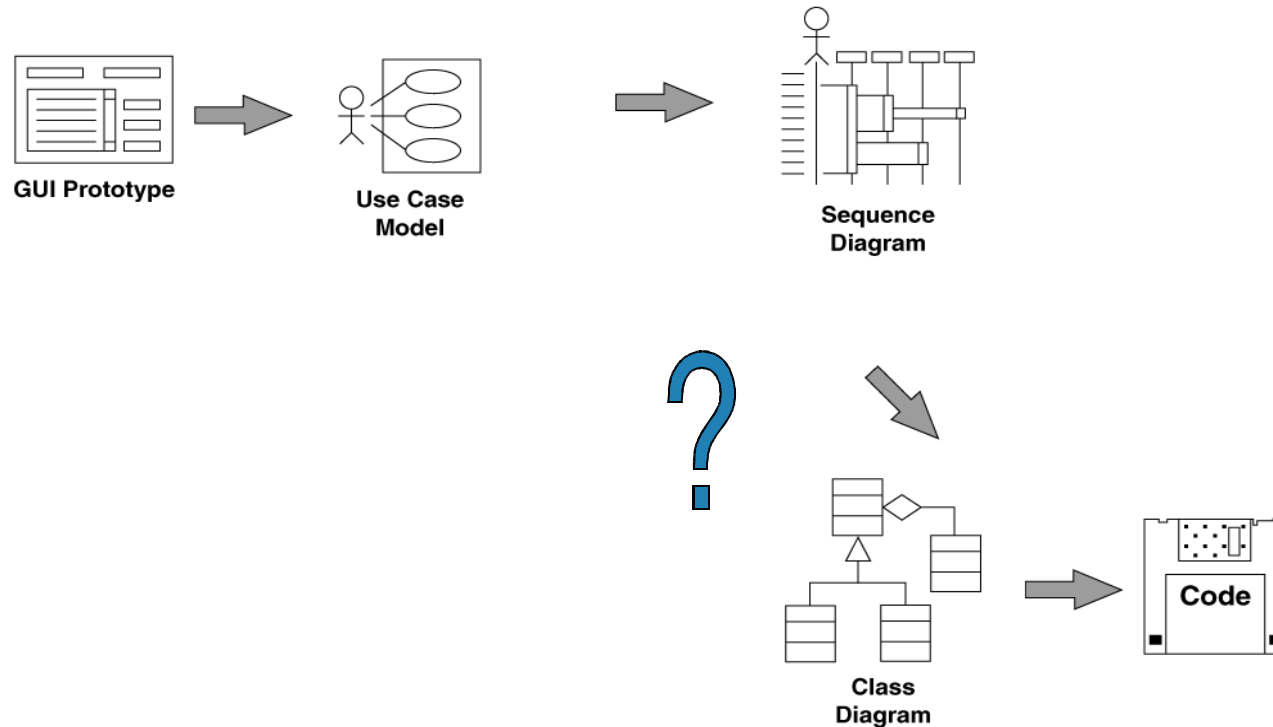


Week 10: Morphing Robustness Diagrams into Sequence Diagrams

Adapted from "UML for e-Commerce" by Doug Rosenberg

http://www.iconixsw.com/uml_for_e-commerce.ppt

Sequence Diagrams

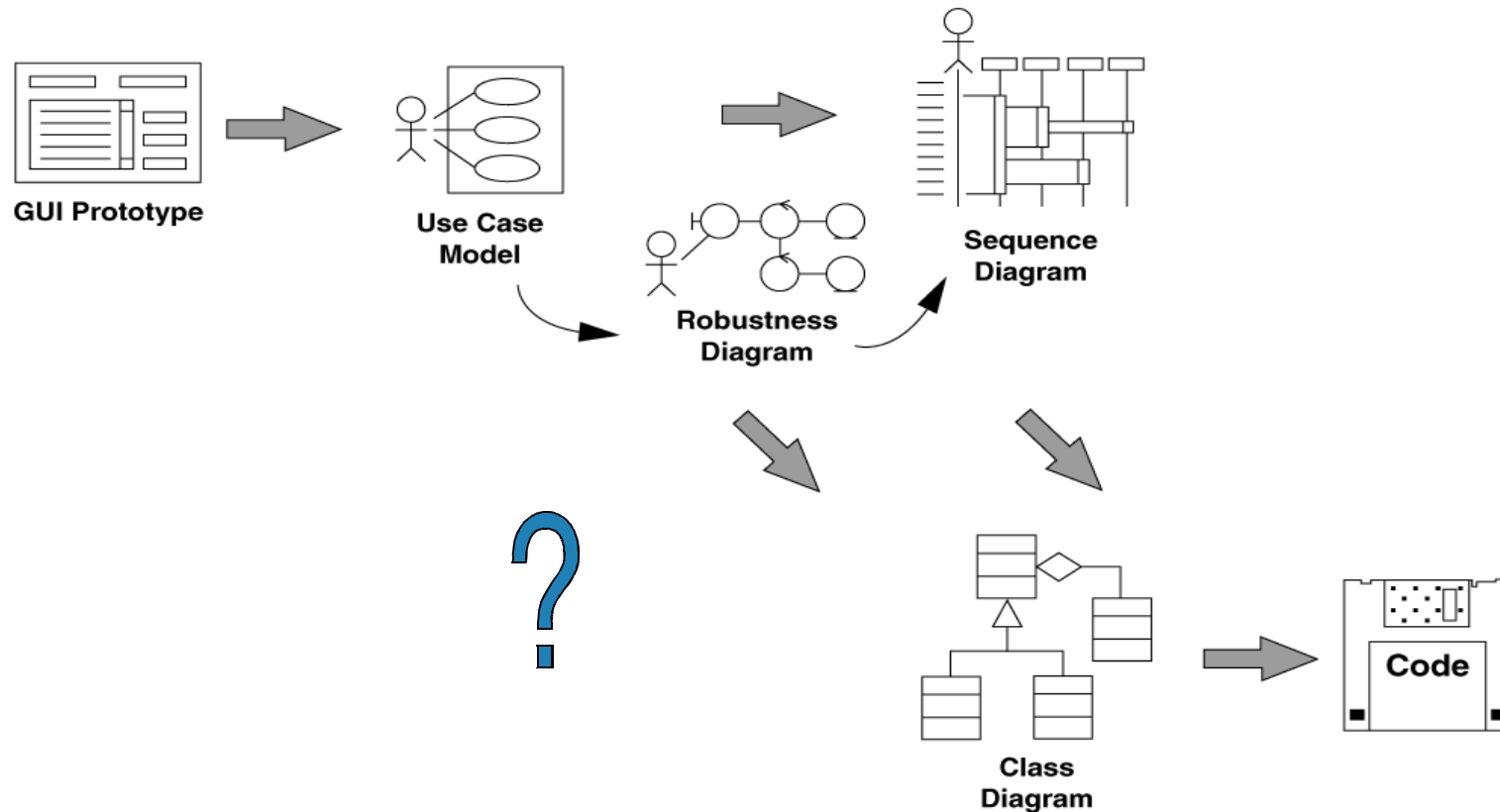


We allocate methods to classes as we draw sequence diagrams.

Before we do sequence diagrams, though...

- ☀ We need to have a good idea about what objects will be performing in which use case, and what functions the system will perform as a result of user actions.
- ☀ We get this information from **robustness diagrams**, the result of robustness analysis.

Robustness Diagrams -- the missing link!



We discover new objects, and add attributes to classes, as we draw robustness diagrams.

But we can't draw robustness diagrams before...

- ☀ We describe system usage *in the context of the object model*.
