**Final Project (Databases 1)**

**By**

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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.

dept\_id

PM

Mgr

proj\_nom

0,1

1,n

1,n

0,1

Employee

Department

Project

1,n

1,n

1,n

1,1

Assign

Alloc

proj\_id

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.

Start\_date

assign\_date

proj\_nom

Belongs

ASSIGN

Project

Department

Employee

dept\_nom

proj\_id

Manages

Manages

dept\_id

emp\_nom

emp\_id

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 |
|  |  |  |
|  |  |  |
|  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| emp\_id | emp\_nom | dept\_id | date\_dept |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

Employees

Project

FK

FK

FK

|  |  |  |
| --- | --- | --- |
| proj\_id | date\_proj | emp\_id |
|  |  |  |
|  |  |  |
|  |  |  |

|  |  |  |
| --- | --- | --- |
| dept\_id | dept\_nom | mgr\_id |
|  |  |  |
|  |  |  |
|  |  |  |

Department

Enrolment project

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.

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);