Final Project (Databases 1)

By

Mike Jun Yang Chiu Lim

Student's id: 2311179

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1. Correctly identify the entities and the relationships (Abstract Data Model). Correctly identify the multiplicities of each relationship. **Explain clearly your reasoning and your conclusions**.

Entities: Employee, Department and Project

Relationships: ProjectManager, Assignation, DepartmentManager and EnrollmentDepartment

Attributes: proj_id, proj_nom, emp_nom, emp_id, dept_id, dept_dom, Aassignationdate and startdate

An employee or many employees could be assigned to work zero project or multiple projects.

There could be one and only one employee responsible for the project.

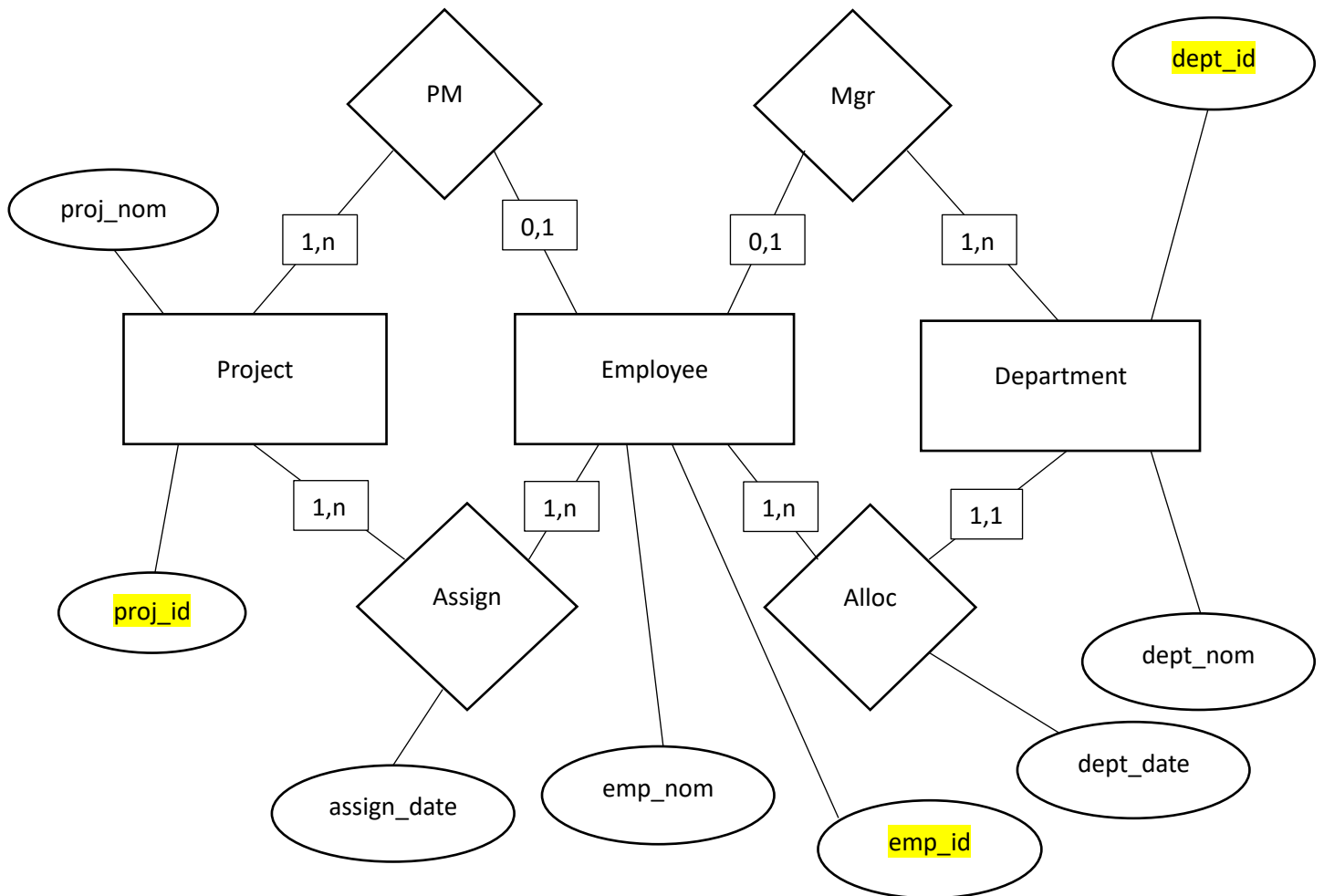A project could be given to no employee or multiple employees.

A department can have no employee or many employees.