- ☀ This means that we don't write abstract, vague use cases that we can't design from.
- ☀ Instead, we need to write use case text that references the names of objects in the problem domain.
- ☀ We also reference the names of "boundary objects" in the use case text.

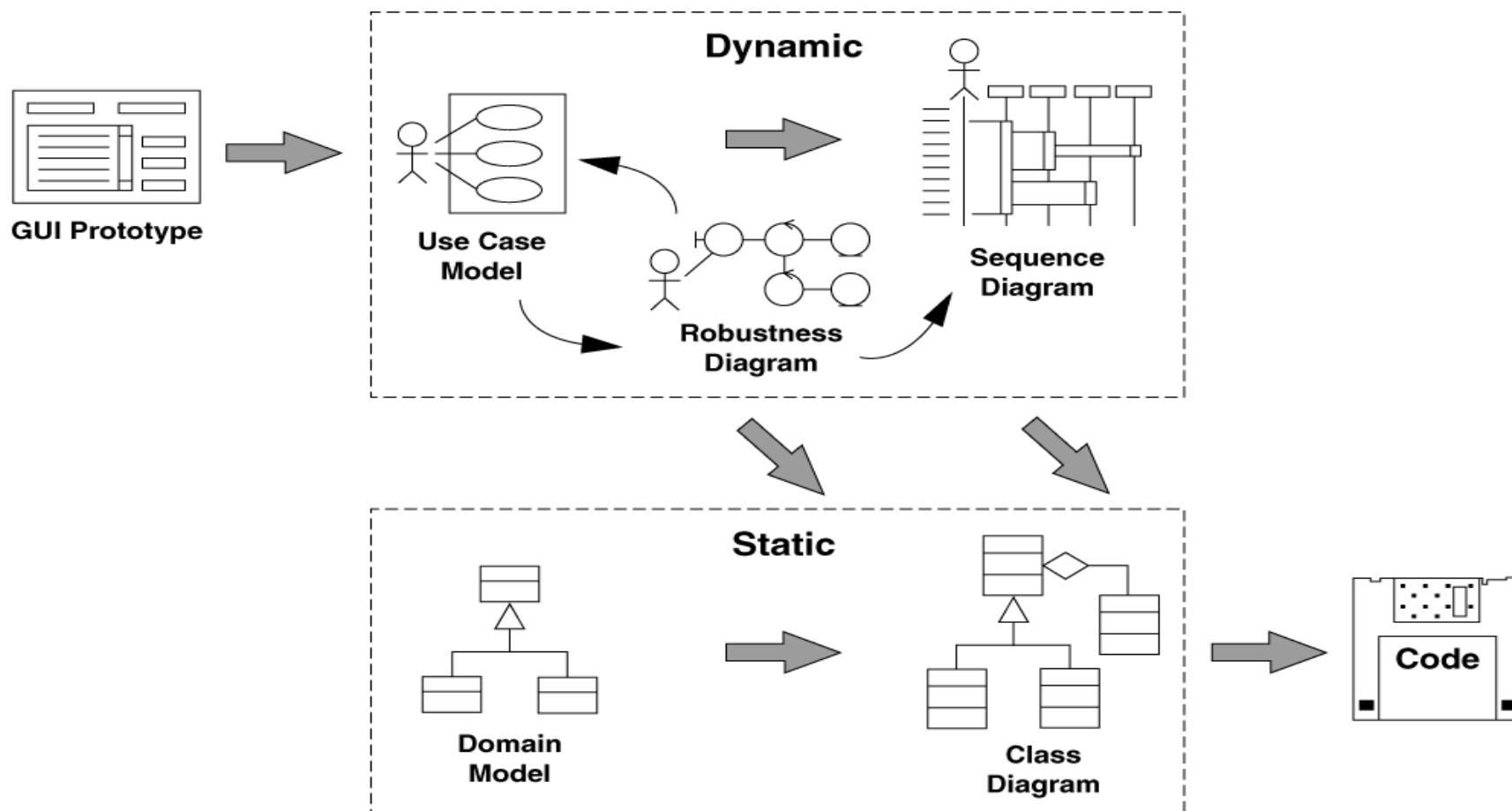
First, though...

- ☀ We need to identify the main abstractions that are present in the problem domain.
- ☀ In other words, we need a domain model.
- ☀ We show our domain model on class diagrams.

Refining our class diagrams

- ☀ We'll refine our (static) analysis level class diagrams (our domain model) continuously as we explore the dynamic behavior of the system in more and more detail during analysis and design.
- ☀ This will ultimately result in our design-level class diagrams, which we can code from.

