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CS 157A

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CS 157A FINAL PROJECT

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1. **Executive Summary**

The purpose of this report is to go through the process of creating a database for the purpose of keeping a daily inventory of the cakes that are baked at the bakery I work at. It will go through creation of the tables and how they are filled and queried.

2. **Background/Introduction**

I work at a bakery and we sell a large amount and variety of cakes. It is important to know how much stock is being moved around throughout the week. Waste management is very important in the food industry. A database would help a great deal in collecting and organizing this data.

3. **Problem Statement**

The bakers wish to track how many cakes are being sold and how many are being tossed because they weren't sold before the expiration date. By tracking the stock of cakes, they can determine the popularity of a type of cake and whether or not they will need to bake more and restock. They also need to keep track of any advance orders placed so they can plan accordingly.

4. **Purpose/Motivation**

The purpose of this database is to understand how much cake should be produced on a day by day basis and which variety of cake is popular enough to stock extra of.
What we will need to know each day of the week:

- What types of cakes are available in store.
- What sizes of said cakes are available.

- How many of each cake are sold.
- What cakes are leftover at close and their expiration dates.
- How many needed to be thrown out (accidents/expiration).
- How many and what cakes are being pre-ordered.

5. **Design**

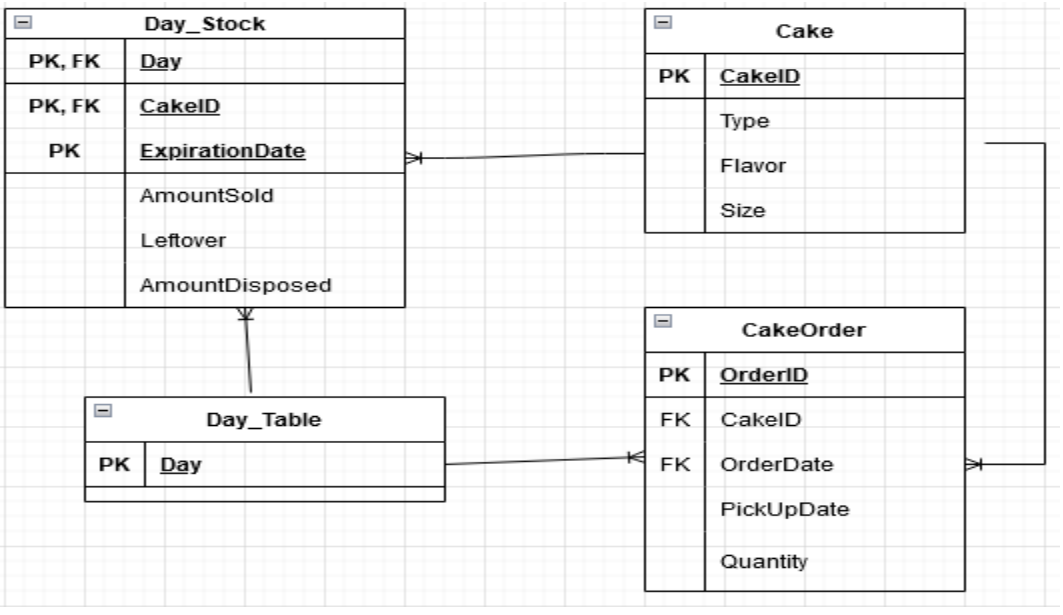
   a. **Business Rules:**

      - Each flavor is assigned at least one size (1 flavor might only be made in a small size but another might be made in small, medium, or large)
      - Each cake is dated for 3 days.
      - Stock is equal to amount leftover + amount sold + amount disposed

   b. **Attributes:**

      - **Today's Stock**: Date, Stock, Leftover, AmountSold, AmountDisposed, ExpirationDate
      - **Cake**: Type, Flavor, Size
      - **Orders**: OrderDate, PickUpDate, Quantity

   c. **Normalized ERD**



Stock is removed because it is a calculated attribute and Date is moved into its own table

