

# CS 210 - Fundamentals of Programming I

Spring 2006 - Programming Project 2, Part B

70 points

Out: April 20, 2006

Due: May 2, 2006 (last day of classes)

Part B of this programming project is to implement the program you designed in Part A. The work must be entirely your own except for any help you may receive from the instructor. Name your main program file `vidstore.cpp`, the files for the VideoStore class `store.h` and `store.cpp`, and the files for the DVD class `dvd.h` and `dvd.cpp` (i.e., the ones from Programming Assignment 7). Graded Part A's will be available from the instructor after 3pm on Monday, April 24. Otherwise they will be returned in class on Tuesday, April 25.

- This project is to be submitted by email to `cs210@csserver.evansville.edu` by 5:00pm on Tuesday, May 2, 2006 (the last day of classes). Email all 5 files (`vidstore.cpp`, `store.h`, `store.cpp`, `dvd.h`, and `dvd.cpp`) as attachments to one email message. (Make sure you send it to `csserver`. If you send to just `evansville.edu`, it will not be delivered.)
- Your program **must** compile for it to be graded. Programs that do not compile will be not be graded and will receive a score of 0. Therefore, it is better to hand in a program late and working than to hand it in on-time and not working. Late work will be accepted until the final exam (Friday, May 5).
- Implementation note: Although not specified in Part A, the default constructor for the VideoStore class should create an empty VideoStore object. I.e., one with no DVDs stored in its vector. The code for initializing a store should be in a separate member function or an explicit value constructor that receives and passes back an ifstream object per the next item.
- **To facilitate the grading of your programs, input for the initialization of the video store's collection of DVDs must be read from a file.** When a choice is made to initialize the store, your program should ask the user for the name of the file to open, associate it with an ifstream variable, and read the expected data from the file stream. (See sample program run.) You should use `InteractiveOpen` from previous exercises to handle opening the file stream. This may be done either in the VideoStore class member function that does the initialization or in the main program with the opened ifstream object passed in to an explicit value constructor.

Since the data is coming from a file, your program should not prompt for the data. You may assume that all of the data in the file is valid. (I.e., your program does not have to check for invalid data.) Put the prototype and definition for `InteractiveOpen` in whichever file the function is being called in (`store.cpp` or `vidstore.cpp`).

The format of the input file will be as follows. The number of distinct DVDs will be on the first line. The following line will contain the title, director, and genre of the first DVD and the third line will contain the number of actors in the cast, the actors' names, and the number of copies for the first DVD. The data for the second DVD will be on the next 2 lines, and so forth. Note that the DVD class implements the standard input operator (>>) and the format of the data files conform to the use of this operator.

Test files `dvddata1.dat` and `dvddata2.dat` containing input data in the prescribed format are available at the course webpage under today's date. Recall that in KC-267, the input files need to be in the `C:\WINDOWS` folder. Otherwise they go in the project folder.

- Make sure your program is user-friendly. The prompts should be informative and any output should be explained and formatted.
- The program should gracefully handle invalid menu choices, and the error conditions previously noted in Part A.
- Follow the guidelines in the *A C++ Programming Style Guideline* handout. As stated in the syllabus, part of the grade on a programming project depends on how well you adhere to the guidelines. The grader will look at your code listing and grade it according to the guidelines.

### Example program run

```
Welcome to the CS 210 video rental store!
```

```
Please choose from the following actions:
```

- A. Initialize the collection.
  - B. Add a new DVD to the collection.
  - C. Rent a DVD.
  - D. Return a DVD.
  - E. Print out a list of all DVDs
  - F. Print out a list of DVDs with the same director
  - G. Print out a list of DVDs of the same genre
  - H. Print out a list of DVDs with the same actor in the cast
  - I. Print out the total number of all the DVDs owned by the store
  - J. Print out the total number of DVDs that are currently rented out
- Q. Quit the program.

```
Your choice: A
```

```
Please enter the name of the input file: dvddata1.dat  
The Video Store has been initialized.
```

```
Please choose from the following actions:
```

- A. Initialize the collection.
- B. Add a new DVD to the collection.
- C. Rent a DVD.

