# CMPT 354
## *Assignment 4: Term Project*

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| Total marks: | 150 | 2000-1 |
| Due: | Part 1 on 2000-03-01 | Instructor: G. Louie |
| | Part 2 on 2000-03-22 | |

Get together with 3 - 4 of your classmates and do this as a group project. If you are planning to do this project with less than 3 or more than 4 students in your group, you must first get permission from Dulce! Each group should send Dulce (dma@cs.sfu.ca) a single email with the names and student numbers of its group members by 2000-02-16.

***Vvvideo!***

For this assignment, your group must design and implement a database for a video store chain called *Vvvideo!*. The *Vvvideo!* chain has a number of stores, employees, and members. Employees work at the different stores. Members can rent items from stores.

Each *Vvvideo!* store has a set of items that can be rented to members. Items can include (among others) VHS videotapes, DVD's, music CD's, videogames, etc.

A person must become a *Vvvideo!* member before being able to rent items from the *Vvvideo!* stores. It costs nothing to become a member, but potential members have to fill out an application and provide information such as first and last name, address, city, province, postal code. Members must also provide a major credit card account number along with an expiry date in order to rent items. If a rented item is not returned, then the member's credit card is charged.

*Vvvideo!* also allows for associate members. An associate member is basically someone who does not or cannot provide a credit card account, but is instead associated with another member who does have a credit card. Associate members are usually minors and must have a full member who agrees to be responsible for the associate member's rentals. Each associate membership must have a form signed by a full member agreeing to take responsibility. The form is kept on file in the Vvvideo! store which processed the application.

Once a person has become a member (either full or associate), he or she is then able to rent items from any of the *Vvvideo!* stores. Members are issued wallet-sized cards which they must present in order to rent an item. If a member does not have his or her card, an employee must verify the member's identity by asking for picture ID and checking the member's information in the database.

Members can rent items from one of the *Vvvideo!* chain's stores. Members can rent as many items as they wish, as long as their accounts are in good standing. When an item is rented, it has a due date that indicates when the item must be returned.

If an item is not available for rental, members may ask an employee to reserve the item for them. The *Vvvideo!* store will contact the member when the item on reserve becomes available, either when the item is returned by another member or when the new item is shipped to the store.

Every item has a loan period, which can be different for different items *i.e.* first-run videotapes/DVD's have a 1-day loan period, while older videotapes/DVD's, CD's, and videogames have a 3-day loan period.

If a member exceeds the loan period for an item, he or she is subject to an overdue fine. The fine is tracked and members with outstanding fines exceeding a threshold monetary value of more than $50.00 will not be allowed to borrow any more items until the outstanding fines are paid.

As indicated previously, a *Vvvideo!* rental item can be a videotape, a DVD, an audio CD, or a videogame. Videotapes and DVD's contain movies, CD's contain albums, and videogames contain (what else?) videogames.

Because members sometimes ask for specific information about a movie or an album, the *Vvvideo!* database keeps additional information about the items.

A movie – which can be available on both videotape and DVD – is associated with a number of genres such as action, drama, romance, foreign, documentary, animation, etc. A movie also has one or more stars associated with it, as well as its director and year of release.

For CD albums, the name of the album's artist or group is stored. The genre of the album (different from the movie genre) is also kept. Some music genres include pop, instrumental, jazz, rock, classical, country, etc. The titles of the individual tracks and their playing time are associated with the album as well to allow members to search for albums by song.

*Vvvideo!* tracks the titles and platforms (e.g. Nintendo, Playstation, Dreamcast) of videogames, as well as the company which created the game.

Each time a member rents an item, the rental transaction is captured in the *Vvvideo!* database, indicating the date of the rental, the member renting, as well as the charge for the rental.

The *Vvvideo!* database also keeps employee information. Attributes such as the employee's name, address, city, home phone number, work phone number, SIN, etc. are kept on file, along with a work history indicating the branch or branches at which an employee is working or has worked. As well, the employee's position title (associate, cashier, assistant manager, manager) is kept to enable other employees to contact the appropriate person at the branch. For example, if an employee needed to contact the

assistant manager at the Broadway store, the database would be able to give the appropriate person's name and the contact telephone number.

Employees can also be *Vvvideo!* members. The company gives employees a 35% discount on all rentals to encourage employees to use the company's services. The discount is automatically calculated at the time of the rental and is only valid for current employees.

The database also keeps information about each *Vvvideo!* branch store, including such attributes as address, city, postal code, telephone number, etc.

Note that these specifications are incomplete, so you will have to make some (reasonable) decisions about how to deal with missing or ambiguous information.

**Part I**

This project is to be done in two parts. For part one, your group is required to do the following:

1. Create an entity-relationship diagram using the Chen notation covered in the course text to represent your data model and determine the attributes required by each entity or relationship. You must indicate which attributes in your relations are primary keys by underlining them,
2. Implement the relations in SQL-Server and show the DDL statements that you used. Use integrity constraints where applicable.

Part one is due by the date indicated at the top of page one and is worth 20% of the total project mark.

**Part II**

Part two involves creating a front-end using Visual C++ to enable a user to interact with your system. Some of the tasks your front-end should handle include:

- Processing rentals and rental returns, including generating a rental receipt for the member,
- Processing members (*i.e.* searching, adding, deleting, and modifying member info based on the specifications provided),
- Processing items (*i.e.* searching, adding, deleting, and modifying item info based on the specifications provided),
- Processing reserves,
- Searching for employee contact info,
- Querying for items based on item attributes such as star, genre, and title for movies, or artist, title, and track for albums. The application should be able to indicate if a given item is available at a specified store (or when it becomes available), as well as provide a list of all stores where the item is available,

Also provide the following reports that a manager or assistant manager can generate:

- Processing employee info (*i.e.* adding, deleting, and modifying employee information),
- Processing store info,
- Tracking rentals during a time period (*i.e.* weekly, monthly) by store,
- Tracking rentals during a time period by item groups (*i.e.* videotapes, DVD's, CD's, etc),
- Tracking items that have not been rented in the previous 3 months,
- Tracking membership levels by store.

These reports are mandatory, but feel free to provide additional reports that your group considers useful. Note that reports are displayed on the screen/console. They do not have to be printed, although you may want to provide some sample hardcopies for marking.

Note that these are only a small subset of the tasks that such a system would typically handle. A 'real-world' system would also have additional front-ends and batch jobs.

Part two is due on the date indicated at the top of page one. This part of the project will be marked on the basis of two items:

1. a hand-in report documenting the functionality and internal design of your system. Note that this is not a user manual, but rather just a design document with your ERD, your DDL from part I, and a writeup on your high-level design of the front-end and its modules,
2. a demonstration given to your TA in the CSIL lab. Towards the due date, a signup sheet will be posted to allow your group to book a time with the TA to do your demo.

**Group Work**

Your group shall jointly determine which members will be responsible for the various required tasks such as design, programming, documentation, etc. Identify in your hand-in report who is given primary responsibility for each task, although tasks should be done in collaboration. You will have to hand in your written documentation on the dates indicated and demo your project to Dulce at the CSIL lab. The overall project grade will be:

- 90% group work (20% part 1, 70% part 2),
- 10% peer evaluation

Note that the marking scheme allows for group members to get different grades. Send the peer evaluation in confidence to Dulce (dma@cs.sfu.ca) via email when you hand in your written report. Indicating your group members and give a score between 1 and 15 for each member.