Chapter One Questions:

1. How many records does the file contain? How many fields are there per record?
   Records are the rows of the table, so the file contains 7 records. Fields are the number of columns of the table, so the file contains 5 fields.

2. What problem would you encounter if you wished to produce a listing ordered by manager's last name? How could you alter the file structure to solve this problem?
   First, the data entered for the manager's name might not always be in the same format. It is possible that the orders of first name and last name are messed up. Which makes query by first/last name being unreliable. Second, the current design has first name and last name in the same field. Querying the last name might require doing things like searching with regular expressions on the name string. The best practice would be having first name and last name in two different fields which makes querying much easier.

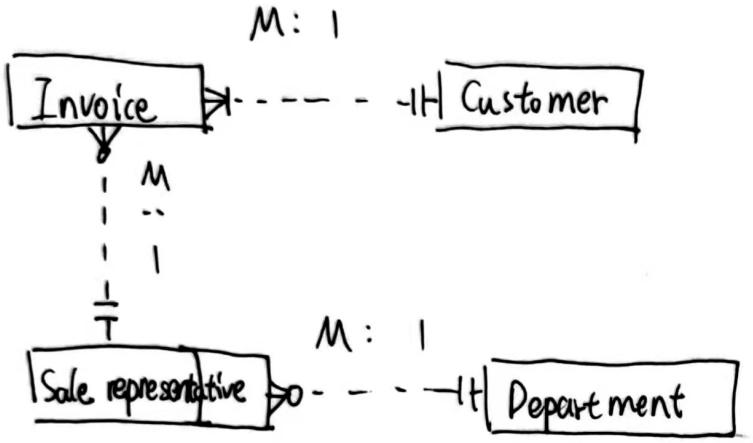
3. Knowing that users would need reports for particular states, area codes or zip-codes (postal codes), how would you (re)structure the file?
   Currently, the structure does not support an easy query to the states, area codes, and zip-codes. I will restructure the table to add three new fields called MANAGER_STATE, MANAGER_AREA_CODE, and MANAGER_ZIPCODE.

4. Identify and discuss the serious data redundancy problems in the file structure.
   There is a huge data redundancy on the information of the managers. The name, phone, and address of the manager is repeated multiple times. Once any of the managers moved to another place or changed phone number, every project this manager encountered will have to be changed to maintain data consistency. The best way of doing this is having a different table call MANAGER to record manager information and just put manager id in this "PROJECT" table.

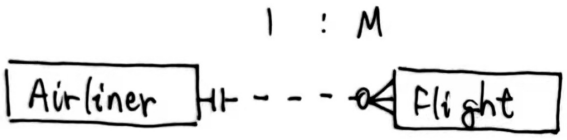
Chapter Two Questions:

1. What is a business rule, and what is its purpose in data modeling?
   As the textbook defined: "Business rule is a brief, precise, and unambiguous description of a policy, procedure, or principle within a specific organization." And this information is the guideline for defining entities, attributes, relationships, and constraints.
2. What is a relationship, and what three types of relationships exist?
   Relationship describes how entities are connected with each other. The three types of relationships are one-to-many, many-to-many, and one-to-one.
3. Give an example of each of the three types of relationships.
   a. One-to-many: A university will have many current students but each student can only be enrolled in one university at a time.
   b. Many-to-many: A course many have multiple students and each students may take multiple courses.
   c. One-to-one: One student will have only one unique UNB id and one UNB id can only be associated with one specific student.

4. Create a Crow' s Foot ERD to include the following business rules for the ProdCo company:
   a. Each sales representative writes many invoices.
   b. Each invoice is written by one sales representative.
   c. Each sales representative is assigned to one department.
   d. Each department has many sales representatives.
   e. Each customer can generate many invoices.
   f. Each invoice is generated by one customer.



5. Create a Crow' s Foot ERD for each of the following descriptions.
   c. An airliner can be assigned to fly many flights, but each flight is flown by only one airliner.



d. The KwikTite Corporation operates many factories. Each factory is located in a region, and each region can be "home" to many of KwikTite's factories. Each factory has many employees, but each employee is employed by only one factory.