

Java for Programmers COSC1290/1295

Semester 1 2012

School of CS and IT, RMIT University

Assignment 2

Introduction

This assignment is designed to help you:

1. Practise your knowledge of class design in Java;
2. Practise the implementation of different kinds of OO constructs in Java;
3. Practise the use of polymorphism;
4. Practise error handling in Java;
5. Develop a reasonable sized application in Java.

This is an individual assignment worth a total of 20% towards your final grade (including demo component) and is due in the start of Week 9 (April 30th 2012 11:59PM). You will be required to demonstrate your progress on this assignment in the labs in Week 8 (worth 2%)

Assignment Specification

Your task in this assignment is to extend the VidFix system (created in Assignment 1) to include a number of new functionalities. As such, your deliverable includes 1) a Class Diagram showing the overall design of the extended system and 2) an associated implementation which includes the additional functionalities discussed below:

Movies:

In order to reach a wider range of Customers, the company has decided to offer some of its Movies in DVD format (hardcopy) in addition to its downloadable versions (discussed in Assignment 1). These DVD rentals/purchases are delivered to Users through the mail and as such incur additional shipping costs. The system should store the *title*, *genre*, *year*, *status*, *running length* and *cast* information for each Movie in addition to the following media specific data:

- *DVDs by Mail*: For each DVD, the system must store a barcode (String value) and information relating to its dimension (default 190.5 x 135 x 14.6 mm) and weight in grams (default 20 grams). The dimension and weight of a DVD are used to compute its Shipping cost as discussed later in the *rental/purchase requirements* section. The company typically maintains multiple copies of a Movie (copies of a specific movie share the same barcode), and hence the system must keep track of these copies so that users are informed if items are

either unavailable or out of stock (i.e. all copies have either been rented or purchased).

Note: You are not required to automatically generate unique barcodes for DVDs, instead this is provided by a User (Administrator) of the system.

- *Downloadable Movies:* the system must store a unique ID for each Movie (other than the title) as well as the size in megabytes and media format of the associated file, so that users are aware of any system requirements of the specific media (bandwidth and storage requirements etc.)

Users:

The system must include functionalities for managing Users. A User can either be a *Member* or an *Administrator*. The following information is common to both types of users: *full name, email address, mailing address*, a unique *user id* and a *password* (unencrypted text value). In addition:

- Users must logon (using their *username* and *password*) in order to use the system. The VidFix system must differentiate between *Administrators* and *Members* and presents the appropriate menu based on login credentials. If a login attempt fails an appropriate exception must be thrown.
- Users should be able to change their own personal information (specifically their *email, password* and *Mailing Address*)

Members

- The system has to cater for two types of Members, *Standard* and *Premium*. While at present both Member types enjoy equal access to the media library, the company aims to, in future, offer selected content (latest movie and TV Shows) exclusively to Premium members (not implemented in this assignment).
- However, at this stage, Premium Members are offered Shipping discounts and Rental Delay Penalty reprieves that are not available to Standard Members (as discussed in *rental/purchase requirements* section below). Premium Membership incurs a cost of \$5 per Month deducted at the beginning of each Month from the user's Credit Amount (see *Administrators* section below).
- Each Member has a pre-loaded credit amount from which all purchases/rentals are to be deducted (including Shipping cost or Membership fees in the case of Premium Members). Members should have the ability to top-up their credit amount and view their remaining credit using the VidFix System.
- While the System must ensure that *Standard Members* have sufficient funds to purchase/rent a Movie, *Premium Users* are allowed to exceed their limit by a pre-set overdraw limit (\$20), after which point an Exception indicating insufficient funds must be thrown and the member notified to top-up their credit. In the case of *Premium Members*, the overdrawn amount is deducted from the User's credit the next time he/she tops-up.
- The system must maintain a Shopping Cart for each user and all rental/purchases must first be added to this cart before checking out. A user must be provided with a detailed list of the rental/purchase cost for each item, the discounts applied and total shipping costs, before checkout. If a checkout

fails as a result of the constraints specified in the *Rental/Purchase requirements* section below, the user must be notified with an appropriate error message.