The ICONIX Process



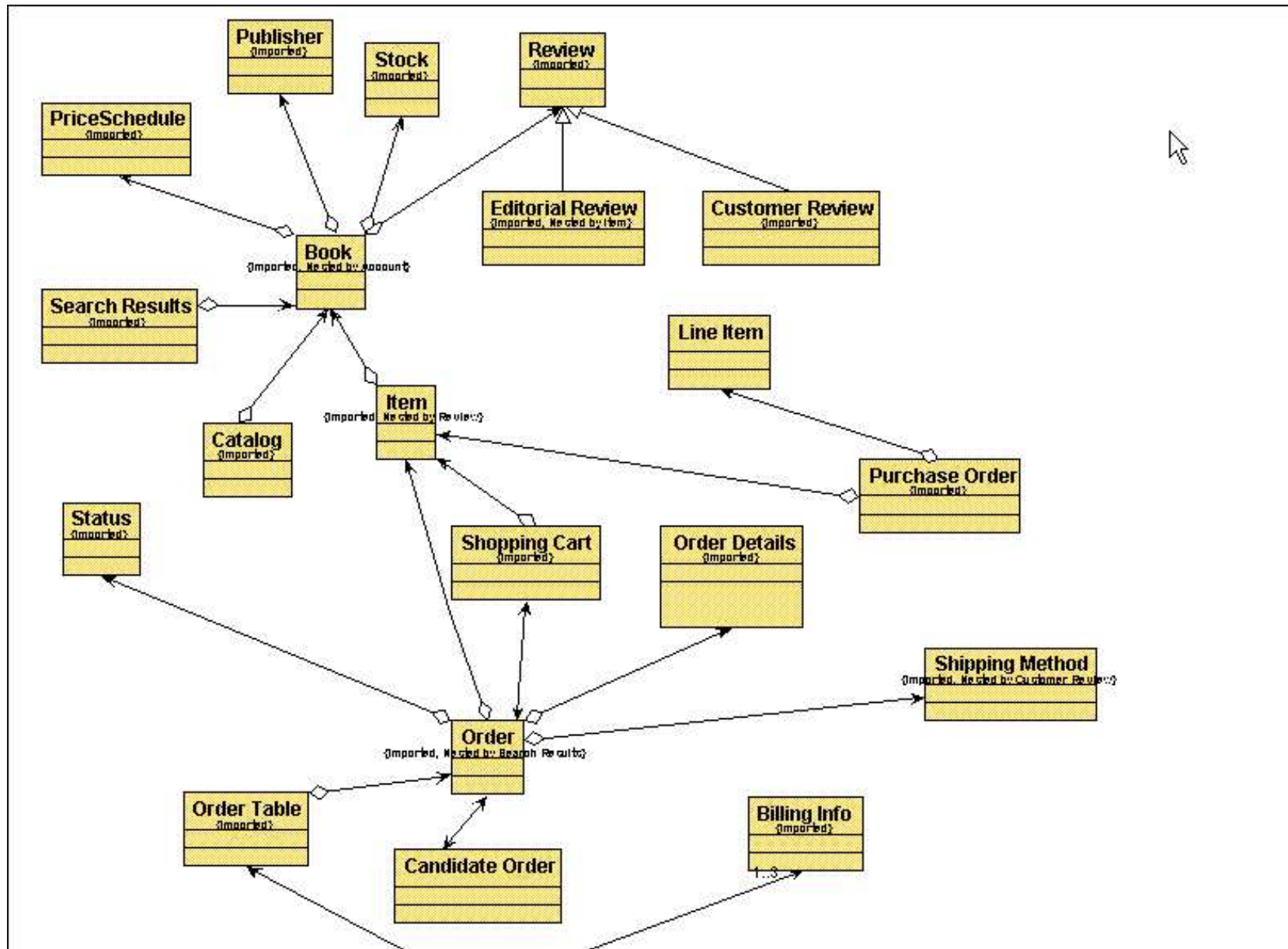
The Internet Bookstore Example

- Domain Model
- Use Case Model
- 2 use cases: Login, Edit Shopping Cart
- Robustness and Sequence Diagrams for each use case
- Show common errors (Wrong way / Right way)

