Interpretation of Conceptual Models

Contents

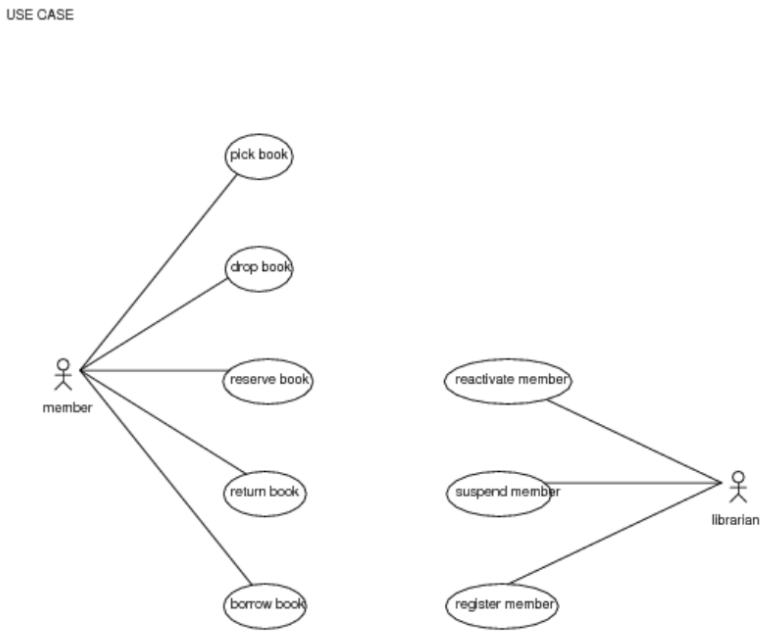
Input User Stories

1. As a librarian, I want to register a member so that a new citizen can make use of our services. Given the citizen is eligible, when they present themselves at the counter, then the member is active.
2. As a member, I want to borrow a book so that I can take it home and read it. Given the book is available and member is active, when I take the book to the counter, then the book is borrowed.
3. As a member, I want to return a book so that other citizens can borrow it. Given the book is borrowed, when I return it to the counter, then the book is available.
4. As a member, I want to reserve a book so that I can borrow a book that is currently not available when I go to the library. Given the member is active and book is borrowed, when I ask to reserve the book, then the book is reserved.
5. As a member, I want to drop a book so that other citizens can borrow it. Given the book is reserved, when I drop it to the counter, then the book is ready.
6. As a member, I want to pick a book so that I can take a reserved book home and read it. Given the member is active and book is ready, when I ask for it at the counter, then the book is borrowed.
7. As a librarian, I want to suspend a member so that this member can no longer borrow books. Given the member is active, when I suspend membership, then the member is suspended.
8. As a librarian, I want to reactivate a member so that a member can again borrow books. Given the member is suspended, when I reactive membership, then the member is active.

Use Case Model

Output Model

Following is the use case model of the eight user stories:



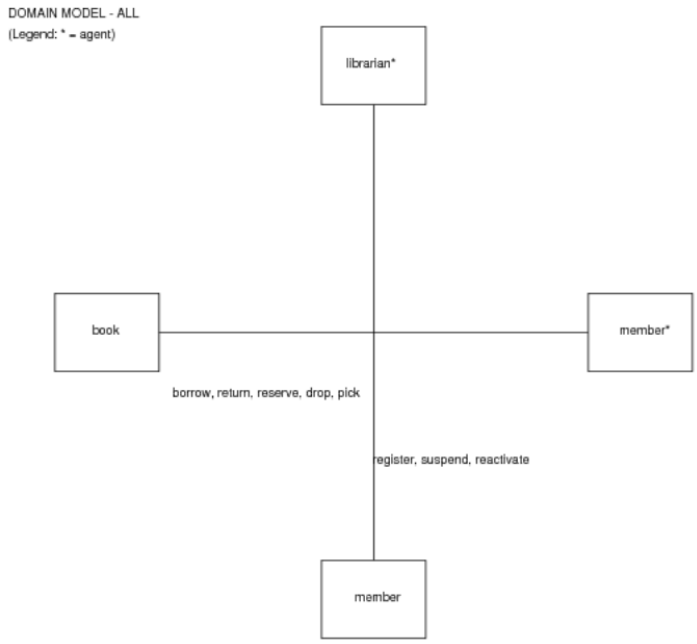
Interpretation

- Actors are represented as humans. For example, *librarian* and *member* are the only two actors in the set of user stories.
- Use cases are represented by the ellipses. For example, the librarian has three use cases – *register member*, *suspend member* and *reactivate member*. Similarly, the member has five use cases – *borrow book*, *return book*, *reserve book*, *drop book* and *pick book*.
- The uses cases are connected to the respective actors who are responsible for the use case, using straight lines.

