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# **Given the following business rules, create the appropriate Chen and Crow’s Foot E-R diagram for each of the specified relationships:**

## **a.** **A** **company** **operates** **four** **departments.**

Although the company operates four departments now, it may later decide to combine operations or to expand them. Clearly, the company operates *at least one* department.

## **b. Each department in part (a) employs employees.**

To exist, a department must have at least one employee. To simplify payroll procedures, an employee is likely to be assigned to just one department. How many people must be involved in a given operation before a department can be formed? The answer to that question depends on company policy, which dictates the appropriate business rule. Thus the business rule(s) will ultimately decide the cardinalities.

## **c. Each of the employees in part b may or may not have one or more dependents.**

Since an employee is not required to claim a dependent, DEPENDENT is optional to EMPLOYEE. Because a company cannot permit the existence of a dependent who is not claimed by an employee, and *because we have chosen to make the DEPENDENT's primary key a combination of the EMPLOYEE's primary key and the DEPENDENT's number*, DEPENDENT is a weak entity.

## **d. Each employee in part (c) may or may not have an employment history.**

Each employee may have an employment history. If a newly hired employee has no prior work experience, that employee will not have an employment history, so the EMP\_HIST is *optional* to EMPLOYEE. Since an employee may have worked for more than one previous employer or may have worked in several other departments prior to the current assignment, there is a 1:M relationship between EMPLOYEE and EMP\_HIST. Clearly, an employment history is associated with a specific employee and, because we have decided that the EMP\_HIST' primary key will be a combination of the EMPLOYEE's primary key and the EMP\_HIST's record number, the EMP\_HIST is both a weak and optional entity. In short, the EMP\_HIST dependencies and primary key may be:

EMP\_HIST (**EMP\_NUM**, **HIST\_LINE**, HIST\_YEAR, HIST\_DESCRIPTION, .... etc.)

(We have bold-faced the primary key components.) Note again that the EMP\_HIST is a weak entity *because of the designer's decision* to create its primary key in this fashion.

# **Using the E-R diagram components developed in question 15, create Chen and Crow’s Foot E-R** **diagrams that includes all the components.**