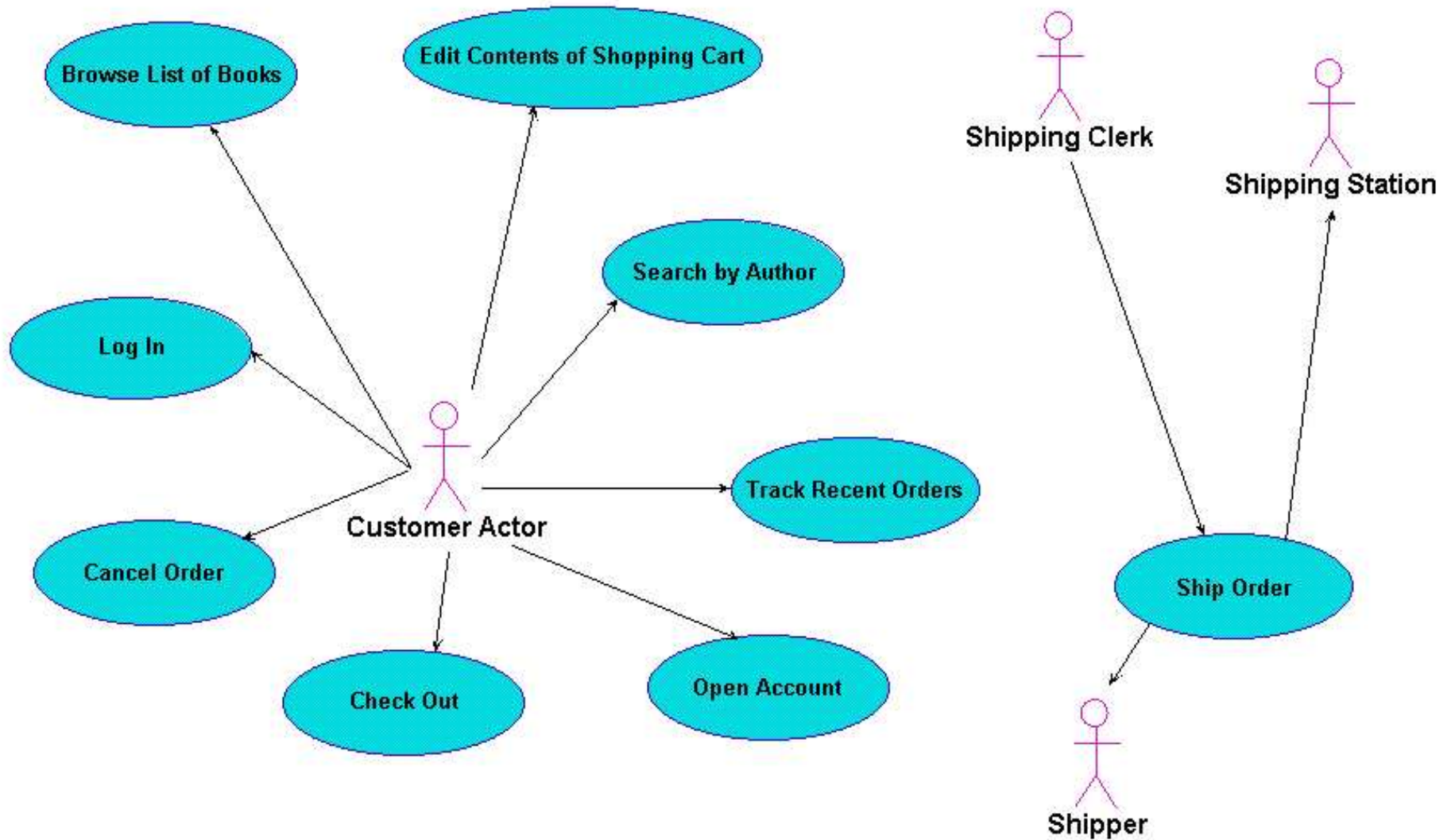
Requirements

- The bookstore shall accept orders over the Internet.
- The bookstore shall maintain a list of accounts for up to 1,000,000 customers.
- The bookstore shall provide password protection for all accounts.
- The bookstore shall provide the ability to search the master book catalog.
- The bookstore shall provide a number of search methods on that catalog, including search by author, search by title, search by ISBN number, and search by keyword.
- The bookstore shall provide a secure means of allowing customers to pay by credit card.
- The bookstore shall provide a secure means of allowing customers to pay via purchase order.
- The bookstore shall provide a special kind of account that is preauthorized to pay via purchase order.
- The bookstore shall provide electronic links between the Web and database and the shipping fulfillment system.
- The bookstore shall provide electronic links between the Web and database and the inventory management system.
- The bookstore shall maintain reviews of books, and allow anyone to upload review comments.
- The bookstore shall maintain ratings on books, based on customer inputs.

