Name: Sahil Shah Due: / /

**Rochester Institute of Technology**

**Golisano College of Computing and Information Sciences**

**School of Information**

PE03: Dimensional Modeling

# Exercise 1: Identifying Facts and Dimensions

* Suppose a regional dairy products company employs you, and your task is to build the data marts for the overall data warehouse
* The company sells products to grocery stores, convenience stores, gas stations, and mass merchandisers
* You will be extracting data from the **Product Returns** operational system and **Sales Forecast spreadsheet**
* Identify each field

D - a dimensional attribute F - a fact

O - operational only, not to be included

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| --- | --- |
| **D/F/O** | **Product Returns** |
| D | Customer Account Number |
| D | Product Category |
| D | Product Brand |
| D | Customer Name |
| D | Product Expiration Date |
| D | Product # |
| D | Product Description |
| D | Package Type |
| D | Plant Number |
| D | Manufacturing Line |
| O | Regular/Low fat |
| D | Customer Ship to Street Address |
| D | Customer Ship to City |
| D | Customer Ship to State |
| D | Customer Ship to Country |
| D | SKU (Stock Keeping Unit) |
| F | Returned Quantity |
| D | Returned Reason |
| F | Expired Quantity |
| F | Damaged Quantity |
| D | Damaged Code |
| D | Returned Date |
| D | Sales Rep |
| D | Sales Region |
|  |  |

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| --- | --- |
| **D/F/O** | **Sales Forecast** |
| D | Account Rep |
| D | Month |
| D | Item # |
| D | Item Description |
| F | Forecast Units |
| F | Forecast Amount |
| F | Valid Forecast Flag |
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# Exercise 2: Identifying Dimensions and Fact Groups

Using the same extract files that you used in Exercise #1, identify the following:

* Possible dimensions
* Possible fact groups (facts in each data mart)

**Possible Dimensions**

1. **Customer\_Dimension**
2. **Product\_Dimension**
3. **Manufacturing\_Dimesion**
4. **Returned\_Dimesion**
5. **Sales\_Dimension**
6. **Return\_Date Dimension**
7. **Expiration\_Date**
8. **Account\_Dimension**
9. **Item\_Dimension**
10. **Sales\_Date**

**Fact Groups**

1. **Product\_Return\_Fact**
2. **Sales\_Forecast\_Fact**

Exercise 3: Designing Dimensions

Design (i.e., draw a diagram of) each of the dimensions that were identified in Exercises 1 & 2. Follow the dimension representation shown on slide #8 of Week 4 Lecture notes). Specifically:

* Identify dimension attributes
* Identify all hierarchies of the attributes within a dimension

# Exercise 4: Designing Fact Groups

Design each of the fact groups that were identified in Exercises #1 & #2. Specifically, for each fact group (data mart):

* list the facts that relate to the process that the fact group represents
* write a description for the fact – i.e., define it
* state the default aggregation rule (“sum” if additive; “semi-additive over time” if semi-additive; “N/A” if non-additive)

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| --- | --- | --- |
| Fact Group: Product\_Returned\_Fact | | |
| Fact Name | Fact Description | Default Aggregation Rule |
| Returned Quantity | The total number of products that were returned | SUM |
| Damaged Quantity | The total number of products that were damaged. | Sum |
| Expiration Quantity | The total number of items that were found damaged. | Semi-Additive |
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| --- | --- | --- |
| Fact Group: Sales\_Forecast\_Fact | | |
| Fact Name | Fact Description | Default Aggregation Rule |
| Forecast Units | The number of units that were forecasted as the sale. | SUM |
| Forecast Amount | The total amount calculated from the sales forecast | SUM |
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# Exercise 5: Create the Data Mart Matrix

The data mart matrix shows the relationship between the possible data marts and dimensions. Any dimension (column) with more than one X implies that this dimension must be conformed across multiple data marts to fit into the Data Warehouse Bus Architecture.

Fill in the data mart matrix using the following table:

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Data Mart | Customer | Product | Manufacturer | Return | Return  \_Date | Sales | Expiration  \_Date | Item | Account | Sales  \_Date |
| Product  \_Return\_Fact | **X** | **X** | **X** | **X** | **X** | **X** | **X** |  |  |  |
| Sales\_Forcast  \_Fact |  |  |  |  |  | **X** |  | **X** | **X** | **X** |
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# Exercise 6: Logical Table Design

Use the dimensional models that you have created so far to:

* Design the actual star schema for each of the fact groups that you defined in Exercise #4.
* Create your Dimensional Models using MySQL Workbench and save it as a pdf file.
* Submit a zip file containing 1) a copy of the answered PE03 and 2) pdf file of EER diagrams to MyCourses PE03 Dropbox by 11:59 PM, Sunday 9/20/2020.
* Bring a hard copy of the answered PE03 & EER pdf to Monday (9/21/20) in- person class.

Name:

Graded By:

**PE03: Dimensional Modeling Grade sheet**

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| --- | --- | --- |
| **Requirements** | **Grade** | **Grade Earned** |
| **Exercise 1: Identifying Facts and Dimensions** |  |  |
| - Identify all the attributes correctly | 10 |
| **Exercise 2: Identifying Dimensions and Fact Groups** |  |
| - Dimensions | 6 |
| - Fact Groups | 4 |
| **Exercise 3: Designing Dimensions** |  |
| - Identify all dimensions’ attributes | 8 |
| - |  |
| - Identify all hierarchies of the attributes | 5 |
| **Exercise 4: Designing Fact Groups** |  |
| - Fact groups | 2 |
| - All the facts are included with the fact groups | 5 |
| - Fact descriptions and aggregation rules | 5 |
| **Exercise 5: Create the Data Mart Matrix** | 9 |
| **Exercise 6: Logical Table Design** |  |
| - Dimensions | 16 |
| - Fact tables | 8 |
| - Conformed dimension | 8 |
| - Correct primary keys and foreign key constraints | 5 |
| - Relationships between fact tables and dimensions | 9 |
| - Submit star schema to Dropbox & bring a hard copy | -20 |
| **Total Grade:** | **100** |  |