Object-oriented programming and design

Lab #8

VHS and DVD Movies

Prerequisites, Goals, and Outcomes

Prerequisites: Before you begin this exercise, you need mastery of the following:

- *Object Oriented Programming*
  - Knowledge of abstract classes
    - How to define an abstract class
  - Knowledge of interfaces
    - How to define an interface
    - How to define a class that implements an interface

Goals: Reinforce your ability to use Java interfaces and abstract classes

Outcomes: You will demonstrate mastery of the following:

- Writing interfaces
- Writing classes that implement interfaces
- Writing abstract classes

Background

In this assignment, you will create the following classes and interfaces:

- Abstract class
  - `Movie`
- Interfaces
  - `VHS`
  - `DVD`
- Classes
  - `VHSMovie`
  - `DVDMovie`

Description

The following class diagram illustrates the relationships between the interfaces and classes:

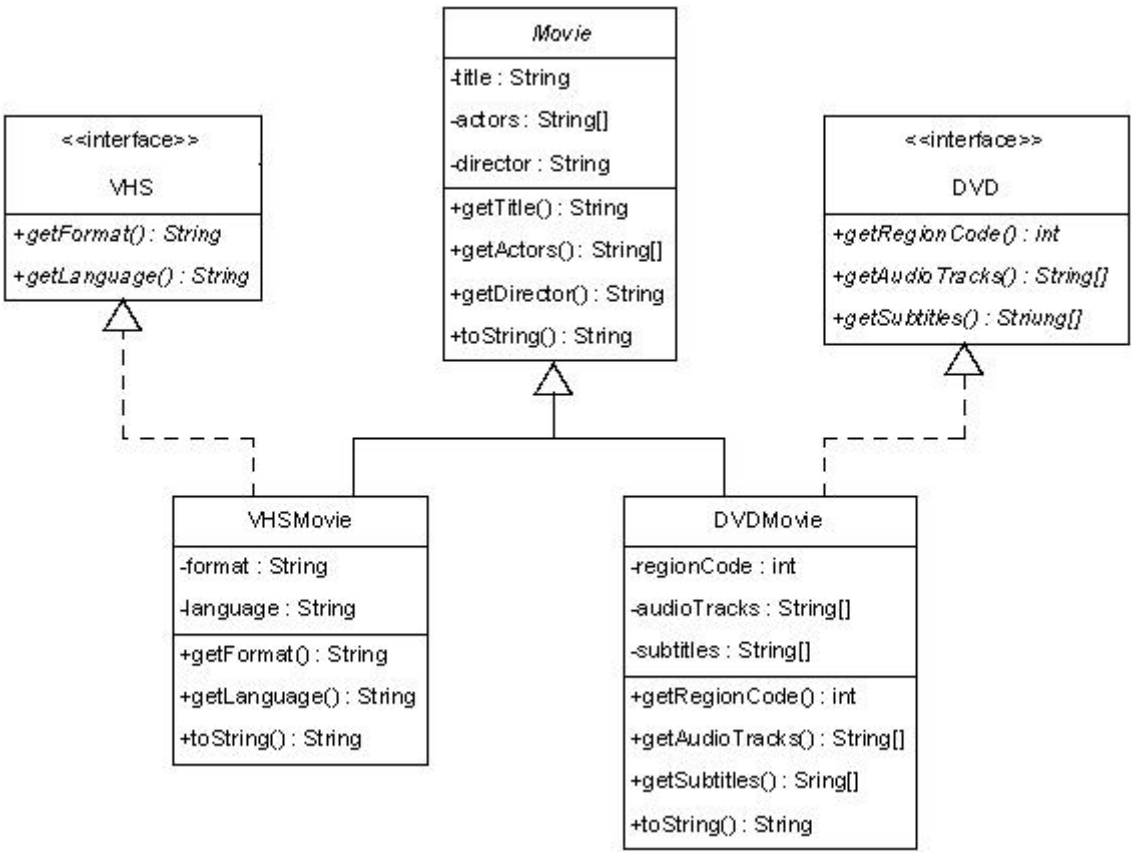

Figure 1 *Class diagram*

The specifications of the interfaces and classes are as follows:

Abstract class `Movie`

The abstract class `Movie` stores the information of a movie.

Instance variables:

- *`String title`*. The title of the movie
- *`String[] actors`*. The names of the actors in the movie
- *`String director`*. The director of the movie

Constructor and methods:

- *`Movie(String initialTitle,`*
- *`String[] initialActors,`*
- *`String initialDirector)`*

  Creates a `Movie` object and initializes the instance variables.

- *`String getTitle()`*. Returns the value of the variable `title`.

