Assignment #1: E/R Diagrams

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Brief Explanation and Assumptions

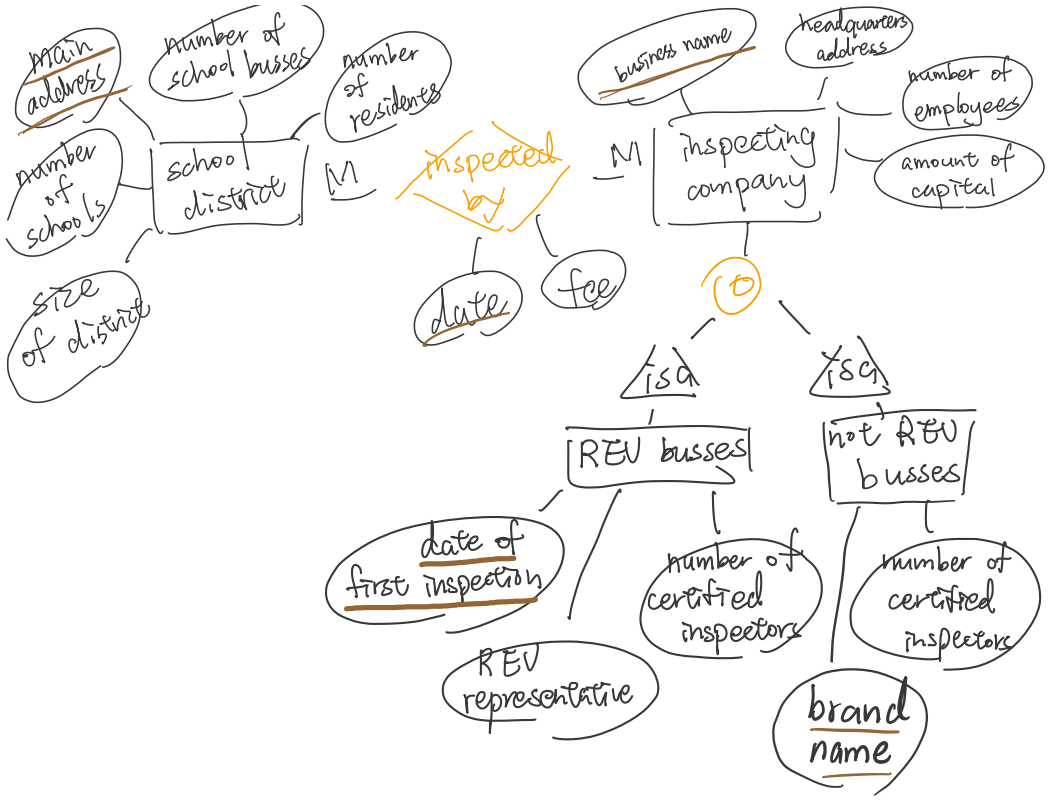
The database is designed for School Bus Inspection of Missouri (SBIM) and the inspection data it receives.

According to the information in the database section, there are three Entity sets: 'school district', 'inspecting company', with a relationship 'inspected by'. By assuming a school district can be inspected by multiple inspecting companies, and an inspecting company could inspect many districts, it's a many to many relationship. An inspecting company could inspect either REV busses or other brands, so they are overlapping subclasses.

Question 1:

Design the corresponding E/ER diagram. Remember throughout to include arrows representing cardinality, where relevant. Underline primary key attributes.

>Two added attributes for "school district" are: number of residents which lives in the specific district, and size of district which are in acres. Two added attributes for inspecting company are: number of employees and amount of capital.



i. Also, convert the diagram to relations. In other words, show the tables that would be used in the database. You do not need to include data, only the structure of the tables. Show primary keys underlined and foreign keys in italics.

School district (main address, number of schools, number of school busses, number of residents, size of district)

main address	number of schools	number of school busses	number of residents	size of district

Inspected by (date, fee, *main address, business name*)

date	fee	*main address*	*business name*

Inspecting company (business name, headquarters address, number of employees, amount of capital)

business name	headquarters address	number of employees	amount of capital

REV busses (*business name*, date of first inspection, REV representative, number of certified inspectors)

business name	date of first inspection	REV representative	number of certified inspectors

Not REV busses (business name, brand name, number of certified inspectors)

business name	brand name	number of certified inspectors

ii. Suggest 3 queries that you could ask of this database.