d. **Tables Created**

```
CREATE TABLE Cake (
    CakeID          VARCHAR(2)  NOT NULL,
    Type            TEXT        NOT NULL,
    Flavor          TEXT        NOT NULL,
    Size            TEXT        NOT NULL,
    CONSTRAINT PK_Cake PRIMARY KEY (CakeID)
);

CREATE Table Day_Table (
    Day             date        NOT NULL,
    CONSTRAINT      PK_Day  PRIMARY KEY (Day)
);

CREATE TABLE DAY_STOCK (
    Day             date        NOT NULL,
    CakeID          VARCHAR(2)  NOT NULL,
    Leftover        INTEGER     NOT NULL,
    AmountSold      INTEGER     NOT NULL,
    AmountDisposed  INTEGER     NOT NULL,
    ExpirationDate  date        NOT NULL,
    CONSTRAINT PK_Today PRIMARY KEY (Day, CakeID, ExpirationDate),
    CONSTRAINT FK_Date FOREIGN KEY  (Day)   REFERENCES Day_Table (Day),
    CONSTRAINT FK_Today FOREIGN KEY (CakeID) REFERENCES Cake (CakeID)
);

CREATE TABLE CakeOrder (
    OrderID         VARCHAR(2)  NOT NULL,
    CakeID          VARCHAR(2) NOT NULL,
    OrderDate       date        NOT NULL,
    PickUpDate      date        NOT NULL,
    Quantity        INTEGER     NOT NULL,
    CONSTRAINT PK_Order PRIMARY KEY (OrderID),
    CONSTRAINT FK_Order FOREIGN KEY (CakeID) REFERENCES Cake (CakeID),
    CONSTRAINT FK_Order_Day FOREIGN KEY (OrderDate) REFERENCES Day_Table (Day)
);
```

e. **Example User Views**

These views show what cakes were left that day, what orders need to be made on a certain day and what flavors are available regularly.

```sql
CREATE VIEW DAY_STOCK_VW AS
    SELECT CakeID, Leftover
    FROM DAY_STOCK
    WHERE Leftover > 0 AND Day = '2022-05-07';

CREATE VIEW CakeOrder_VW AS
    SELECT OrderID, CakeID, PickUpDate, Quantity
    FROM CakeOrder
    WHERE PickUpDate > '2022-05-10';

CREATE VIEW Cake_VW AS
    SELECT Type, Flavor, Size
    FROM Cake;
```

CakeID	Leftover
Filter	Filter
01	3
03	2
33	1
51	2
83	1
91	1

Here, the user checks what cakes we have leftover on 5/7 in the Day_Stock_VW.

OrderID	CakeID	PickUpDate	Quantity
Filter	Filter	Filter	Filter
01	11	2022-05-12	1
04	83	2022-05-15	1
05	03	2022-05-12	1
07	11	2022-05-12	2

In the CakeOrder_VW, we are shown cakes that were ordered for pick up after 5/10.

Type	Flavor	Size
Filter	Filter	Filter
Fresh Cream	Vanilla	Small
Fresh Cream	Vanilla	Medium
Fresh Cream	Vanilla	Large
Fresh Cream	Blueberry	Small
Fresh Cream	Blueberry	Medium
Fresh Cream	Chocolate	Medium
Fresh Cream	Strawberry	Large
Fresh Cream	Green Tea	Large
Mousse	Triple Chocolate	Small
Buttercream	Chocolate	Medium
Buttercream	Chocolate	Large
Buttercream	Strawberry	Medium
Buttercream	Caramel	Medium
Buttercream	Red Velvet	Small

Finally, the last view displays all of the different kinds of cakes that are sold at the store.

6. **Implementation & Test Report**

To fill my tables, I inserted values for the kinds of cakes that are sold,

```
INSERT INTO Cake (CakeID, Type, Flavor, Size)
    VALUES  ('01', 'Fresh Cream', 'Vanilla', 'Small'),
            ('02', 'Fresh Cream', 'Vanilla', 'Medium'),
            ('03', 'Fresh Cream', 'Vanilla', 'Large'),
            ('11', 'Fresh Cream', 'Blueberry', 'Small'),
            ('12', 'Fresh Cream', 'Blueberry', 'Medium'),
            ('22', 'Fresh Cream', 'Chocolate', 'Medium'),
            ('33', 'Fresh Cream', 'Strawberry', 'Large'),
            ('43', 'Fresh Cream', 'Green Tea', 'Large'),
            ('51', 'Mousse', 'Triple Chocolate', 'Small'),
            ('62', 'Buttercream', 'Chocolate', 'Medium'),
            ('63', 'Buttercream', 'Chocolate', 'Large'),
            ('72', 'Buttercream', 'Strawberry', 'Medium'),
            ('83', 'Buttercream', 'Caramel', 'Medium'),
            ('91', 'Buttercream', 'Red Velvet', 'Small');
```

	CakeID	Type	Flavor	Size
1	01	Fresh Cream	Vanilla	Small
2	02	Fresh Cream	Vanilla	Medium
3	03	Fresh Cream	Vanilla	Large
4	11	Fresh Cream	Blueberry	Small
5	12	Fresh Cream	Blueberry	Medium
6	22	Fresh Cream	Chocolate	Medium
7	33	Fresh Cream	Strawberry	Large
8	43	Fresh Cream	Green Tea	Large
9	51	Mousse	Triple Chocolate	Small
10	62	Buttercream	Chocolate	Medium
11	63	Buttercream	Chocolate	Large
12	72	Buttercream	Strawberry	Medium
13	83	Buttercream	Caramel	Medium
14	91	Buttercream	Red Velvet	Small

