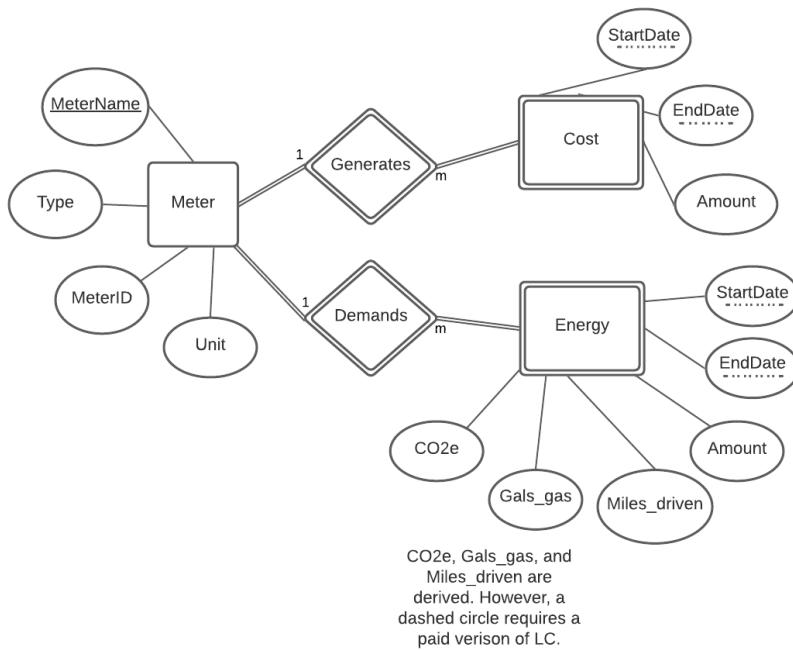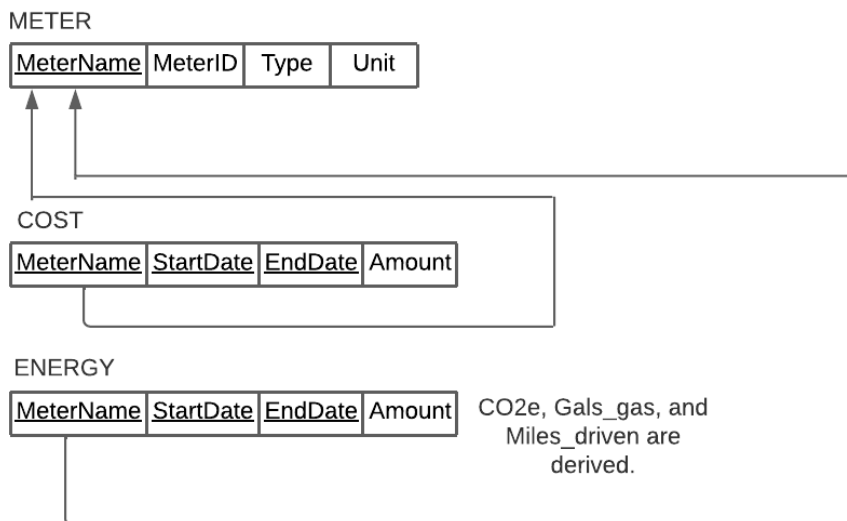Bret Elphick, Dalton Hutchinson, Jimmy Fay, Andrew Fellenz, Katherine Gellman, Brooks Watson, Alexander Reyes
CSC 315-01
04/06/2022

Database Model Document

ER Diagram

CO2e, Gals_gas, and Miles_driven are derived. However, a dashed circle requires a paid verison of LC.

Relational Schema

CO2e, Gals_gas, and Miles_driven are derived.

SQL commands for new design

The same commands work for cost.

- To find the closest start date:

```
select energy.start_date from energy where metername = '<Meter Name>' order by
abs(energy.start_date - '<User Start Date>') limit 1;
```

- To find the closest end date:

```
select energy.end_date from energy where metername = '<Meter Name>' order by
abs(energy.end_date - '<User End Date>') limit 1;
```

- Find all tuples in this range using:

```
select * from energy where metername = '<Meter Name>' and start_date >= '<Closest
Start Date>'and end_date <= '<Closest End Date>';
```

- We can sum or average the energy/cost amount using:

```
select avg(amount) from energy where amount in (select energy.amount from energy where
metername='<Meter Name>' and start_date>=(select energy.start_date from energy where
metername='<Meter Name>' order by abs(energy.start_date - '<User Start Date>') limit
1) and end_date<=(select energy.end_date from energy where metername='<Meter Name>'
order by abs(energy.end_date - '<User End Date>') limit 1));.
```

Database Thoughts

- We have decided that CO2e, Gas_gals, and Miles_driven can be derived from Amount and Unit attributes in ENERGY. Therefore we are not going to directly store them in the database. LucidCharts requires a paid version to use dashed ovals, therefore we have added a note next to these attributes indicating that they are derived in the ER Diagram.
- As for the graphs, we will display a bar graph if less than 5 tuples are returned. If there are more than we will display a line graph.

Initial Database Size

- 22 rows * 4 columns = 88 records in Meter (22 meters and 3 values to keep track of per meter)
- 1426 rows * 4 columns = 5704 records in Cost (1426 meter readings, and 4 values to keep track of per meter reading)
- 1426 rows * 4 columns = 11,408 records in Energy (1426 meter readings, and 4 values to keep track of per meter reading)

Types and Average Number of Searches

- Types of searches: join, project, grouping and aggregate functions
- To get the energy demand, and environmental statistics for a meter, start date, and end date combination we will need to join METER and ENERGY to get the type and unit.
- To calculate averages and sums for meter, start date, and end date combinations we will use the fourth query shown above. The number of tuples involved in the aggregate function depends on the amount returned by the subquery.