- D. Return a DVD.
- E. Print out a list of all DVDs
- F. Print out a list of DVDs with the same director
- G. Print out a list of DVDs of the same genre
- H. Print out a list of DVDs with the same actor in the cast
- I. Print out the total number of all the DVDs owned by the store
- J. Print out the total number of DVDs that are currently rented out
  
- Q. Quit the program.

Your choice: E

Title	# copies	# rented copies
----	-----	-----
Incredibles,_The	5	0
Chicken_Little	10	0
War_of_the_Worlds	5	0
Brokeback_Mountain	10	1

Please choose from the following actions:

- A. Initialize the collection.
- B. Add a new DVD to the collection.
- C. Rent a DVD.
- D. Return a DVD.
- E. Print out a list of all DVDs
- F. Print out a list of DVDs with the same director
- G. Print out a list of DVDs of the same genre
- H. Print out a list of DVDs with the same actor in the cast
- I. Print out the total number of all the DVDs owned by the store
- J. Print out the total number of DVDs that are currently rented out
  
- Q. Quit the program.

Your choice: C

Title: Brokeback\_Mountain  
 Brokeback\_Mountain has been rented

Please choose from the following actions:

- A. Initialize the collection.
- B. Add a new DVD to the collection.
- C. Rent a DVD.
- D. Return a DVD.
- E. Print out a list of all DVDs
- F. Print out a list of DVDs with the same director

- G. Print out a list of DVDs of the same genre
- H. Print out a list of DVDs with the same actor in the cast
- I. Print out the total number of all the DVDs owned by the store
- J. Print out the total number of DVDs that are currently rented out
  
- Q. Quit the program.

Your choice: I

There is/are 30 total DVD(s) in the collection.

Please choose from the following actions:

- A. Initialize the collection.
- B. Add a new DVD to the collection.
- C. Rent a DVD.
- D. Return a DVD.
- E. Print out a list of all DVDs
- F. Print out a list of DVDs with the same director
- G. Print out a list of DVDs of the same genre
- H. Print out a list of DVDs with the same actor in the cast
- I. Print out the total number of all the DVDs owned by the store
- J. Print out the total number of DVDs that are currently rented out
  
- Q. Quit the program.

Your choice: J

There is/are 1 DVD(s) rented out.

Please choose from the following actions:

- A. Initialize the collection.
- B. Add a new DVD to the collection.
- C. Rent a DVD.
- D. Return a DVD.
- E. Print out a list of all DVDs
- F. Print out a list of DVDs with the same director
- G. Print out a list of DVDs of the same genre
- H. Print out a list of DVDs with the same actor in the cast
- I. Print out the total number of all the DVDs owned by the store
- J. Print out the total number of DVDs that are currently rented out
  
- Q. Quit the program.

Your choice: Q

Thank you for using the CS 210 video rental store!

## Extra credit (10 points)

**Note: This extra credit problem is in addition to the above assignment. I.e., you must still submit a program that conforms with the original assignment.**

### Problem Statement

Extend your program to handle multiple video stores. Such a service might be needed if a video rental store does not have any copies of a DVD left for rental and wants to find another store in its chain that can satisfy a customer's request. The program should always have one VideoStore when it starts up and designate that store as the current store. It should include a new menu option to add a VideoStore to the collection of stores, that also makes it the current store, and another new option to change the current store. The "name" of a store will be its index (between 0 and n-1) in the collection. All other menu options should be directed to the current store. (See example program run below.)

### Design Criteria

The collection of stores should be implemented using a vector of VideoStore objects in the main program. The current store should be designated using an index variable that is used to access the current store from the array.

Name your the main program file `vidchain.cpp`. Submit it and the four class files (`store.h`, `store.cpp`, `dvd.h`, and `dvd.cpp`) attached to a **second, separate email message**.

