Assignment for Week 12: Collections

Due Wednesday, 14 April 2004 at beginning of class.

Goals

This is an individual assignment; you must work on it by yourself. The goal is to finish the course with a straightforward assignment that allows you to demonstrate your ability to program in Java.

The Assignment

For this assignment, you will define and test an Inventory class that a movie store or library could use to answer questions like

- Is “Vertigo” in stock?
- Which of your movies were made between 1918 and 1922?
- Which of your movies were directed by Stanley Kubrick?
- Which movies does Katharine Hepburn star in?
- Which movie contains a character named Dr Strangelove?

You are given a Java file Week12.java, which is in the default package. Your assignment is to write another Java file Inventory.java, which is also in the default package.

Week12.java defines the Movie interface as follows.

```
interface Movie extends Comparable {
    // returns the title of this movie
    String title();
    // returns the year this movie was made
    int year();
    // returns the Person who directed this movie
    Person director();
    // the cast of this movie maps Actor objects to Role objects
    Map cast();
}
```

Week12.java defines the following classes: Person, Actor (which extends Person), Actress (which extends Actor), SimpleMovie (which implements Movie), StarMovie (which implements Movie), and Role. A Role object represents a character in some Movie. Since a Role object contains the Movie in which the character appears, and that Movie object contains a Map in which the Role object is the value associated with the Actor that portrays the character, there are circularities within the object graph. See the TestMovie class for examples of how to deal with this circularity when creating a Movie object.

Within Inventory.java, your job is to:

1. Define a class StudentTests. Within this class, define a run() method that will run all of the tests you write for this assignment.

2. Define a class Inventory that represents a collection of movies. The constructor for Inventory shall take no arguments, and initialize an empty Inventory.

3. The add method takes a Movie and adds it to this Inventory.

4. The inStock method takes a Movie and returns true if the Movie is contained within this Inventory.

5. The titles method returns a list of the movies that are within this Inventory, sorted according to the natural ordering. For the Movie classes that are supplied by the instructors, this will be alphabetical order by title.

6. The betweenYears method takes two int values representing two years, and returns a List of all the movies in this Inventory that were made during or between those years, sorted by year. Note that this is *not* the natural ordering.

7. The directedBy method returns a list of the movies directed by a Person, sorted by year. Note that this is *not* the natural ordering.

8. The starring method returns a list of the movies in which a given Actor appears, sorted by year. Note that this is *not* the natural ordering.

9. The hasRole method takes the name of a movie character as a String, and returns a list of the movies that have a character by that name, sorted by year. Note that this is *not* the natural ordering.

10. To submit your assignment, print a paper copy of your Inventory.java file using a fixed width font. (Suggested ways to print this file will be

posted on the course web page.) Make sure your name and your instructor's name appear in the block comment at the top of that file. Place your paper copy on the instructor's desk at the beginning of class on Wednesday, 14 April. Thank you.