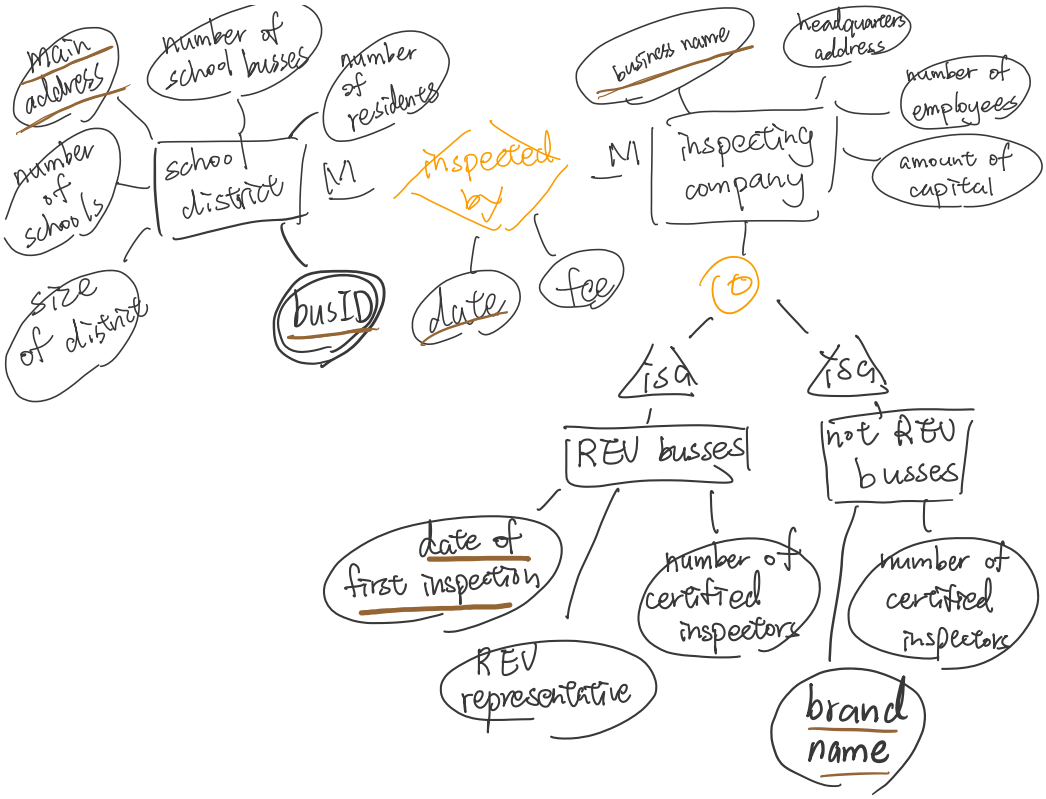
Q1. What school districts does each inspecting company service in?
Q2. Given a specific date, what companies have made reports?
Q3. In which school district the inspect companies pay the least fee?

iii. Suggest 1 query that requires additional attributes. Which attributes are needed to answer this additional query?

Q: What are the total costs for each inspection reports?
->The attribute “total costs” should be added under the relation “inspected by” to answer.

Question 2:

Modify the database to include information for each bus in the school district. SBIM maintains only the bus ID (license number) for school busses. ALSO add the appropriate relation.



The additional attribute “bus ID” is added to the entity set “school district” since busses are running in each district. It should be multi-value attribute because a school district can have multiple busses.

Added relations and structure of tables:

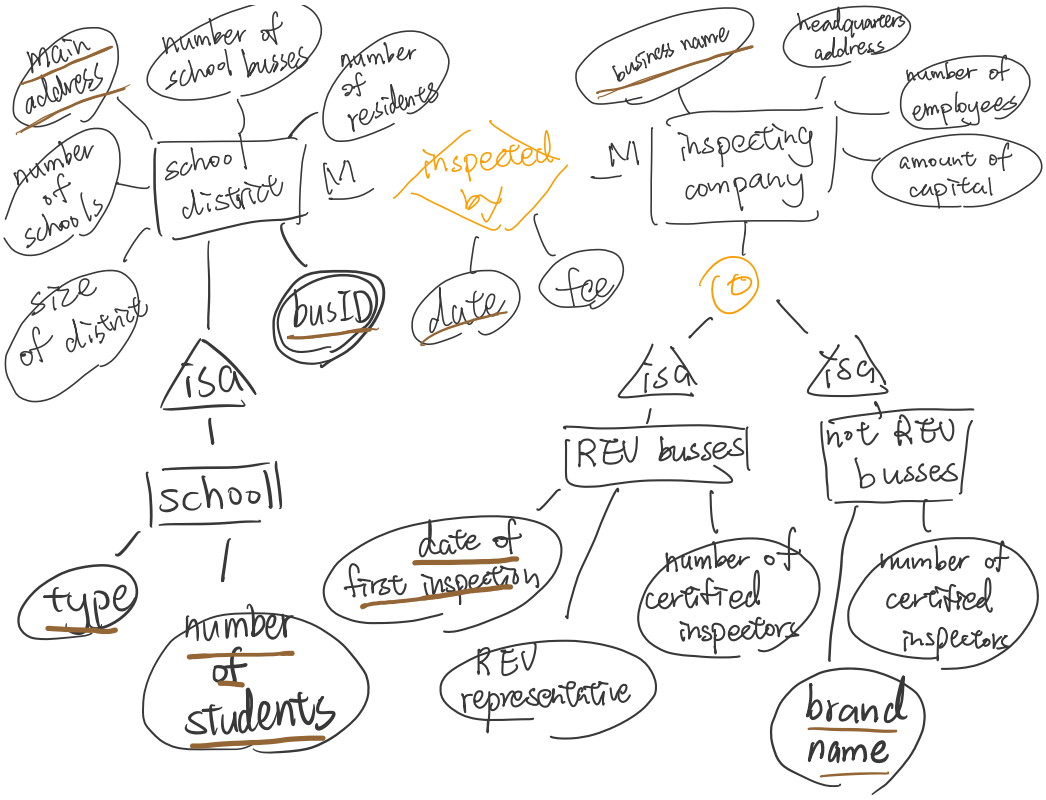
School district (*main address*, busID)

main address	busID

Question 3: [20 points]

Modify the database to include information about the school for each school district. Nearly all school districts have multiple schools. For each of these schools, SBIM keeps information about the type of school (elementary, high school, etc.), and the number of students. ALSO add the appropriate relation.
Now include cardinality for pairs of relations that you added.

"School" belongs to "school district", so the attribute should be a subclass. Since neither attribute "main address", "type", and "number of students" alone can be a primary key, they are combined to become primary keys.



Added relations and structure of tables:
school (*main address*, type, number of students)

main address	type	Number of students