Domain Model



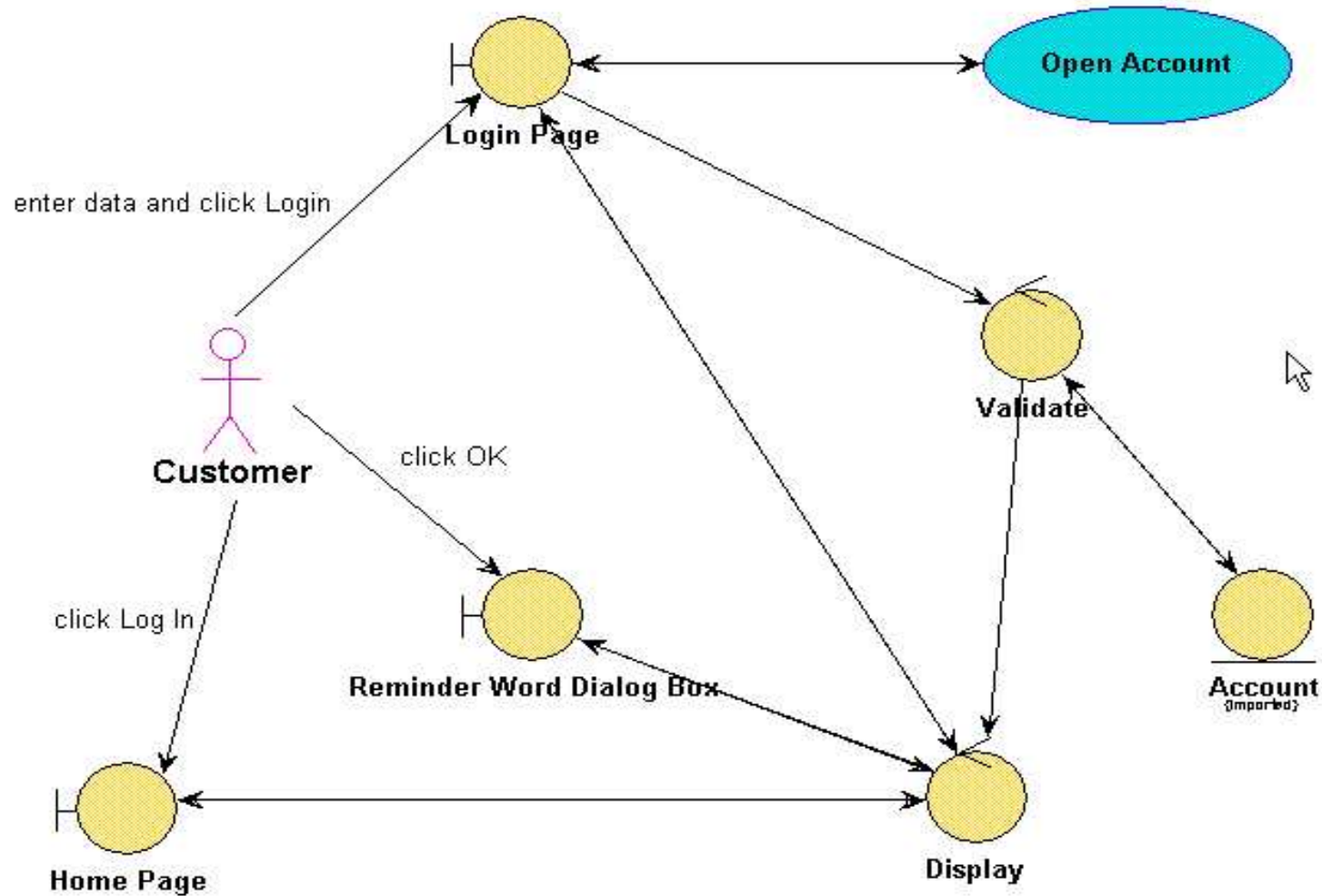
Use Case Model



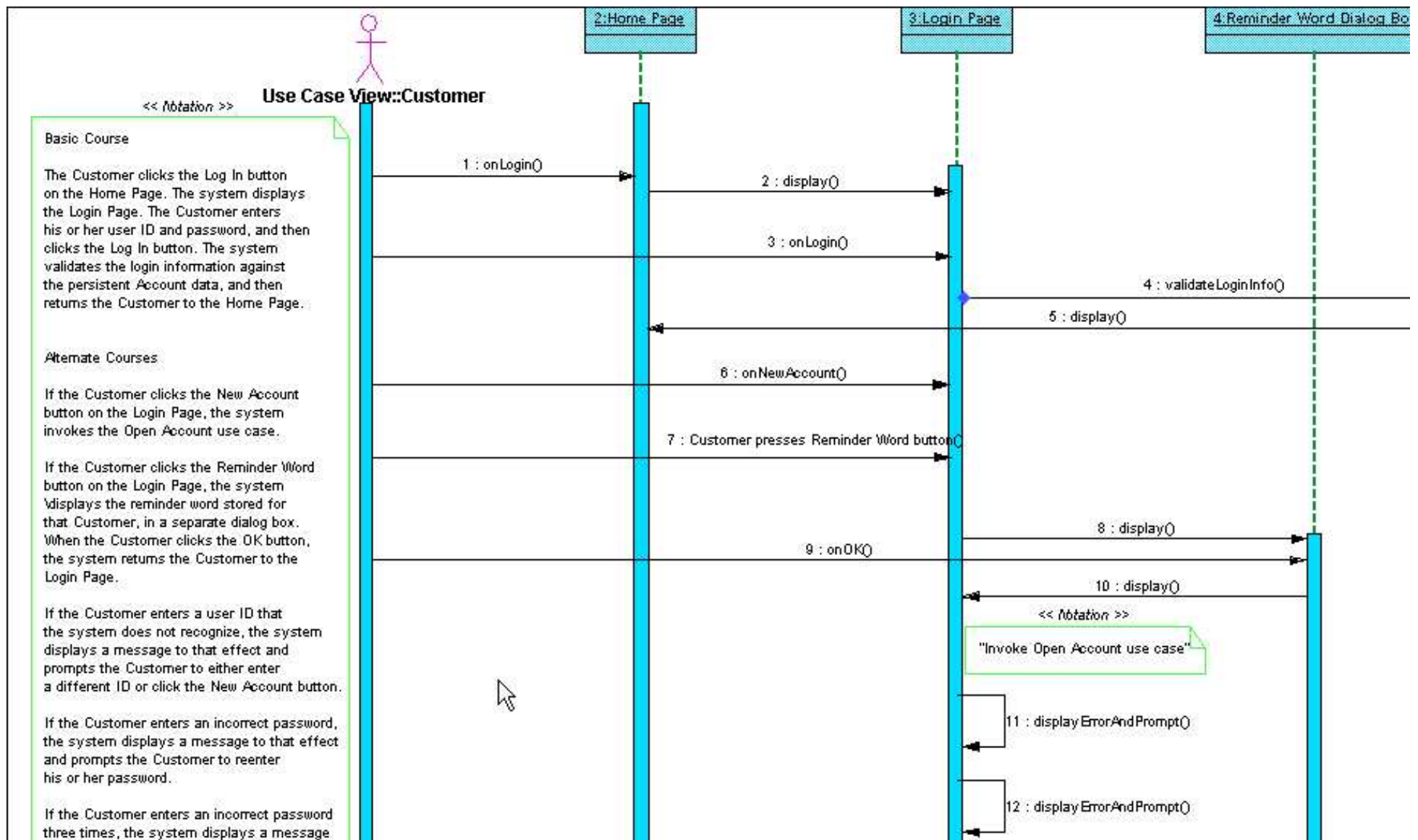
Login: use case text

- Basic Course: The Customer enters his or her user ID and password, and then clicks the Log In button. The system validates the login information against the persistent Account data, and then returns the Customer to the Home Page.
- Basic Course: The Customer enters his or her user ID and password, and then clicks the Log In button....

