Title: Restaurant Inventory Management System

Data Input:
The system requires the purchaser to input the purchase detail into the database and the system will use these purchase histories as training data to calculate purchase plan. Following is an example of data entry:

<table>
<thead>
<tr>
<th>item</th>
<th>purchase date</th>
<th>supplier</th>
<th>unit</th>
<th>unit price</th>
<th>volume</th>
<th>total price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pork</td>
<td>14-Nov</td>
<td>Weiss meats</td>
<td>pound</td>
<td>2.33</td>
<td>100</td>
<td>233</td>
</tr>
<tr>
<td>Beef</td>
<td>14-Nov</td>
<td>Weiss meats</td>
<td>pound</td>
<td>3.21</td>
<td>50</td>
<td>160.5</td>
</tr>
<tr>
<td>Green bean</td>
<td>14-Nov</td>
<td>Lotus Food</td>
<td>pound</td>
<td>3.5</td>
<td>20</td>
<td>70</td>
</tr>
<tr>
<td>Pickled cucumber</td>
<td>14-Nov</td>
<td>WingFatHong</td>
<td>can</td>
<td>1.99</td>
<td>30</td>
<td>59.7</td>
</tr>
</tbody>
</table>

Database Design
The database will consist of 5 tables:

**Item:**
- itemID
- name
- picture
- description
- Perish period
- Exclusive supplierID

**Supplier:**
- supplierID
- name
- phone
- email
- address

**Inventory:**
- itemID
- current volume
- Weekly volume
- Required volume

**SupplyInfo**
- ID
- itemID
- supplierID
- purchase freq
- last date
- last price
- average price

**Purchase:**
- purrID
- purchase date
- supplierID
- total price
- receipt
Transaction:
<table>
<thead>
<tr>
<th>TranID</th>
<th>itemID</th>
<th>supplierID</th>
<th>purID</th>
<th>date</th>
<th>unit</th>
<th>unit price</th>
<th>volume</th>
<th>total price</th>
</tr>
</thead>
</table>

Algorithm Design
The purchaser first needs to set up a purchase schedule, for example, he will go for a purchase every Wed and Fri. So, by checking the system date, the system will generate a purchase plan for him at midnight of that day.

PurchasePlanGenerator
{
  For every item in the inventory table
  {
    if (item.currentVolume < item.requiredVolume)
    {
      GenerateItemEntry(item);
    }
  }
}

To generate an item entry, we need to know two things, the volume of this item in this purchase and which supplier you should go. It is fairly easy to know the purchase volume.

Purchase volume = (perish period - cushion) * weekly volume

For the supplier choice, it is not easy, and it is the core function of this system right now. To choose from different suppliers, we need to develop an algorithm to analysis the purchase history of this item in the transaction table. There are multiple principles we can apply:

- Exclusive supplier
- Lower average price
- Lower last price
- Higher purchase frequency
- Lower purchase frequency
- Price trend

We can use slow intelligence principle to adaptively select from these roles. At first when data is sparse, the system will suggest lower purchase frequency first to give every supplier their chance. After a while when we have enough data, we can adaptively choose other roles, by saying adaptive, we mean if we
choose a role and it turned out to be a bad decision, we choose another role next time. The detail of the adaptive selection is my next step.