- *`String[] getActors()`*. Returns a reference to the array `actors`.

- *`String getDirector()`*. Returns the value of the variable `director`.

- *`String toString()`*. Returns the value of the variable `title`.

Interface `VHS`

The interface `VHS` declares the methods for obtaining VHS tape information.

Methods:

- *`String getFormat()`*. Returns the format of the VHS tape.

- *`String getLanguage()`*. Returns the language of the VHS tape.

Interface `DVD`

The interface `DVD` declares the methods for obtaining DVD information.

Methods:

- *`int getRegionCode()`*. Returns the region code of the DVD.

- *`String[] getAudioTracks()`*. Returns an array with the names of the audio tracks on the DVD.

- *`String[] getSubtitles()`*. Returns an array with the languages of the subtitles on the DVD.

Class `VHSMovie`

The class `VHSMovie` extends class `Movie` and implements the interface `VHS`.

Instance variables:

- *`String format`*. The format of the VHS movie
- *`String language`*. The language of the VHS movie

Constructor and methods:

- *`VHSMovie(String initialTitle,`*
- *`String[] initialActors,`*
- *`String initialDirector,`*
- *`String initialFormat,`*
- *`String initialLanguage)`*

  Creates a `VHSMovie` object and initializes the instance variables.

- *`String getFormat()`*. Returns the value of the variable `format`.

- *`String getLanguage()`*. Returns the value of the variable `language`.

- *`String toString()`*. Returns a string representation of the object with the following format:

  `title`,*`format`*,*`language`*

  where:

  - *`title`* is the title of the VHS movie.
  - *`format`* is the format of the VHS movie.
  - *`language`* is the language of the VHS movie.

The fields are delimited by a comma (,). You can assume that the fields themselves do not contain any commas.

Class `DVDMovie`

The class `DVDMovie` extends class `Movie` and implements the interface `DVD`.

Instance variables:

- *`int regionCode`*. The region code of the DVD movie
- *`String[] audioTracks`*. The names of the audio tracks on the DVD movie
- *`String[] subtitles`*. The languages of the subtitles on the DVD movie

Constructor and methods:

- *`DVDMovie(String initialTitle,`*
- *`String[] initialActors,`*
- *`String initialDirector,`*
- *`int initialRegionCode,`*
- *`String[] initialAudioTracks,`*
- *`String[] initialSubtitles)`*

  Creates a `DVDMovie` object and initializes the instance variables.

- *`int getRegionCode()`*. Returns the value of the variable `regionCode`.

- *`String[] getAudioTracks()`*. Returns a reference to the array `audioTracks`.

- *`String[] getSubtitles()`*. Returns a reference to the array `subtitles`.

- *`String toString()`*. Returns a string representation of the object with the following format:

  `title`,*`regionCode`*

  where:

  - *`title`* is the title of the DVD movie.
  - *`regionCode`* is the region code of the DVD movie.

  The fields are delimited by a comma (,). You can assume that the fields themselves do not contain any commas.

Test driver classes

Complete implementations of the following test drivers are provided in the student archive:

- Class `TestMovie`
- Class `TestVHS`
- Class `TestDVD`
- Class `TestVHSMovie`
- Class `TestDVDMovie`

Files

The following files are needed to complete this assignment:

- *student-files.zip* — Download this file. This archive contains the following test drivers:
  - *TestMovie.java*
  - *TestVHS.java*
  - *TestDVD.java*
  - *TestVHSMovie.java*
  - *TestVHSMovie.java*

Tasks

Implement the abstract class `Movie`, the interfaces `VHS` and `DVD`, and the concrete classes `VHSMovie` and `DVDMovie`. Document using Javadoc and follow Sun's code conventions. The following steps will guide you through this assignment. Work incrementally and test each increment. Save often.

1. **Extract** the files by issuing the following command at the command prompt:

   ```
   C:\>unzip student-files.zip
   ```

2. **Then**, implement the class `Movie` from scratch. Use `TestMovie` to test your implementation.

3. **Next**, implement the interface `VHS` from scratch. Use `TestVHS` to test your implementation.

4. **Then**, implement the interface `DVD` from scratch. Use `TestDVD` to test your implementation.

5. **Next**, implement the class `VHSMovie` from scratch. Use `TestVHSMovie` to test your implementation.

6. **Finally**, implement the class `DVDMovie` from scratch. Use `TestDVDMovie` to test your implementation.

Submission

Upon completion, submit **only** the following:

1. `Movie.java`
2. `VHS.java`
3. `DVD.java`
4. `VHSMovie.java`
5. `DVDMovie.java`