

Coyote Manufacturing Inc is a company with several factories in the southwestern United States. These factories are responsible for leading different projects that the company might undertake, depending on the factory's function. A certain factory might even be associated with several projects, but a project is always under the control of just one factory. Some factories do not undertake any projects at all. If a factory is closed down, the projects undertaken by that factory cannot be cancelled. The project assignments from a closed factory must be temporarily removed in order to allow the project to be transferred to another factory.

Employees work in these factories, and each employee works in only one factory. A factory may employ many employees but must have at least 50 employees in order to exist. A factory with employees cannot be closed down. Every factory is managed by an employee who works in the same factory; but every employee is not a factory manager nor can an employee manage more than one factory. Company policy dictates that every factory must have a manager. Therefore, an employee currently managing a factory cannot be deleted from the database. If a factory is closed down, the employee no longer manages the factory but becomes an employee of another factory.

Some employees are assigned to work on projects and in some cases might even be assigned to work on several projects simultaneously. For a project to exist, it must have at least one employee assigned to it. Projects might need several employees depending on their size and scope. As long as an employee is assigned to a project, his or her record cannot be removed from the database. However, once a project ends it is removed from the database and all assignments of employees to that project must be removed.

Some employees also supervise other employees, but all employees need not be supervised. The employees that are supervised are supervised by just one employee. An employee may be a supervisor of several employees, but no more than 10. The Human Resources Department uses a designated default employee number to replace a supervisor who leaves the company. It is not possible for an employee to be his or her own supervisor.

Some employees may have several dependents. Coyote Manufacturing Inc does not allow both husband and wife to be an employee of the company. Also, a dependent can only be a dependent of one employee at any time.

Coyote Manufacturing Inc sponsors recreational opportunities for the dependents of employees in order to nurture the hobbies of the dependents. Dependents need not have a hobby, but it is possible that some dependents may have several hobbies. Because some hobbies are not as popular as others, every hobby need not have participants. If a dependent is no longer in the database, all records of the participation of that dependent in hobbies should not exist in the database either. Finally, as long as at least one dependent participates in a hobby, that hobby should continue to exist.

All factories of Coyote Manufacturing Inc have a factory name, number, budget and building. A factory has two or more buildings. Each factory can be identified by either its name or number. Coyote Inc operates eight factories and these are numbered 101 through 108. Either the factory number or factory name must always be recorded.

The name of an employee consists of the first name, middle initial and last name. Employee number is used to identify employees in Coyote Manufacturing Inc. Both employee number and name must be recorded. Sometimes the middle initial of an employee may not be available.

Address, gender (male or female), date hired and salary of each employee must be recorded. Salaries range from \$25,000 to \$120,000. Also the salary of an employee cannot exceed the salary of the employee's supervisor.

The start date of an employee as a manager of a factory should also be recorded. In addition, the number of employees working in each plant must be available (this can be computed). Information about dependent include dependent's name, relationship to the employee, birth date, and gender. In addition, the number of dependents of each employee must be captured which like the number of employees working in each factory can be computed.

Projects have unique names and numbers and their location must be specified. Every project must have a project number but sometimes may not have a project name. Project numbers range from 1 to 20. Coyote Inc's projects are located in the cities of Los Angeles, San Bernardino, San Francisco, Phoenix, Las Vegas and San Diego.

Hobbies are identified by a unique hobby name and include one code that indicates whether the hobby is an indoor (I) or outdoor (O) activity and another code that indicates if the hobby is a group (G) or individual (S) activity. The time spent by a dependent per week on each hobby and the associated annual cost are also captured.

Coyote Manufacturing Inc provides significant support to recreational opportunities for the dependents of its employees. However, in order to provide a comprehensive set of recreational activities for dependents, the Coyote Manufacturing Inc Employees Association aggressively solicits sponsors for various hobbies. The sponsor of a hobby can be one or more of an individual, a school, or a church. Although each hobby need not have a sponsor, each individual, school, or church is involved in sponsoring one or more hobbies. Data captured about individuals include name, address and phone number. Schools, organizations and churches are each identified by their name. For a church its denomination and pastor are recorded; and for a school its size and the name of the principal. The church denominations when available are Catholic, Baptist, Methodist, Lutheran, Mormon, Buddhist and Muslim.

Many of the sponsors of hobbies are not-for-profit organizations and for these organizations the type, exempt ID, and annual operating budget are recorded. Some of the schools are public schools and therefore are also classified as not-for-profit-organizations. For the public schools, the name of the school district and its tax base are recorded.

A factory's project may be done in-house or outsourced to one or more contracted vendors. However, a vendor can participate in only one outsourced project at a time. A factory employee is assigned to one in-house project, and an in-house project involves one or more employees. An employee is involved in no more than three in-house projects but need not be involved in any project. For both in-house and outsourced projects, a description of the project is gathered. Data gathered about each vendor include vendor name, address, phone number and contact person. Vendor name is used to identify each vendor.

Since the same vendors are often contracted for future projects, when an outsourced project is removed from the system, the vendor information should be retained for future use. If a hobby is removed from the recreation portfolio of Coyote Manufacturing Inc its relationship with any sponsor is removed as well. Likewise, when a sponsor is removed from the recreation portfolio of Coyote Manufacturing Inc its relationship with any hobby is removed.

### **Queries/Transactions**

- List the factories who do not control any project.
- For the factories that control a project, how many projects are undertaken by each factory.
- List the supervisors who supervise less than 10 employees.
- Who is the supervisor that supervises the least number of employees.
- List the dependents (name and their providers) who do not have hobbies.
- How many dependents do not have hobbies?
- What is the most popular hobby? What is the least popular hobby?
- What is the average budget for the factories of Coyote Manufacturing Inc?
- List the number of buildings for each factory in Coyote Manufacturing Inc.
- For each employee, list his/her salary, his/her supervisor's name and salary.
- List how many employees each factory has.
- List all the indoor hobbies.
- List all the outdoor hobbies.
- List all the group hobbies
- List all the individual hobbies.
- Name the dependent that spends the least amount of time per week on a hobby.
- Name the dependent that spends the least amount of time per year on a hobby.
- What is the costliest hobby(ies)?
- What is the least expensive hobby(ies)?
- Which hobby does not have a sponsor?
- Which hobby has an individual sponsor, a school sponsor and a church sponsor?
- For each factory, list the in-house projects.
- For each factory, list the outsourced projects and the vendors they are outsourced to.
- Which are the projects that are outsourced to more than one vendor?
- List how many in-house projects each employee is assigned to. Display the list in descending order by the quantity of in-house projects.
- List Employees who are supervisors
- List Employees who do not have Dependents
- List Dependents who have the most hobbies
- List Dependents who have the least hobbies
- Given an Employee, show the oldest Dependent of that Employee
- Given an Employee, show the youngest Dependent of that Employee
- Given an Employee, list the ages of the Dependents of that Employee
- List the number of Dependents each Employee has
- Show which Employee was hired first?
- Show which Employee was hired most recently?
- How many supervisors are there?
- How many managers are there?
- Make sure that we illustrate using a join
- Given a Project, list the names of Employees working on that Project
- Given a Project, list the Dependents of the oldest Employee working on that Project
- List the number of Employees working on each Project
- Show the min, max and average salaries of Employees working on each Project
- Show how many Projects have five or more Employees working on them