- Members should be able to view their Rental History (Including Outstanding Rentals and Overdue Fees) and the system should advise users if they attempt to purchase/rent movies that they have done so in the past.

Administrators:

Administrators are responsible for managing the VidFix system by performing the following functionalities:

- Add/Remove/Edit Movies
- Add/Remove/Edit Users (including other Administrators)
- Print Sales and Rental Revenue Statistics.
- View Outstanding Rentals as well as the Rental History for a specific Movie or Member
- Deduct Membership fees from all Premium Members (Performed once a month)
- Process DVD rental returns by specifying the barcode of the item and the number of days late
- Change Rental Price, Purchase Price and Shipping Cost (see rental/purchase requirements)

Rental/Purchase Requirements

- All Movies can be purchased at a price of \$17 dollars. A 5% discount is offered to Premium members who purchase over 5 movies in a given checkout.
- All Movie Rentals are charged at \$5 dollars for 48 hours, with a late fee of \$1 per day for DVD rentals (of course this does not apply for downloadable movies).

Premium Members are not charged late fees totaling under \$10 per month. However, if this limit is exceeded, the total late fee to date is incurred on the User's credit balance. This late fee (if under \$10 dollars) is reset each time a Premium Membership fee is paid in the beginning of the Month.

- A flat rate shipping cost of \$5 per *package* is incurred for DVD rentals/purchases wherein a single *package* consists of items of total weight less than 70 grams, which fit within the shipping dimension 250 x 150 x 50 mm.

Premium users are offered a Shipping Discount of 10% for purchases constituting more than one package in a given checkout.

Sample Data

Test Data that includes a list of Movies and Users will be provided on Blackboard. You are allowed to hardcode this data in the Driver class of your implementation for this Assignment.

General Requirements

Your implementation has to take the following into account:

- Good OO design principles in terms of Inheritance, Polymorphism, Coupling and Cohesion
- Throw appropriate Exceptions when error conditions relating to the Business case are detected (e.g. Insufficient Credit etc.)
- Use appropriate data structures from the Java collection API (e.g. Map, Set, List etc.) in your implementation.
- All input/output to the system should be provided through Standard-input and Standard-output and as such no File I/O is required for this Assignment.
- Your programs should validate user inputs and not crash or display unexpected data upon invalid input. (e.g. Entry of an invalid menu option number in the Main Menu or other menus etc.)
- Marks will be deducted if you do not follow good coding styles and comments etc. (See <http://java.sun.com/docs/codeconv/html/CodeConventions.doc4.html>).

Submission

- Assignment submissions should be made via Weblearn by the due date (Start of Week 9, April 30 2012, 11:59 PM).
- Your progress on this assignment will be assessed in the lab a week before the submission date in Week 8 (worth 2%). Refer to the course guide for details on the assessment structure for this course
- You must include in your submission 1) Your class Diagram in .pdf, .jpg or .gif file 2) all your *.java files (do not include *.class files) and 3) a single README file containing information on how to run your application. All these files are to be archived into one .ZIP file and submitted to weblearn.
- Late submissions will incur a penalty of 10% per day. Submissions made 5 days after the due date will receive no marks.

Further Information

Any further inquiries regarding this assignment should be raised in appropriate discussion forum in Blackboard.

Academic Integrity

The submitted assignment must be your own work. No marks will be awarded for any parts, which are not created by you. Plagiarism is treated very seriously at RMIT.

Plagiarism includes copying code directly from other students, Internet or other resources without proper reference. Sometimes, students study and work on assignments together and submit similar files which may be regarded as plagiarism. Please note that you should always create your own assignment even if you have very similar ideas. Plagiarism-detection tools will be used for all submissions. Penalties may be applied in cases of plagiarism.