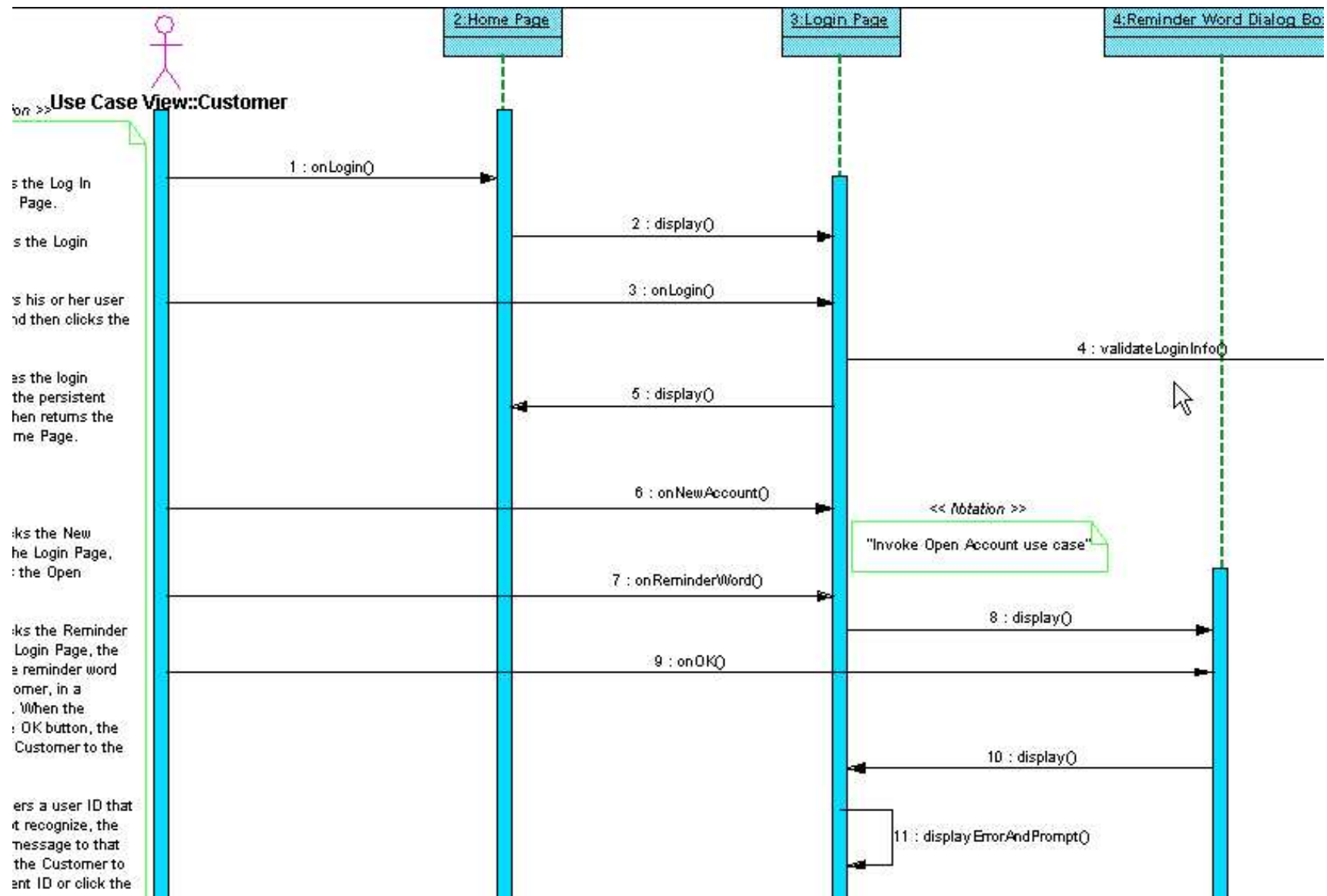
Login: robustness diagram



Login: bad sequence diagram



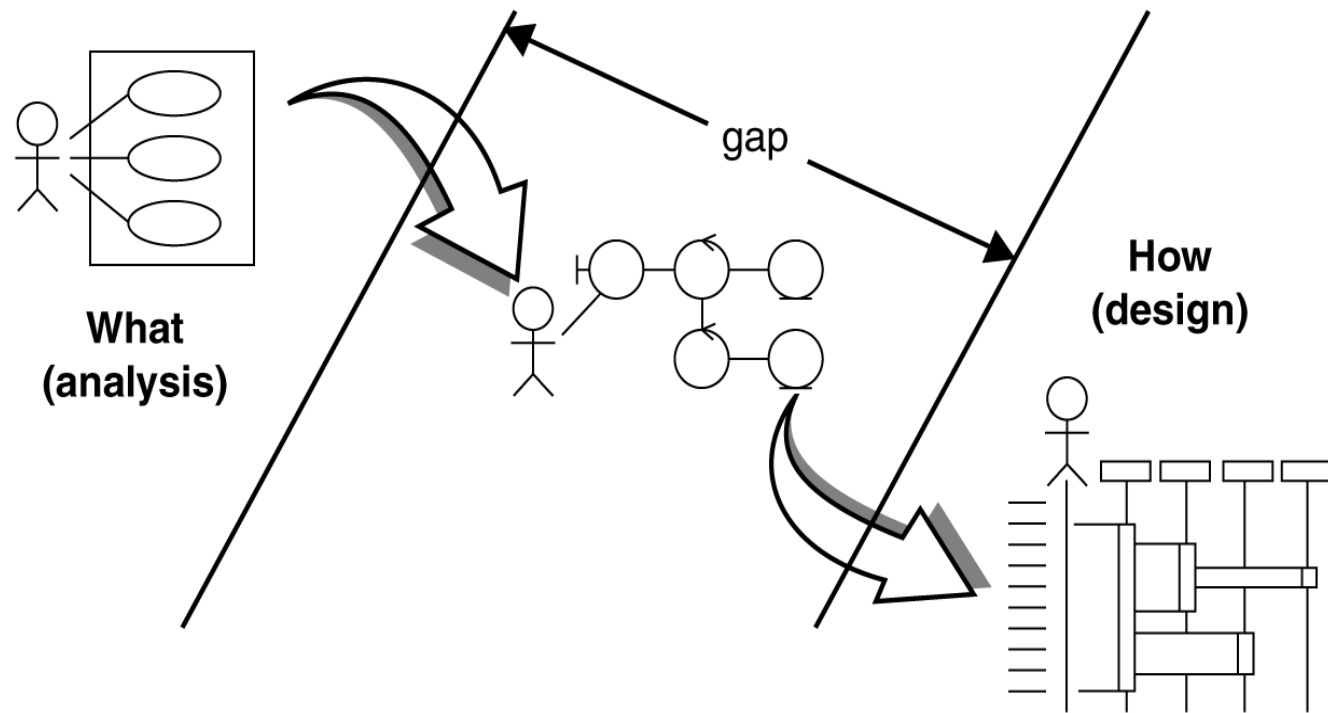
Login: good sequence diagram



Edit Shopping Cart use case text

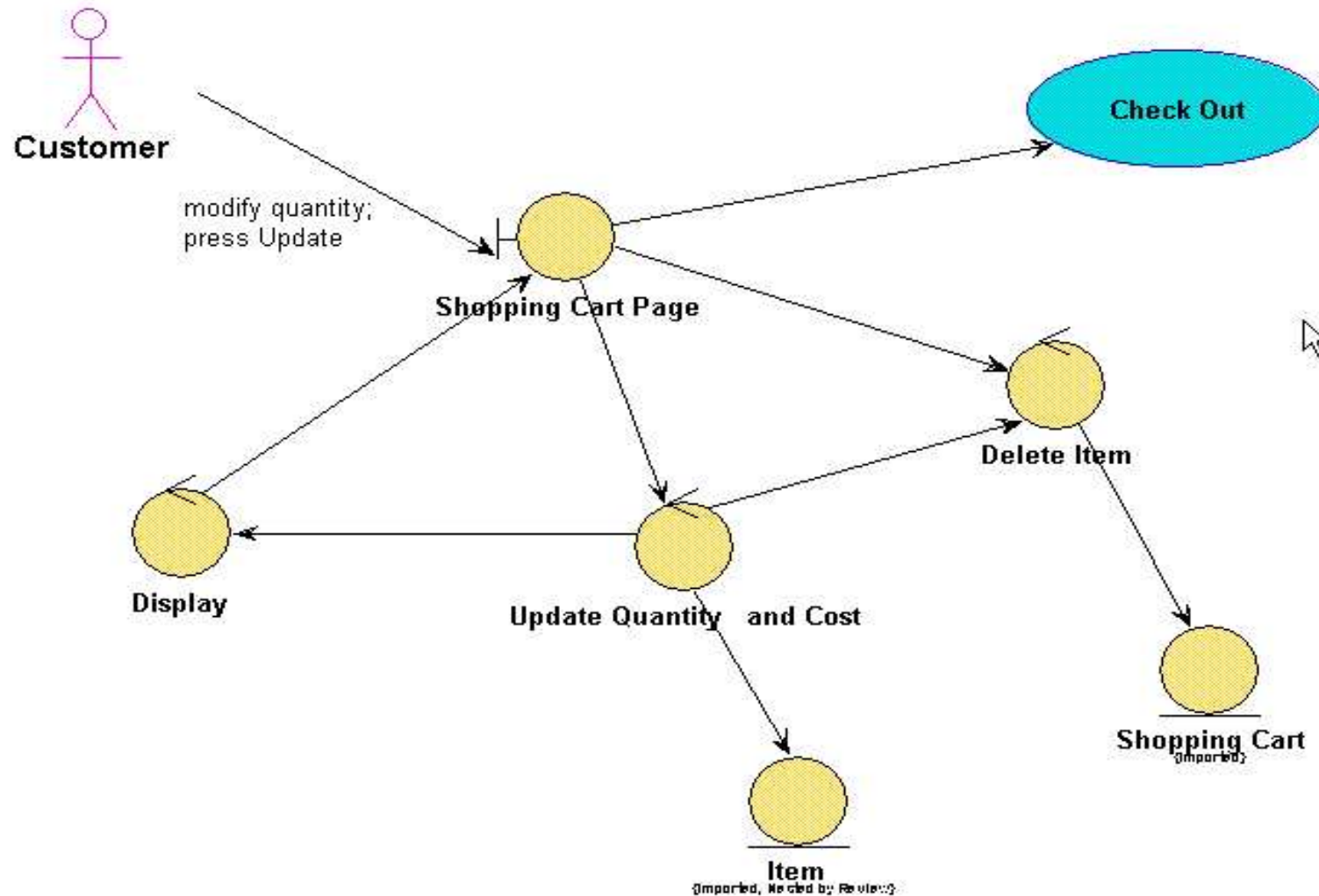
- ❁ **Basic Course:** On the Shopping Cart Page, the Customer modifies the quantity of an Item in the Shopping Cart, and then presses the Update