1. Any **design patterns** or **idioms** used in the implementation should be highlighted in comments above the respective class definition
2. **STL** usage carries **more** weightage, thus, highly recommended
3. Take care to use **good programming practices**
4. Appropriate **commenting** will be appreciated
5. Handle the boundary conditions through **error** or **exception handling**
6. Implement the best cases in terms of **memory management** & **runtime complexity**
7. **Read the instructions again**

Problem Statement

A company has decided to create an online **Expense Manager** that will keep track of purchases made through a credit card by a user. The user interface (called frontend) will be web based, but the backend has to be in C++ for high performance.

You have been asked to **design** & **implement** the backend application only.

Functional Specification:

1. Through the frontend, the users can **register** only one credit card each, with the following information:
   a. User name
   b. Credit card number [assume number of 4 digits for convenience]
   c. Credit limit
   *The frontend will feed the **registration information** into the **backend** where the registration information is stored.*

2. Once the registration is done, all credit card transactions done by users will be **automatically captured** when the card is swiped. The swiping system is implemented **elsewhere**. The captured information will be:
   - Amount
   - Date
   - Category
   - Subcategory
   - Credit Card number
   If the credit card number does not exist in the backend, the transaction is **not** stored in the backend application.
   The card swiping system will feed the information of the transaction to the backend. You should implement the swiping system as a function/class that randomly swipes a card for testing.

   A sample transaction could be:

Amount	: 500
Date	: 20/7/2010
Category	: Vehicle

Subcategory   : Fuel
            Credit Card   : Card number

3. From the frontend, users will be able to **view** reports of their usage in **different** formats. The reports will be **generated** by the **backend**.

Functional Requirements:
Your backend application should support the following features:
1. **Registration** & **unregistration** of credit cards
2. **Swiping system**
3. **Report generation** of credit card usage by a user. Reports can be
    - All transactions **done between two dates**
    - All transactions that fall within a **specified amount range**
    - All transactions done in a **category**
    - **Total** amount spent on a **category**
    - Transactions **sorted** on **amount**
    *More reports may be **added** in the future*

Expectations:
- **Create** a few users & **demonstrate** the usage of the system by entering a few transactions for the users in the backend application (you can use **hard coded values** from *main()* instead of writing code to take values from the user).A transaction of a credit card that is not registered in the backend should be **rejected** with a suitable **message**
- **Display** all the aforementioned **reports**
- Add one transaction where a user **overdraws** his/her credit limit
- Application should be **extensible** enough to allow addition of more reports, etc without much **impact** on the **existing** code

---

Example output (Your output may look different):

```
<<<<Transaction of Rs330 done by Lois [Credit Left-> 1140]>>>>

<<<<Transaction of Rs400 done by Horton [Credit Left-> 300]>>>>

<<<<Transaction of Rs700 done by Horton [Credit Left-> -400]>>>>

###User Notification###########################
# You have overdrawn the credit limit          #
# Name : Horton                                 #
# Credit Card No : 1000                         #
# Total Overdrawn Amount: -400                  #
###############################################


<<<<Transaction of Rs530 done by Lois [Credit Left-> 610]>>>>

<<<<Transaction of Rs600 done by Horton [Credit Left-> -1000]>>>>

###User Notification###########################
# You have overdrawn the credit limit          #
# Name : Horton                                 #
# Credit Card No : 1000                         #
# Total Overdrawn Amount: -1000                 #
###############################################

<<<<Transaction of Rs200 done by Lois [Credit Left-> 410]>>>>

<<<<Transaction of Rs570 done by Lois [Credit Left-> -160]>>>>

###User Notification###########################
# You have overdrawn the credit limit          #
# Name : Lois                                   #
# Credit Card No : 1234                         #
# Total Overdrawn Amount: -160                  #
###############################################
Date Range Report for Horton
Transactions between 05/03/2010 & 15/05/2010
Date            Amount          Category        Sub-category
05/05/2010      200             Vehicle         Fuel
15/05/2010      100             Bill            Phone
15/03/2010      700             Vehicle         Fuel
15/03/2010      800             Bill            Internet
20/04/2010      930             Shopping        Clothes

Amount Range Report for Horton
Transactions between amounts Rs100 & Rs500
Date            Amount          Category        Sub-category
05/05/2010      200             Vehicle         Fuel
15/05/2010      100             Bill            Phone
05/02/2010      400             Entertainment   Movies
20/08/2010      120             Bill            Electricity

Date Range Report for Lois
Transactions between 01/02/2010 & 15/06/2010
Date            Amount          Category        Sub-category
20/05/2010      530             Shopping        Clothes
18/02/2010      330             Shopping        Clothes
20/04/2010      530             Shopping        Clothes
05/06/2010      200             Vehicle         Fuel
Press any key to continue . . .
```

Some Categories and Subcategories can be (you can add your own):

Category	Sub Category
Bills	Electricity
	Internet
	Phone
Vehicle	Fuel
	Servicing
	Accessories
Entertainment	Movies
	Dining
Shopping	Clothes
	Food