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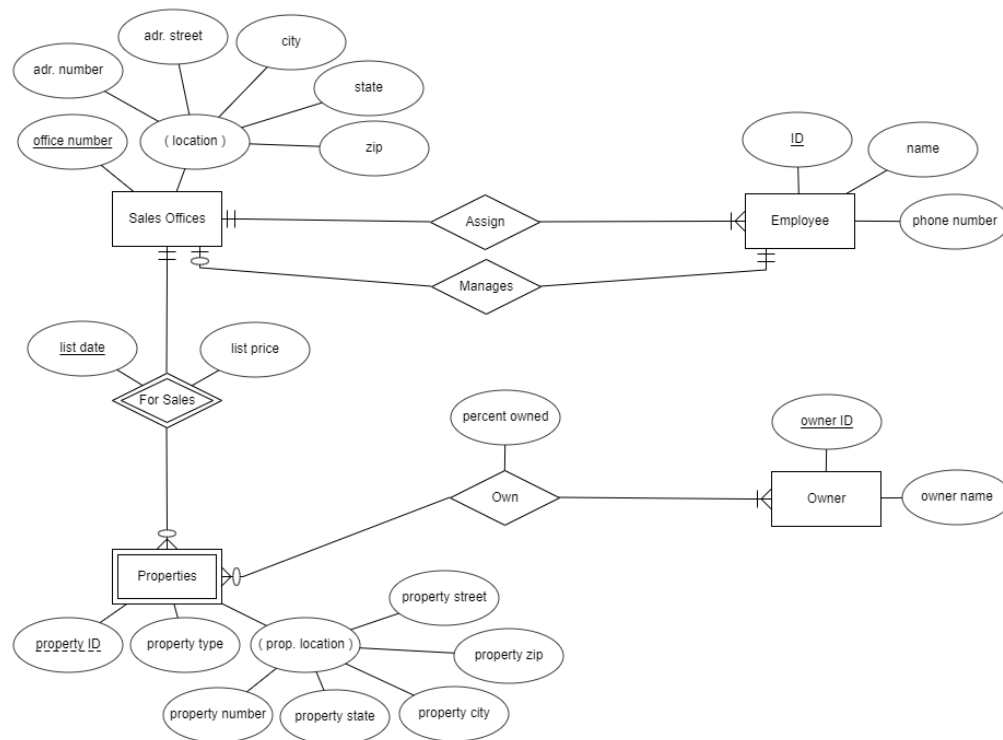
CS 340 / Dr. Julianne Schutfort

Oct 4th, 2020

Homework #1

(Due Date: Oct 4th, 2020)

1. **Figure #1:** This is an image of the ER Model of the Real Estate



Primary Keys:

- For Sales Offices, primary key is going to be the **office number** as it has to be unique to find the office
- Employee entity with the **employee ID number**
- Properties entity with the **property ID number**
- The Owner entity with the **owner ID number**

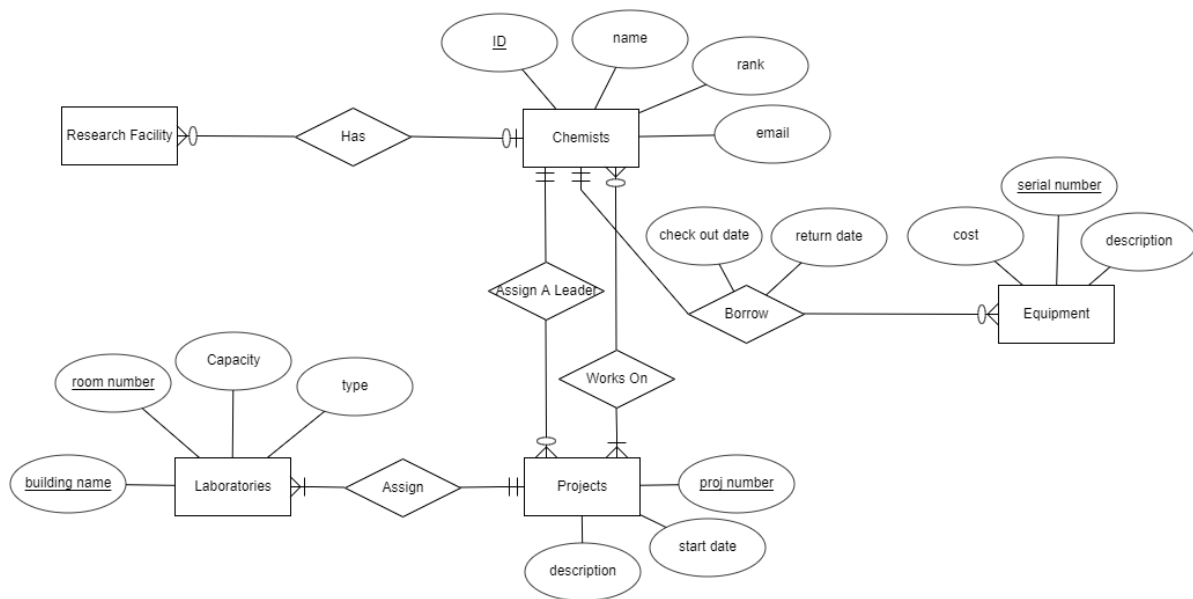
Cardinalities:

