Remove Book` use case.

Brief Description:
The `Hold Book` use case enables a librarian to place a hold on a book for a borrower.
Step-by-Step Description:
The borrower hands the librarian a form bearing the number of the book, together with his or her card. 1 The librarian enters `H` at the computer terminal, and then types in the book number and scans the bar code on the borrower's card. 2. If there already is a hold on the book for another reader, the system displays a message to this effect. 3. If there is no hold on the book, the system updates the relevant book data. The librarian returns the card to the borrower, and sets aside the form for recycling.

Figure 10.7. The `Hold Book` use case.

Brief Description:
The `Query Catalog` use case enables a librarian or borrower to query the catalog.
Step-by-Step Description:
1.1 To determine all the books in the library by a specific author, the librarian or borrower enters A= followed by the author's name. 1.2 To determine all the books in the library with a specific title, the librarian or borrower enters `T=` followed by the title. 1.3 To determine all the books in the library in a specific subject area, the librarian or borrower enters `S=` followed by the subject area. 2 The system displays the requested information on the terminal.

Figure 10.8. The `Query Catalog` use case.

The initial business model includes all the use cases of the use case diagram of Figure 10.3, together with their descriptions.

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The initial requirements also include all these use cases, together with their descriptions.

An MSG Foundation staff member wants to update the expected annual return on an investment. 1. The staff member enters the new value of the expected annual return on the investment. 2. The information system changes the date on which the expected annual return was updated to that day's date.
ble alternatives: A. The staff member enters the investment number incorrectly. B. The staff member enters a negative number for the new value of the expected annual return on the investment.

Figure 11.4. An extended scenario of the use case `Manage an Investment`.

An MSG Foundation staff member wants to update the estimated annual operating expenses. 1. The staff member enters the new value of the estimated annual operating expenses. 2. The information system changes the date on which the estimated annual operating expenses were updated to that day's date.
Possible alternative: A. The staff member enters zero or a negative number for the new value of the estimated annual operating expenses.

Figure 11.5. An extended scenario of the use case `Update Estimated Annual Operating Expenses`.

An MSG staff member inputs the new annual property tax for a mortgage (1, 2). The information system updates the mortgage record (3), and informs the staff member that this has been done (4–6).

Figure 11.6. The flow of events of the interaction diagrams for updating the annual property tax (Figures 11.40 and 11.41 of *Object-Oriented Software Engineering*).

11.12: See Figure 11.4.

11.13: See Figure 11.5.

11.14: See Figure 11.6.

An MSG staff member inputs the new weekly income of the couple (1, 2). The information system updates the mortgage record (3), and informs the MSG staff member that this has been done (4–6).

Figure 11.7. The flow of events of the interaction diagrams for updating weekly income (Figures 11.43 and 11.44 of *Object-Oriented Software Engineering*).

11.15: See Figure 11.7.