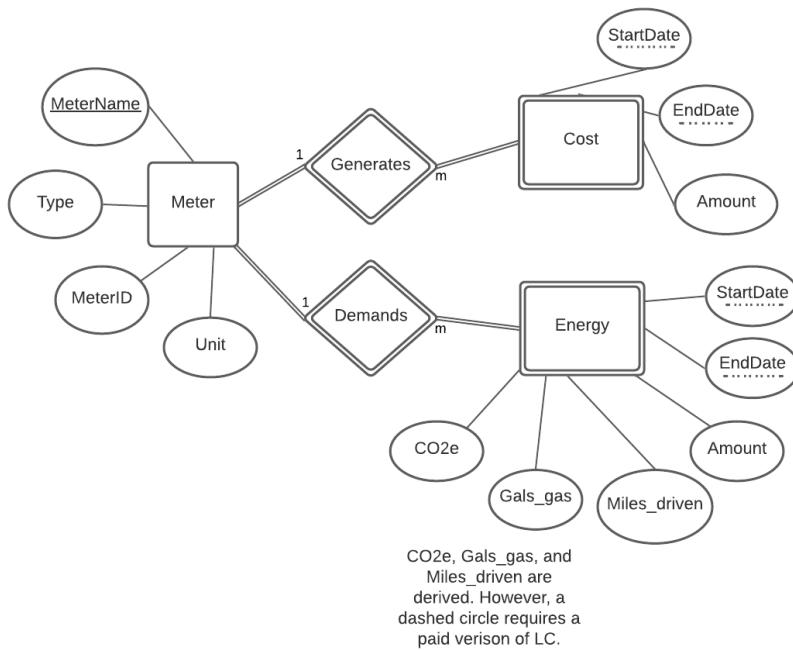


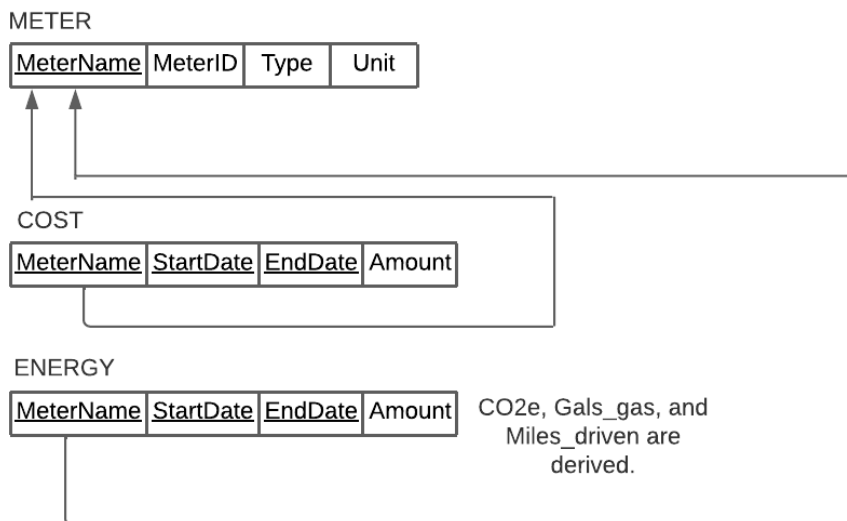
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 Watson, Alexander Reyes
 CSC 315-01
 04/06/2022

Database Model Document

ER Diagram



Relational Schema



SQL commands for application

- Command to create the table

```
"select energy.startdate, energy.enddate, energy.amount, cost.amount from
energy inner join cost on energy.metername = cost.metername and
energy.startdate = cost.startdate and energy.enddate = cost.enddate where
energy.metername='" + request.form['metername'] + "' and
energy.startdate>=(select energy.startdate from energy where metername='" +
request.form['metername'] + "' order by abs(energy.startdate - '" +
request.form['startdate'] + "') limit 1) and energy.enddate<=(select
energy.enddate from energy where metername='" + request.form['metername'] + "'
order by abs(energy.enddate - '" + request.form['enddate'] + "') limit 1);"
```

The same command was used to find the sum of energy amounts by replacing “avg” with “sum”. Additionally, the same command was used to find average cost amount and sum of cost amounts by replacing “energy” with “cost”.

- Command to get average energy amount

```
"select avg(amount) from energy where metername='" + request.form["metername"]
+ "' and startdate >=(select energy.startdate from energy where metername='" +
request.form["metername"] + "' order by abs(energy.startdate - '" +
request.form["startdate"] + "') limit 1) and enddate<=(select energy.enddate
from energy where metername='" + request.form["metername"] + "' order by
abs(energy.enddate - '" + request.form["enddate"] + "') limit 1);"
```

- Command to get all meters

```
"select distinct metername from meter;"
```

- Command to get the type and unit of inputted meter

```
"select type, unit from meter where metername = '" + request.form["metername"]
+ "';"
```

- Command to get all start dates and end dates in range of user input

```
"select startdate, enddate from energy where metername='" +
request.form["metername"] + "' and startdate >=(select energy.startdate from
energy where metername='" + request.form["metername"] + "' order by
abs(energy.startdate - '" + request.form["startdate"] + "') limit 1) and
enddate<=(select energy.enddate from energy where metername='" +
request.form["metername"] + "' order by abs(energy.enddate - '" +
request.form["enddate"] + "') 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.