button. The system stores the new quantity, and then computes and displays the new cost for that Item....
- ❁ **Alternate Course:** If the Customer changes the quantity of the Item to 0, the system deletes that Item from the Shopping Cart.

Robustness diagrams bridge the “what/how” gap



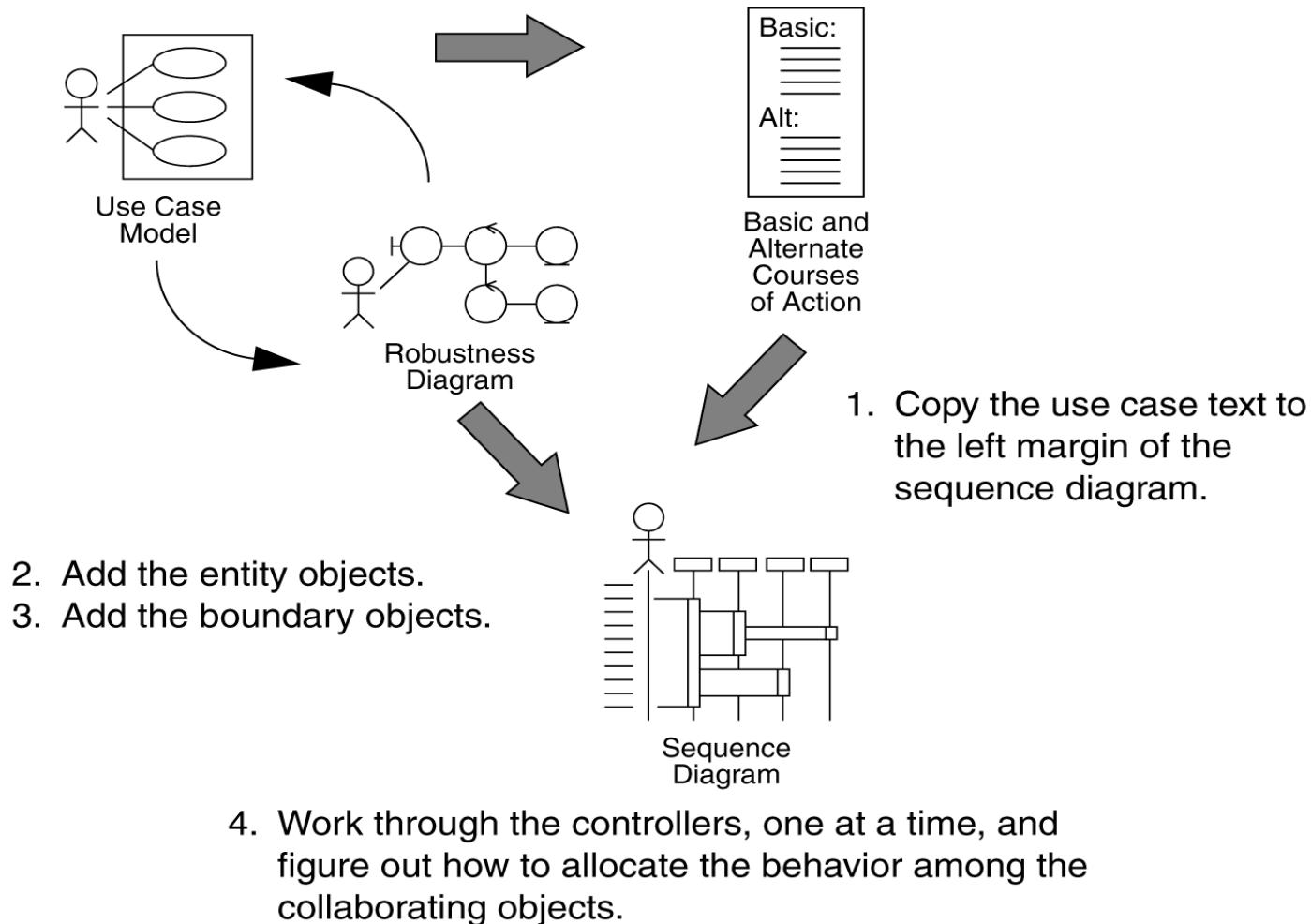
🌐 Most current UML texts do not address crossing this what/how gap.