### Example program run of extra credit

```
Welcome to the CS 210 multiple video rental store service!
```

```
Store 0 is the current store.
```

```
Please choose from the following actions:
```

- A. Initialize the collection.
- B. Add a new DVD to the collection.
- C. Rent a DVD.
- D. Return a DVD.
- E. Print out a list of all DVDs
- F. Print out a list of DVDs with the same director
- G. Print out a list of DVDs of the same genre
- H. Print out a list of DVDs with the same actor in the cast
- I. Print out the total number of all the DVDs owned by the store
- J. Print out the total number of DVDs that are currently rented out
- K. Change the current store.
- L. Add a new store.
  
- Q. Quit the program.

```
Your choice: L
```

Store 1 has been added to the service.

Store 1 is the current store.

Please choose from the following actions:

- A. Initialize the collection.
- B. Add a new DVD to the collection.
- C. Rent a DVD.
- D. Return a DVD.
- E. Print out a list of all DVDs
- F. Print out a list of DVDs with the same director
- G. Print out a list of DVDs of the same genre
- H. Print out a list of DVDs with the same actor in the cast
- I. Print out the total number of all the DVDs owned by the store
- J. Print out the total number of DVDs that are currently rented out
- K. Change the current store.
- L. Add a new store.
  
- Q. Quit the program.

Your choice: A

Please enter the name of the input file: dvddata1.dat

Store 1 has been initialized.

Please choose from the following actions:

- A. Initialize the collection.
- B. Add a new DVD to the collection.
- C. Rent a DVD.
- D. Return a DVD.
- E. Print out a list of all DVDs
- F. Print out a list of DVDs with the same director
- G. Print out a list of DVDs of the same genre
- H. Print out a list of DVDs with the same actor in the cast
- I. Print out the total number of all the DVDs owned by the store
- J. Print out the total number of DVDs that are currently rented out
  
- Q. Quit the program.

Your choice: E

DVDs in Store 1 are:

Title	# copies	# rented copies
-----	-----	-----
Incredibles,_The	5	0

Chicken_Little	10	0
War_of_the_Worlds	5	0
Brokeback_Mountain	10	1

Store 1 is the current store

Please choose from the following actions:

- A. Initialize the collection.
- B. Add a new DVD to the collection.
- C. Rent a DVD.
- D. Return a DVD.
- E. Print out a list of all DVDs
- F. Print out a list of DVDs with the same director
- G. Print out a list of DVDs of the same genre
- H. Print out a list of DVDs with the same actor in the cast
- I. Print out the total number of all the DVDs owned by the store
- J. Print out the total number of DVDs that are currently rented out
- K. Change the current store.
- L. Add a new store.
  
- Q. Quit the program.

Your choice: I

There is/are 30 DVD(s) in the Store 1 collection.

Store 1 is the current store.

Please choose from the following actions:

- A. Initialize the collection.
- B. Add a new DVD to the collection.
- C. Rent a DVD.
- D. Return a DVD.
- E. Print out a list of all DVDs
- F. Print out a list of DVDs of the same genre
- G. Print out a list of DVDs with the same actor
- H. Print out the total number of all the DVDs owned by the store
- I. Print out the total number of DVDs that are currently rented out
- J. Change the current store.
- K. Add a new store.
  
- Q. Quit the program.

Your choice: J

Please enter the index of the store you want: 0

Store 0 is the current store.

Please choose from the following actions:

- A. Initialize the collection.
- B. Add a new DVD to the collection.
- C. Rent a DVD.
- D. Return a DVD.
- E. Print out a list of all DVDs
- F. Print out a list of DVDs of the same genre
- G. Print out a list of DVDs with the same actor
- H. Print out the total number of all the DVDs owned by the store
- I. Print out the total number of DVDs that are currently rented out
- J. Change the current store.
- K. Add a new store.
  
- Q. Quit the program.

Your choice: I

There is/are 0 DVD(s) in the Store 0 collection.

Note that Store 0 is a default constructed empty VideoStore object so it has no DVDs.