Domain Model

Output Model

Following is the domain model of the eight user stories:



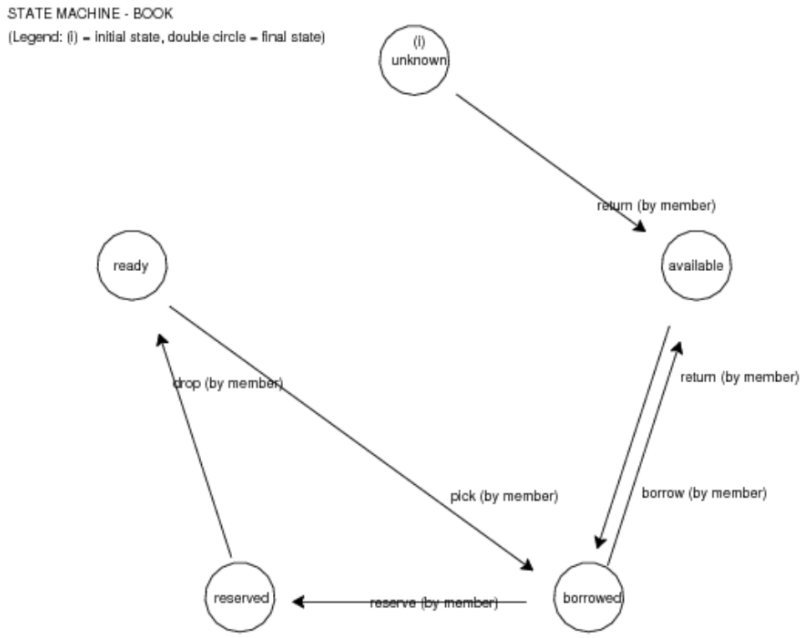
Interpretation

- Agents are represented as rectangles with a star after the name of the agent. For example, *librarian* and *member* are the only two agents in the set of user stories.
- Objects are represented as rectangles without a star after the name of the object. For example, *book* and *member* are the only two objects in the set of user stories.
- Objects are connected to the respective agents who are responsible for the actions, using straight lines. The straight lines are labeled with all actions between the combination of agent and object. For example, there are three actions between the librarian (i.e., agent) and the member (i.e., object) – *register*, *suspend* and *reactivate*.
- Note that an entity can be an agent in one user story and an object in a different user story. For example:
    - Member is an object in the following actions (with *librarian* as agent)) - *register*, *suspend* and *reactivate.*
    - Member is an agent in the following actions (with *book* as object) – *borrow*, *return*, *reserve*, *drop*, *pick*.

State Machine

Output Model

Following is the state machine of book from the eight user stories:



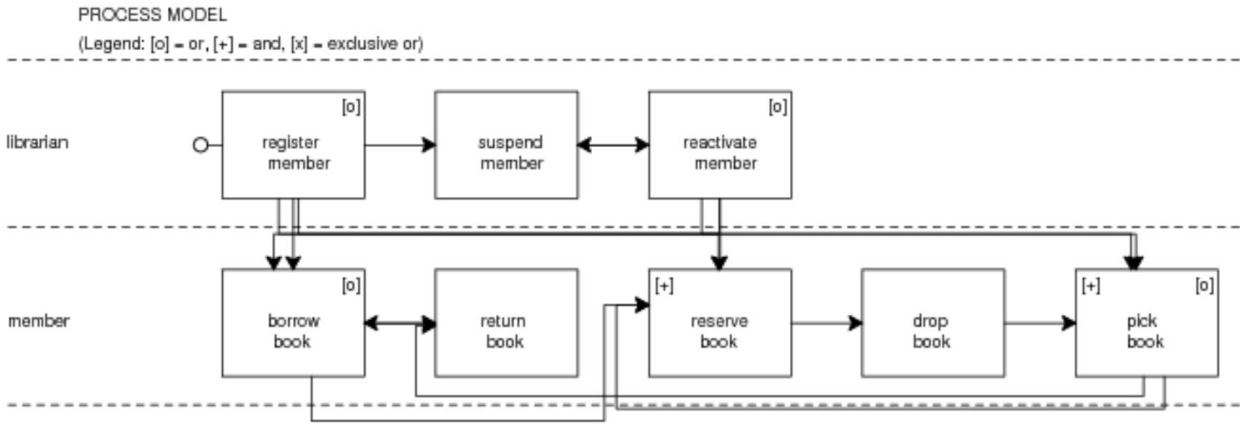
Interpretation

- There are five known states (i.e., *available*, *borrowed*, *reserved* and *ready*) and one unknown states of book in the set of user stories. The states are represented using circles.
- Arrows represent the transition of the state of book (i.e., object) because of an action. The arrow starts from the initial state and ends at the final state and is labeled using the action (and the agent responsible for the action). For example, when the book is *ready* (i.e., initial state) and the *member* (i.e., agent) *picks* (i.e., action) the *book* (i.e., agent), then the state of the book becomes *borrowed* (i.e., final state).
- The initial state is marked with *(i)* inside the circle (i.e., state).

Process Model

Output Model

Following is the process model of the eight user stories:



Interpretation

- Agents are represented by the swimlanes. For example, *librarian* and *member* are the only two agents in the set of user stories.
- Activities (along with the involved objects) are represented as rectangles in the appropriate swimlanes. For example, *librarian* and *member* are the only two agents in the set of user stories, therefore these are the only two swimlanes.
- Arrows represent the sequence flow of the activities. The arrow starts from the precondition activity and ends at the activity. Note that the arrows are not labeled. For example, to *suspend* a *member*, the *member* should be *registered* first. Similarly, to *reserve* a *book*, the *book* should be *borrowed* (by someone else) first.
- The symbol [+] in the top-left corner of the rectangles implies that there are more than one preconditions for the activity and both of them should be satisfied for the activity to be performed.
- The symbol [o] in the top-left corner of the rectangles implies that there are more than one preconditions for the activity and either of them should be satisfied for the activity to be performed.
- The symbol [o] in the top-right corner of the rectangles implies that there are more than one postconditions for the activity.