

# Assignment 1 Object oriented programming

**IMPORTANT:** This assignment must be done individually

Read Section 1 to understand the programming requirements, Section 2 to understand the programming tasks that you need to carry out and Section 3 to know what you need to submit as the result.

## 1 Description

In this assignment, you will create a Java program named **VideoRentalMan** for a simple video rental service management system. The purpose of this program is to allow customers to rent videos from the store for a few days, and allow the store owner to manage the rental contract and to compute the fee of each contract.

A customer has an ACCOUNT which has the following attributes: id, name, ~~registered\_date~~, email. Id is an unique customer identifier which is generated automatically by the system using the formula: the letter “S” followed by a number, which is auto-incremented from the current year. For example, the first customer to be registered into the programming in the year 2010 will have the id of S2010. The second customer of that year has the id of S2011, and so on.

There are two types of accounts that the program needs to support. The first type is standard account, which inherits all the attributes of account. The second type is VIP account, which has one extra attribute called “address”. The VIP account is provided with the free delivery service. Thus, this attribute is used to store the information about the location where customers want to get the video. Note that, every account instance must be either Standard or VIP. There are no other types of account.

The attributes of Videos are: id, name, disks (the number of disks - integer) and price (renting price per day - floating). The video id is a unique video identifier which is generated by the system using the formula: the letter “V” followed by the next auto-incremented integer starting from a base, which is calculated by the multiplying the disks value by one thousand. For example, the first video with the disk attribute value of 1 will have the id of V1001, the second video will have the code V1002 and so on. Similarly, the first video with the disk attribute of 2 will have the id of V2001, etc.

An rental contract records a fact that a customer via his account has rented a specific video for some days. It also holds data about the rented date, number of days (for renting), rental fee, status of the contract (closed or not). Thus, contracts will have the following attributes: video (the video instance has been selected by customer), account (the account instance), date (string), days (integer) fee (floating), closed (boolean). The fee is generated by multiplying the number of renting days with the price per day of video.

## 2 Task requirements

1. You must create a top-level package named `videorentalman` for the program.
2. Specify and implement suitable Java classes for the stated program requirements.
3. Specify and implement an `VideoRentalManager` class that is responsible for managing the rental contract objects. This class must have the following operations:

- (a) `addContract(Contract)` – adds a new contract
  - (b) `getContract(Account, Video): Contract` – returns the rental contract of specific account and video.
  - (c) `setContractInfo(Account, Video, string, integer)` – records the date and the number of days the video was rented by specific account (in that order).
  - (d) `closeContract(Contract)` - turn the default status (Open) of a contract to Closed.
  - (e) `reportAll(): String` – generates an initial report of all the current contracts (without fee) in the program
  - (f) `reportOpenContract(): String` – generates a report of all the contracts which are not closed yet together with their fee, number of rental days.
  - (g) `sort()` – sorts the current open contracts in the descending order of the fee.
- Note: you are recommended to use a variant of the quick sort algorithm that operates on a Comparable array of objects
4. Specify and implement the `VideoRentalDemo` class, which is the main program class. This class has a `main` method that performs the following tasks:
- (a) Initialise at least 5 accounts (3 standard and 2 VIP) and 5 video
  - (b) Initialise and use `VideoRentalManager` to create 10 contracts (containing a mixture of standard and VIP accounts)
  - (c) Print a non-sorted initial report of the contracts on the standard output
  - (d) Print a sorted initial report of the contracts on the standard output
  - ~~Initialise and enter fee for 5 contracts~~
  - (e) Close 3 finished contracts
  - (f) Print a (sorted) report of the opened contracts on the standard output
  - (g) End the program

### 3 Submission requirements

You must submit a single zip file containing the `videorentalman` package to the portal by the due date. The zip file name must be of the form `studentid-class-jav2015-1.zip`, where `studentid` is your student identifier and `class` is your class name (the remaining bits of the file name must not be changed!). For example, if your student id is 0912345678 and your class is 1c12 then your zip file must be named `0912345678-1c12-jav2015-1.zip`.

**IMPORTANT: failure to name the file as shown will result in no marks being given!**