- One-to-many relationship with "**Assign**" on Sales Offices and Employee with Mandatory for both
- One-to-one relationship with "**Manages**" on Sales Offices and Employee with Mandatory and Optional
- One-to-many relationship with "**For Sales**" on Sales Offices and Properties with Mandatory and Optional
- Many-to-many relationship with "**Own**" on Properties and Owner with Mandatory and Optional

Assumptions:

- Properties is weak entity as they don't exist if Sales Offices doesn't list them
- Assuming that properties need to be mandatory listed for sales by the Sales Offices to be available

2. Figure #2: This is an image of the ER Model of the Research Facility



Primary Keys:

- The Research Facility entity doesn't have any primary key
- The Chemists entity has a unique **chemist ID**
- The Projects entity has a unique **project number**
- The Laboratories entity has a unique combination of **building name & room number**
- The Equipment entity has a unique **serial number** for the equipment

Cardinalities:

- One-to-many relationship with "**Has**" between Research Facility and Chemist with Optional for both entities
- One-to-many relationship with "**Assign A Leader**" between Chemists and Projects with Optional and Mandatory
- Many-to-many relationship with "**Works On**" between Chemists and Projects with Optional and Mandatory
- One-to-many relationship with "**Assign**" between Projects and Laboratories with Mandatory for both entities
- One-to-many relationship with "**Borrow**" between Chemists and Equipment with Optional for both entities

Assumptions:

- Assuming that a Chemist can borrow 0 to many equipment and equipment need mandatory at least 1 from the Chemist
- Assuming the Research Facility have 0 or more Chemists in the facility itself
- Assuming that Projects can have 0 to more Chemists to work on the project
- Assuming check out and return date can have multiple listing as many chemists may check out many items

3. Using a **DBMS (Database Management System)** for storage is way better to have it file under **Operating system file**. Even though both offer the same of storage system, but DBMS outperform the operating system file more. The operating system file performs the basic of retrieving file when is commanded, file naming, management, and storing on a medium storage like a hard disk. For DBMS, it has massive amount of data storage, have security to safely save the file, etc...

Some advantages of DBMS:

It is safe, stay in a consistent state when there is a failure with the software, hardware, etc... It also deals with persistent as the database outlive the program that it was executed on. DBMS also allows multi-users to access the data concurrently. And it is also convenient as it is easy to work with large amount of data in the database.

Some disadvantages of Operating system file:

There is no security protection when it comes to saving the file, it could be stolen easily. The system file does not provide backup file like DBMS so if there is any corruption in the software or system, the file cannot be restored. And there is no efficient way to process the file in the system itself.

Some advantages of Operating system file & disadvantage of DBMS:

The system itself is not complex as the DBMS system. The system is also less expensive than DBMS, but other than that, there is not much anything that Operating system file can beat DBMS except for those condition.

Overall, these values teach that some software system like the DBMS to be the best at storage and manipulating the database as it is reliable, safe, and consistent with it software and other systems might have less of the feature and can't be trusted easily to depend on when it comes to sensitive data.