ER Model and CREATE TABLE Script

The Example in Entity Relationship Modeling

ABC Inc.

Employees in ABC Inc. are paid by hours they have worked, even the manager. ABC keeps the employee number, name, date joined, and the hourly rate for each employee.

Each employee belongs to one department at one time. Over the years, an employee may work in a number of departments. The date that an employee joins and leaves a department is recorded. Every department has a department code, department name, any numbers of phone extension numbers, and a manager who is one of the employees. An employee can manage only one department and ABC is only interest in knowing the current manager of a department.

Each employee will have a MPF account. The MPF-account-no and the balance are stored.

Each month, ABC wants to generate a report listing the name, the current department and the wage that an employee earns for a month. The MPF balance will also be listed for the employee in the report.

**Entity Relationship Diagram for ABC Personnel System**



Entity Relationship Model for the ABC Personnel System

With Many-to-Many Relationship Resolved

Entity Relationship Model for the ABC Personnel System

With Many-to-Many Relationship and Multivalue Attributes Resolved

**Entity Relationship Diagram for ABC Personnel System**

**for Converting to Table (Foreign Keys in Proper Places)**



Description and Explanation of the ER model

EMPLOYEE and DEPARTMENT (Employ relationship)

An employee may have worked for one to many departments over the years, even though an employee will only work for one department at a time. The StartDate and EndDate record the dates that an employee starts to work for a particular department and the date that the employee leaves that department respectively.

A department can have many employees. It must have at least one employee because it must have a manager.

The DeptEmployee entity records the information about the employee working in a specific department. An employee can have one to many DeptEmployee records because an employee will be attached to a department when he/she is employed and over the years he/she may work in a number of departments. A department has at least one DeptEmployee as it has at least one manger when it is established. Moreover, a department can have many DeptEmployee records as more than one employee can work in the department over the years.

DEPARTMENT and EMPLOYEE (Manage relationship)

A department must be managed by one employee.

An employee can manage maximum one department. Some employees do not manage any department if they are not managers.

DEPARTMENT and DeptPhone

A department can have many phone extensions but has at least one. One phone extension will belong to only one department.

EMPLOYEE and MPF ACCOUNT

An employee must have one MPF account because the MPF account will be created for the full-time employees when they join the company.

One MPF account belongs to only one employee.

EMPLOYEE and MONTHLY WORK

An employee can have many monthly work records after he/she works for the company more than one month. On the other hand, a new employee will not have any monthly work record because he/she will have the first record only after working for the company for at least one month.

A monthly work record belongs to only one employee.

/\* Create Table Statements \*/

CREATE TABLE EMPLOYEE (

EmployeeNumber NUMERIC(4) PRIMARY KEY,

EmployeeName VARCHAR(20) NOT NULL,

DateJoined DATE NOT NULL,

HourlyRate NUMERIC(10,2) NOT NULL );

/\*

The referential constraint for EmployeeNumber is Delete Restrict in the MPF\_Account Table.

I choose this constraint because a law may require a company to keep the MPF record of its employees even they leave the company. In order to make sure that we know who owns the account, the record of an Employee cannot be deleted if there is related MPF Account record

\*/

CREATE TABLE MPFACCOUNT (

MPFAccountNo NUMERIC(4) PRIMARY KEY,

MPFBalance NUMERIC(10,2) NOT NULL,

EmployeeNumber NUMERIC(4) NOT NULL

REFERENCES EMPLOYEE (EmployeeNumber)

ON DELETE RESTRICT);

/\*

The referential constraint for EmployeeNumber is Delete Restrict in the MonthlyWork Table.

I choose this constraint because you may want to keep the wage record for tax purpose

\*/

CREATE TABLE MONTHLYWORK (

EmployeeNumber NUMERIC(4)

REFERENCES EMPLOYEE (EmployeeNumber)

ON DELETE RESTRICT,

Year NUMERIC(4),

Month NUMERIC(2),

TotalWorkingHours NUMERIC(5,2) NOT NULL,

Wage NUMERIC(10,2) NOT NULL,

PRIMARY KEY (EmployeeNumber, Year, Month));

/\*

In the following definition of the Department table, the referential constraint for EmployeeNumber is Delete Restrict.

Delete Cascade should not be used because it does not make sense to delete a department if the employee (manager) leave the company.

If you want to delete a manager's employee record, you need to update the Employee\_Number in DEPARTMENT to another employee first

\*/

CREATE TABLE DEPARTMENT (

DepartmentCode NUMERIC(3) PRIMARY KEY,

DepartmentName VARCHAR(20) NOT NULL,

EmployeeNumber NUMERIC(4) NOT NULL

REFERENCES EMPLOYEE (EmployeeNumber)

ON DELETE RESTRICT);

CREATE TABLE DEPTEMPLOYEE (

DepartmentCode NUMERIC(3)

REFERENCES DEPARTMENT (DepartmentCode)

ON DELETE RESTRICT,

EmployeeNumber NUMERIC(4)

REFERENCES EMPLOYEE (EmployeeNumber)

ON DELETE CASCADE,

StartDate DATE,

EndDate DATE,

PRIMARY KEY (DepartmentCode, EmployeeNumber, StartDate));

CREATE TABLE DEPTPHONE (

DepartmentCode NUMERIC(3)

REFERENCES DEPARTMENT (DepartmentCode)

ON DELETE CASCADE,

PhoneExt CHAR(4),

PRIMARY KEY (DepartmentCode, PhoneExt));

/\*

The following SQL statements drop all the tables in proper sequence

\*/

DROP TABLE MPFACCOUNT;

DROP TABLE MONTHLYWORK;

DROP TABLE DEPTEMPLOYEE;

DROP TABLE DEPTPHONE;

DROP TABLE DEPARTMENT;

DROP TABLE EMPLOYEE;