

LAB #7: INHERITANCE + POLYMORPHISM

Using an inheritance hierarchy, design a Java program to model items at a library (books, journal articles, videos and CDs.) Have an abstract superclass called `Item` and include common information that the library must have for every item (such as unique identification number, title, and number of copies). No actual objects of type `Item` will be created - each actual item will be an object of a (non-abstract) subclass. Place item-type-specific behavior in subclasses (such as a video's year of release, a CD's musical genre, or a book's author). More in detail:

1. Implement an abstract superclass called `Item` and define all common operations on this class (constructors, getters, setters, equals, toString, print, checkIn, checkOut, addItem, etc). Have private data for: identification number, title, and number of copies.
2. Implement an abstract subclass of `Item` named `WrittenItem` and define all common operations on this class. Added private data for `author`.
3. Implement 2 subclasses of `WrittenItem`: `Book` and `JournalPaper`.
 - 3.1. Class `Book`: no new private data. When needed, override/overload methods from the superclass.
 - 3.2. Class `JournalPaper`: added private data for year published. When needed, override/overload methods from the superclass.
4. Implement another abstract subclass of `Item` named `MediaItem` and define all common operations on this class. Added private data for `runtime` (integer).
5. Implement 2 subclasses of `MediaItem`: `Video` and `CD`.
 - 5.1. Class `Video`: added private data for director, genre and year released. When needed, override/overload methods from the superclass.
 - 5.2. Class `CD`: added private data for artist and genre. When needed, override/overload methods from the superclass.

Write the definitions of these classes and a client program (your choice!) showing them in use. Some possible output could look like this:

```
Display info about a book
ID: 123456
TITLE: To kill a mocking bird
AUTHOR: Harper Lee
NUMBER OF COPIES: 5
After the book was checked-out, the number of copies changed. The new info is:
Display info about a book
ID: 123456
TITLE: To kill a mocking bird
AUTHOR: Harper Lee
NUMBER OF COPIES: 4
After a new copy of this book was added, the number of copies changed. The new info
is:
Display info about a book
ID: 123456
TITLE: To kill a mocking bird
AUTHOR: Harper Lee
```

NUMBER OF COPIES: 5
Display info about a video
ID: 1111
TITLE: The Godfather
DIRECTOR: Francis Ford Coppola
GENRE: drama
YEAR RELEASED: 1981
RUNTIME: 215.0 minutes
NUMBER OF COPIES: 3
After the video was checked-in, the number of copies changed. The new info is:
Display info about a video
ID: 1111
TITLE: The Godfather
DIRECTOR: Francis Ford Coppola
GENRE: drama
YEAR RELEASED: 1981
RUNTIME: 215 minutes
NUMBER OF COPIES: 4
...
...

Notes:

- A.** The lab will NOT be graded, but you have to submit good quality work in order to get credit.
- B.** The lab should be completed by the start of the next scheduled lab class. Save the **.java** files on your disk and e-mail them (attachments) to Mohamed Said at mhesha1@students.towson.edu
- Very important:** Make sure that you have COSC 237.section, your name, and Lab#7 in the *Subject* box of your e-mail.
- C.** In case you have any problems, contact the instructor or the TA for assistance.