**44-560 Advanced Topics in Database Systems**

# Relationships

Create Visio models representing various relationships between Employee and ParkingSpot.

The attributes of Employee are empID (primary key), firstName, lastName, yearHired.

The attributes of ParkingSpot are spotID (primary key), lotNumber, spaceNumber, description.

1. Draw a Visio model for the following relationship: Every employee is assigned *at most one* parking spot. A parking spot may be assigned to more than one employee, or may not be assigned to any employee.
   * Create entities in Visio for **Employee** and **ParkingSpot**. Choose reasonable data types for each attribute. Indicate which attributes should be required.
   * To create the relationship in Visio, determine where the foreign key should be placed. Since the relationship is optional one from **Employee** to **ParkingSpot**, but optional many from **ParkingSpot** to **Employee**, the foreign key must be placed in **Employee**.
   * Click the relationship shape in the shapes window, and drag it to the **Employee** entity.
   * Click the other end of the relationship line and drag it to **ParkingSpot**. Entities appear highlight as they are selected. It may take several tries to get the relationship drawn correctly.
   * Right-click the relationship and set the begin symbols and end symbols correctly.
   * Your content should be similar to the following (there are many programs for displaying crow’s feet diagram – you should be able to read any of them).



optional many

optional one

The small circles at either end represent an optional cardinality, a vertical bar represents “one” and crow’s feet represent “many”.

This relationship is optional one from **Employee** to **ParkingSpot**, meaning that an employee may be assigned at most one parking spot. It is possible that an employee may not have a parking spot at all. The relationship from **ParkingSpot** to **Employee** is optional many, meaning that an parking spot may be assigned to several employees or to no employees at all. This diagram correctly models the scenario described above.

1. Draw a Visio model for the following relationship: Every employee is assigned *at least one* parking spot (so every employee has a parking spot, and some employees may have more than one); each parking spot is assigned to *at most one* employee.
   * Use “Save as” to save a new version of your first diagram.
   * Determine where you want the foreign key placed.
   * Since the relationship is mandatory many from **Employee** to **ParkingSpot**, but optional one from ParkingSpot to Employee, the foreign key must be placed in ParkingSpot.
   * Set the symbols on the relationship correctly. Be sure the relationship from **Employee** to **ParkingSpot** is mandatory many. Your Visio model should look like the figure shown below.



1. Draw a Visio model for the following relationship: Every employee has *exactly one* parking spot; each parking spot is assigned to *at most one* employee.
   * The two previous scenarios represent 1:M relationships between **Employee** and **ParkingSpot**. This scenario represents a 1:1 relationship between these two entities.
   * Use “Save as” to create a third version of your drawing.
   * Determine where you want the foreign key placed.
   * Since the relationship is mandatory one from **Employee** to **ParkingSpot**, but optional one from **ParkingSpot** to **Employee**, the foreign key should be placed in **Employee** so all foreign keys will have a value.
   * Modify the entities and relationship, so your model looks like the following.

optional one



* + Our final step is to add a label to the relationship line to describe the relationship. Select the line representing the relationship. Right-click and select Edit Text and set it equal to **is assigned to.** An employee *is assigned to* a parking spot and a parking spot *is assigned to* an employee. Your Visio model should now look like this:



1. Draw a Visio model for this scenario:
   * An employee works in exactly one department.
   * A department has many employees.
   * Every department has at least one employee.
2. For each employee, store employee id, name (first and last), address (street, city, state, zip), and date hired.
3. For each department, store the department id and the name of the department.
4. Note that this is a 1:M relationship, and the foreign key must be placed in the employee entity.
5. Label the relationship line with the verb phrase **works in**.