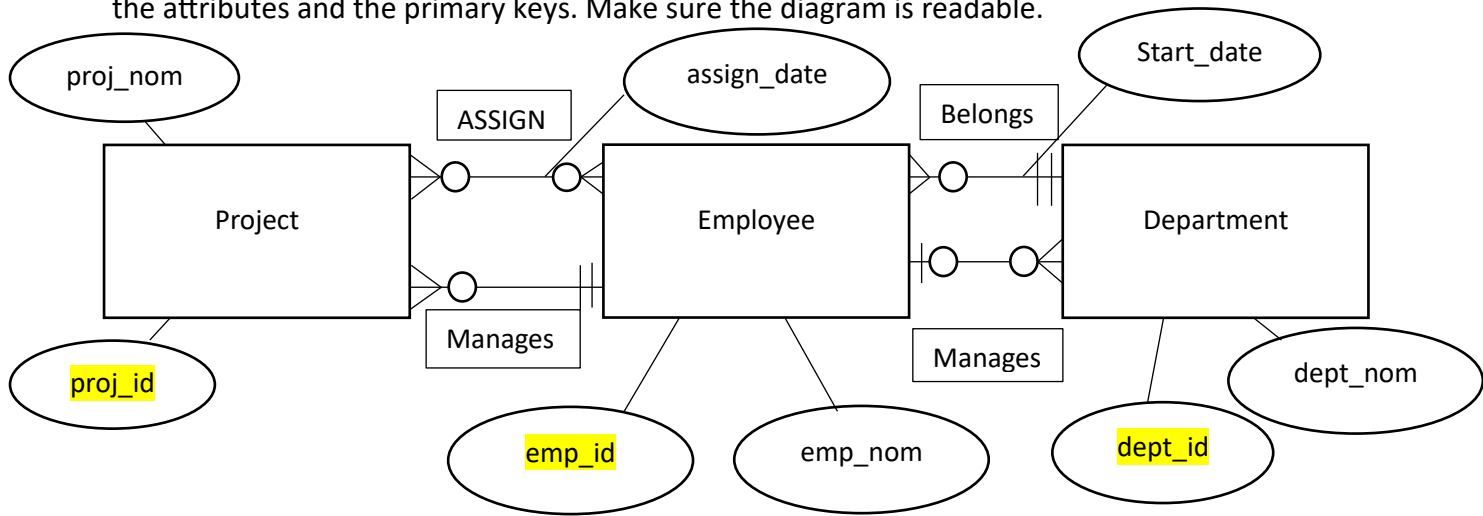A department can have zero or one employee only as the department manager

An employee(manager) can manage zero or many departments.

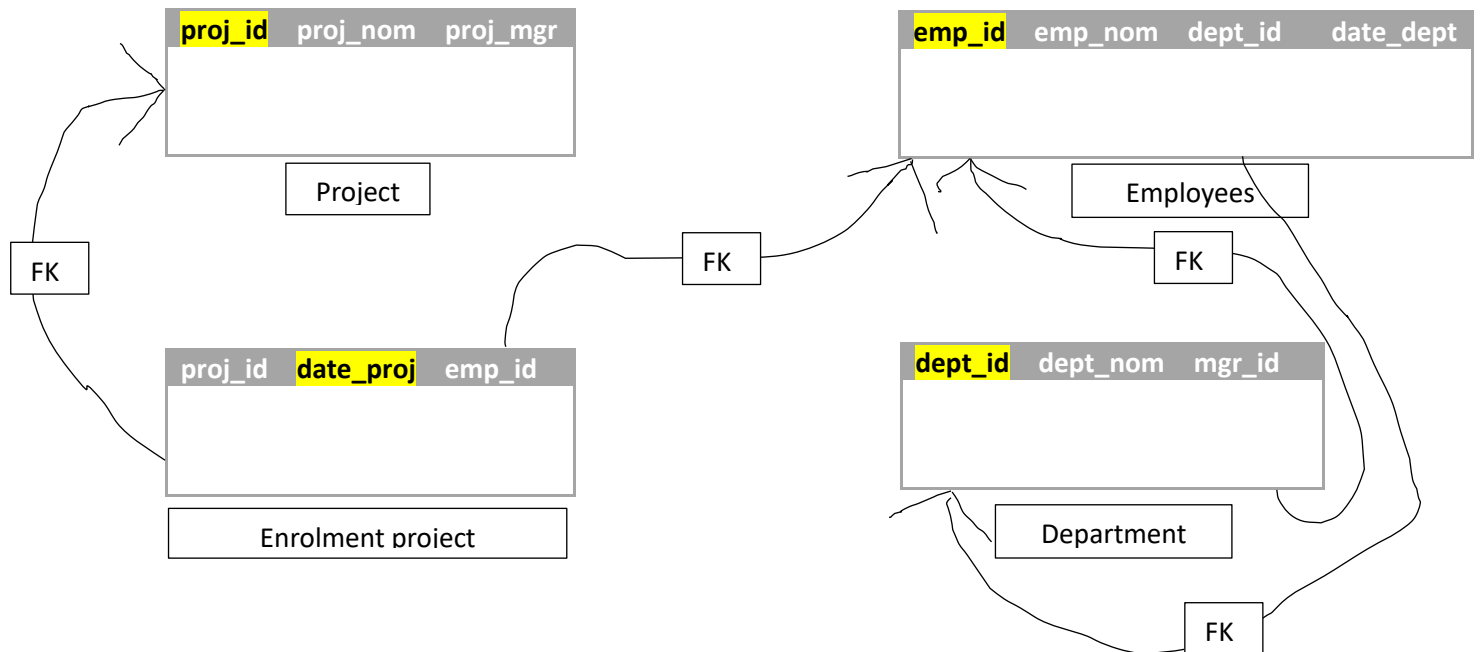An employee works in one and only one department only.

