**System Analysis and Design**

**Homework**

**Assignment 1. Video Store Use Cases**

Most of us have rented videos from a video store. We know that they also rent games and sell various items, such as popcorn, soft drinks, and pre-viewed and new movies. They accept various forms of payment. If you forgot your membership card, they still have a way to identify you if you have other ID.

Your mission is to come up with exactly **three (3)** use cases for a video store's business. Use the *Formal* format, meaning that you should be as complete as possible in describing the main success scenario and cover as many sub-cases as you can. Please write clearly.

You can research video stores on the Web. Remember, a use case is text, **not** diagrams. Use diagrams only if they add real clarity.

You will be graded on completeness, your definition of the various actors, how well you define your pre-conditions, and general adherence to the form of such a use case. Please do not adapt the ProcessSale use case from the book, although you can follow the format.

**Assignment 2. Object Designs**

Your assignment is to derive classes from the following informal use case:  
  
An electric company sends out bills for electricity every month. Different customers have different billing periods (that is, not everyone is billed on the first of the month.) The bill is based upon the amount of electricity they used during the billing period. This, in turn, comes from reading a meter. A customer may receive a bill at an address other than the one where the electric meter is located. In fact, a person may receive bills for more than one service location. Bills are due 21 days after the billing cycle ends. Thus if a person is in a billing cycle to get bills on the 7th of the month, the bill will be due on the 28th. Electricity is taxed, so the bill must show tax. However, some customers (such as schools) are not taxable.  
  
The "happy path" is when the bill is created and sent out. Additionally, the "happy path" includes the customer paying the bill in full and on time.  
  
Unhappy paths include:  
  A. Undeliverable bills.  
  B. Bills that are paid late or not in full.  
  C. Unreadable meters.  
  
Other considerations:  
  A. Customers move.  
  B. Customers request new service (new customer).  
  C. Customers terminate service.  
  D. Different customers may pay different rates.

  E. The company may change the rate it charges at any time, but the customer will be charged the rate that was in effect at the beginning of his billing cycle.

  F. The company may bill additional charges, such as replacing a meter, late fees, etc. on the electric bill.

  G. The system must be able to re-create a bill for any customer for any billing period.

This is not a database assignment but rather an assignment to create classes, although you can see that some but not all of the classes will map to tables. You may create UML diagrams that show the interaction of your various classes. Classes should include their **name**, **properties**, and **methods**. **They should also name the GRASP design pattern(s) you used.**

Grading criteria:  
50% You have correctly identified sufficient classes to solve the problem and defined them clearly, including their methods.    
40% Your associations are clear and follow good design rules and your classes are tagged with appropriate comments.  
10% Ease of readability of the diagram.

一家电力公司每月发电费单。不同的客户有不同的计费周期（也就是说，并不是每个人都在每月的第一天计费）。账单是基于他们在计费周期内使用的电量。这反过来又来自于抄表。客户可以在电表所在地以外的地址收到账单。事实上，一个人可能会收到多个服务地点的账单。账单在账单周期结束后21天到期。因此，如果一个人在一个账单周期内，在每月7号收到账单，那么账单将在28号到期。电费是要交税的，所以账单上必须注明税金。但是，有些客户（如学校）是不征税的。

“幸福之路”是指创建并发送账单。此外，“快乐之路”包括客户按时足额支付账单。

不愉快的道路包括：

A、 无法送达的账单。

B、 迟交或未缴清的账单。

C、 无法读取的仪表。

其他注意事项：

A、 顾客搬家。

B、 客户要求新服务（新客户）。

C、 客户终止服务。

D、 不同的顾客会付不同的费用。

E、 公司可以随时更改其收费标准，但客户将按照其计费周期开始时有效的费率收费。

F、 公司可在电费单上收取额外费用，如更换电表、滞纳金等。

G、 系统必须能够为任何客户在任何计费周期内重新创建账单。