Edit shopping cart robustness diagram



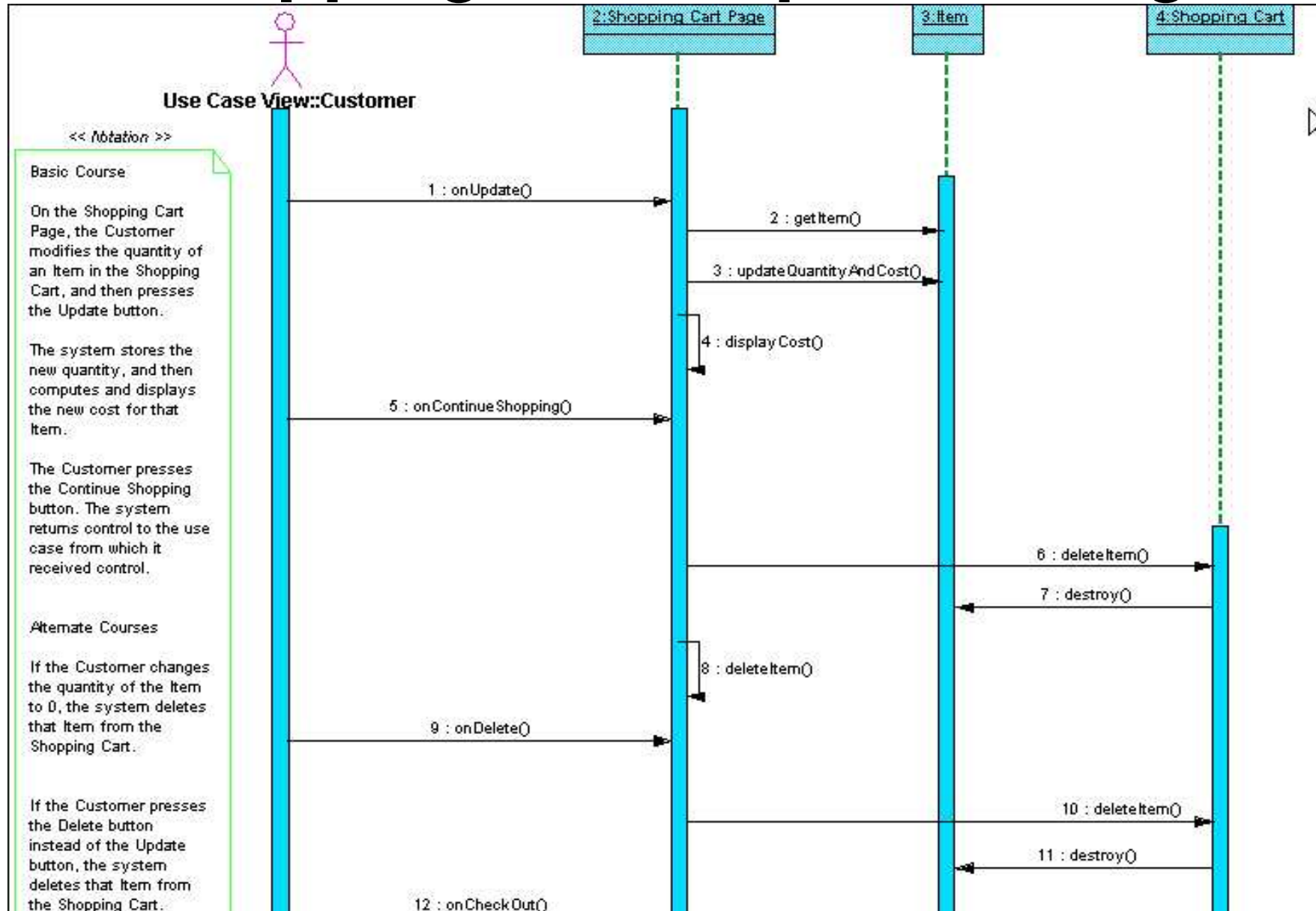
Starting a sequence diagram

Use case text is refined during robustness analysis and reviewed during the preliminary design review.



The user requirements are always visible as we work through the design of the system.

Edit shopping cart sequence diagram



Use the Sequence Diagram to Allocate Behavior

☀ *Which class does an operation belong in?*

Halbert and O'Brien criteria:

- ☀ Reusability: does it make this class more general?
- ☀ Applicability: does it fit? Is it relevant?
- ☀ Complexity: is it easier to build it here or elsewhere?
- ☀ Implementation knowledge: does it rely on internal details?

Update your static model, again