2. Draw the ER diagram using Chen's notation, clearly indicate in the diagram the attributes and the primary keys. Make sure the diagram is readable.

PM

Mgr

dept_id

proj_nom

1,n

0,1

0,1

1,n

Project

Employee

Department

1,n

1,n

1,n

1,1

proj_id

Assign

Alloc

dept_nom

dept_date

assign_date

emp_nom

emp_id

3. Draw again the ER diagram using the crow's foot notation. Clearly indicate in the diagram the attributes and the primary keys. Make sure the diagram is readable.

proj_nom

assign_date

Start_date

ASSIGN

Belongs

Project

Employee

Department

proj_id

Manages

Manages

emp_id

emp_nom

dept_id

dept_nom

4. Determine the Relational Data Model correctly. Determine which should be the association tables, which should be the foreign keys and all required attributes. **Explain clearly your reasoning and your conclusions**. Present the Relational Data Model: list all the tables indicating correctly the columns, the primary keys and the foreign keys.

proj_id	proj_nom	proj_mgr

Project

emp_id	emp_nom	dept_id	date_dept

Employees

FK

FK

FK

proj_id	date_proj	emp_id

Enrolment project

dept_id	dept_nom	mgr_id

Department

FK

In the project table, we have employee's id, the project's name and the project's manager. The project's id is the primary key.

In the employee table, we have employee's id, employee's name, department's id and the engagement date of department. The employee's date is the primary key and the department id is the foreign key.

In the enrolment project table, we have the project id, the starting date of the project and the employee's id. The starting date is the primary key, the project's id and the employee's id is the foreign key.

In the department table, we have department's id, department's name and the department's manager. The department's id is the primary key and the manager's id is the foreign key(one employee is responsible for one whole department).

5. Physical Data Model: Create a MS SQL Server script, containing the Transact-SQL commands to create the database and the tables corresponding to the Relational Data Model. Make sure that in the script you insert some sample data in each table.

```sql
CREATE DATABASE FINAL PROJECT
GO

USE FINAL PROJECT

CREATE TABLE employees(
        emp_id INTEGER NOT NULL CHECK (emp_id > 0),
        emp_nom VARCHAR(50) NOT NULL,
        dept_id INTEGER,
        date_dept DATE,
        PRIMARY KEY(emp_id),
        FOREIGN KEY(dept_id) REFERENCES department(dept_id));

CREATE TABLE department(
        dept_id INTEGER NOT NULL CHECK (dept_id > 0),
        dept_nom VARCHAR(30) NOT NULL,
        mgr_id INTEGER NOT NULL,
        PRIMARY KEY(dept_id),
        FOREIGN KEY(mgr_id) REFERENCES employees(emp_id));

CREATE TABLE project(
        proj_id INTEGER NOT NULL CHECK (proj_id > 0),
        proj_nom VARCHAR(30) NOT NULL,
        proj_mgr INTEGER NOT NULL CHECK (proj_mgr > 0),
        PRIMARY KEY(proj_id));

CREATE TABLE enrollment project(
        proj_id INTEGER,
        date_proj DATE,
        emp_id INTEGER,
        PRIMARY KEY(date_proj),
        FOREIGN KEY(emp_id) REFERENCES employees(emp_id),
        FOREIGN KEY(proj_id) REFERENCES project(proj_id));

INSERT INTO employees (emp_id, emp_nom, dept_id)
VALUES (1, 'Brown' , 10),
            (2, 'Smith' , 10),
            (3, 'Laliberte', 10);

INSERT INTO department (dept_id, dept_nom, mgr_id)
VALUES (10, 'Chemistry' , 1),
            (11, 'Physics' , 2),
            (12, 'Biology', 3);

INSERT INTO project (proj_id, proj_nom, proj_mgr)
VALUES (100, 'C#' , 1),
            (101, 'Web' , 2),
            (102, 'Database', 3);

INSERT INTO enrolment project (proj_id, date_proj, emp_id)
VALUES (100, '25/07/2023' , 1),
            (101, '25/07/2023' , 2),
            (102, '23/07/2023', 3);
```