

Other considerations:

- Classes that have subclasses should be abstract, which means they will never have any objects. This allows the problem to be more readily extended.
- Consider associations with roles when you come across the *my object is a member of both these classes* dilemma.
- Don't introduce the complexity of inheritance unless the specialized data in the subclasses is important to the main objectives of the project.

TESTING YOUR UNDERSTANDING

Exercise 6-1.

Consider the model in Figure 6-24 which describes purchases of a product by customers of a small mail order company selling toys. For simplicity, each purchase is for one or more of a single toy. Each transaction must have a customer so that he or she can be invoiced and the product delivered. The data will be used to prepare statistics about the different products sold, values of purchases, and the spending habits of customers.

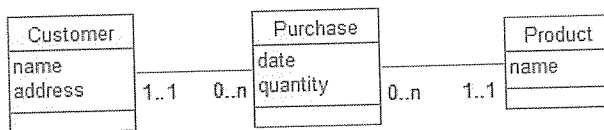


Figure 6-24. Customers purchase products.

The company changes the way it does business to allow customers to walk in off the street and pay cash. No customer needs to be associated with a cash purchase. Discuss how effective the following changes to the data would be.

- Change the optionality at the customer end of the relationship to 0 so not all purchases need a customer.
- Leave the optionality as 1 but include a dummy customer object, with name CashCustomer.
- Create subclasses of Customer: Cash_Customer and Account_Customer.
- Create subclasses of Purchase: Cash_Purchase and Account_Purchase.

Exercise 6-2.

1. A farmer keeps information about the application of fertilizer (e.g. amount, date) to his crops. His farm is made up of large sections which are divided into fields. Usually an application of fertilizer is applied to an entire section, but occasionally it is to an individual field. How would you model this?

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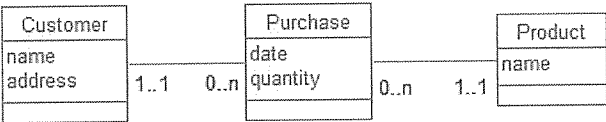


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Exercise 6-3.

2. A volunteer library has staff, members, and books. It wants to know which books are on loan to whom, know how to contact the borrower, and charge fees for overdue books. Reference books cannot be borrowed. Members are fined \$5 per day for overdue books, but staff do not receive fines. How might you model this situation? Some initial classes are shown in Figure 6-25.

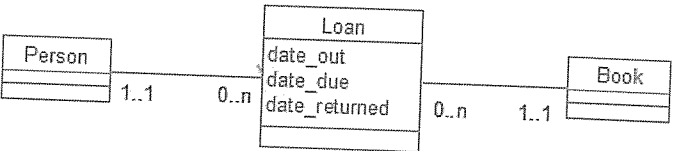


Figure 6-25. People can borrow books.