What days are being tracked,

```
INSERT INTO Day_Table (Day)
        VALUES  ('2022-05-07'),
                ('2022-05-08');
```

The stock that was available that day and how it moved,

```
INSERT INTO DAY_STOCK (Day, CakeID, Leftover,
    AmountSold, AmountDisposed, ExpirationDate)
        VALUES  ('2022-05-07', '01', '3', '2', '0', '2022-05-08'),
                ('2022-05-07', '03', '2', '1', '0', '2022-05-08'),
                ('2022-05-07', '12', '0', '2', '0', '2022-05-08'),
                ('2022-05-07', '22', '0', '1', '1', '2022-05-07'),
                ('2022-05-07', '33', '1', '0', '0', '2022-05-08'),
                ('2022-05-07', '43', '0', '2', '0', '2022-05-08'),
                ('2022-05-07', '51', '2', '0', '0', '2022-05-10'),
                ('2022-05-07', '83', '1', '0', '0', '2022-05-10'),
                ('2022-05-07', '91', '1', '1', '0', '2022-05-09');
```

```
INSERT INTO DAY_STOCK (Day, CakeID, Leftover,
    AmountSold, AmountDisposed, ExpirationDate)
        VALUES  ('2022-05-08', '01', '0', '2', '1', '2022-05-08'),
                ('2022-05-08', '01', '1', '0', '0', '2022-05-11'),
                ('2022-05-08', '02', '1', '2', '0', '2022-05-11'),
                ('2022-05-08', '03', '0', '3', '0', '2022-05-08'),
                ('2022-05-08', '12', '1', '4', '0', '2022-05-11'),
                ('2022-05-08', '22', '1', '1', '0', '2022-05-11'),
                ('2022-05-08', '33', '0', '0', '1', '2022-05-08'),
                ('2022-05-08', '43', '1', '1', '0', '2022-05-11'),
                ('2022-05-08', '51', '0', '2', '0', '2022-05-10'),
                ('2022-05-08', '63', '1', '1', '0', '2022-05-11'),
                ('2022-05-08', '83', '0', '1', '0', '2022-05-10'),
                ('2022-05-08', '91', '1', '1', '0', '2022-05-09');
```

And what pre-orders were taken.

```
INSERT INTO CakeOrder (OrderID, CakeID, OrderDate,
    PickUpDate, Quantity) VALUES
    ('01', '11', '2022-05-07', '2022-05-12', '1'),
    ('02', '72', '2022-05-07', '2022-05-10', '2'),
    ('03', '63', '2022-05-07', '2022-05-09', '1');
```

```
INSERT INTO CakeOrder (OrderID, CakeID, OrderDate,
    PickUpDate, Quantity) VALUES
    ('04', '83', '2022-05-08', '2022-05-15', '1'),
    ('05', '03', '2022-05-08', '2022-05-12', '1'),
    ('06', '43', '2022-05-08', '2022-05-10', '1'),
    ('07', '11', '2022-05-08', '2022-05-12', '2'),
    ('08', '91', '2022-05-08', '2022-05-10', '2');
```

OrderID	CakeID	OrderDate	PickUpDate	Quantity
Filter	Filter	Filter	Filter	Filter
01	11	2022-05-07	2022-05-12	1
02	72	2022-05-07	2022-05-10	2
03	63	2022-05-07	2022-05-09	1
04	83	2022-05-08	2022-05-15	1
05	03	2022-05-08	2022-05-12	1
06	43	2022-05-08	2022-05-10	1
07	11	2022-05-08	2022-05-12	2
08	91	2022-05-08	2022-05-10	2

Users can use select statements to find specific information about the cake stock.

```
SELECT DAY, Leftover, AmountSold, AmountDisposed, ExpirationDate
    From DAY_STOCK
    WHERE CakeID = '01';
```

	Day	Leftover	AmountSold	AmountDisposed	ExpirationDate
1	2022-05-07	3	2	0	2022-05-08
2	2022-05-08	0	2	1	2022-05-08
3	2022-05-08	1	0	0	2022-05-11

Here, the user made a query about our stock of Cake 01 which corresponds to a small size, vanilla fresh cream cake.

7. Conclusion

In conclusion, the conceptual design phase allowed me to determine exactly what I wanted the database to accomplish. The ERD helped me greatly to organize what attributes I needed and how to link them together during the table creation. Finally, the physical design gave my ideas both form and function. There is still a lot I need to learn about and work on for SQL and database management.

8. Appendix

Repository Link: https://github.com/kynanhui/CS157a_Final_Project.git