Academy Database Managment System

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Interview/Description of Problem

The goal of this project is to develop a comprehensive Database Management System (DBMS) for the university academy to enhance the efficiency of managing the academy's information. The DBMS will streamline administrative processes by comprehensive data on staff and students, categorizing students, managing devices, assignments, and financial transactions.

The university academy wants to implement a database solution to manage information more efficiently. The system will contain detailed information about both staff and students, tracking their daily updates. Students will be divided into two types: regular and external.

Student Information:

- **Regular Students:** These are the typical students enrolled in the academy's programs.
- **External Students:** These students may have access to additional lectures, subject to certain limitations such as maximum attendance. External students attending these lectures will receive certificates for their participation.

Assignment and Feedback Management:

- Students will complete various assignments throughout the academic year.
- They are required to provide feedback for each assignment.
- Both the feedback and assignment criteria will be meticulously recorded.

Device Management:

- Every staff member and student will be assigned a device.
- The DBMS will store detailed information about these devices and their assignees to ensure proper tracking and management.

Financial Management:

- The system will manage salary payments for staff and students, covering both monthly and one-time payments.
- There will be specific modules for handling billing and payments related to external students from companies that have contracts with the academy. These companies will be billed for the students they sponsor, and the system will ensure accurate financial tracking.

External Company Contracts:

- The DBMS will handle billing for external students from companies that have contracts with the academy.
- These companies will pay the academy for certain students, and the system will manage these financial interactions efficiently.

This comprehensive DBMS aims to streamline the administrative processes of the academy, ensuring efficient management of data related to students, staff, devices, assignments, and financial transactions.

The candidate is required to:

1. Model the database using Entity-Relationship model (Conceptual Model).
2. Translate the result of the conceptual design into a relational logical model (including attribute types for each relation and interrelation constraints), without considering performance analysis, volumes, or redundancies during the restructuring phase.

3. Write SQL queries that allow:

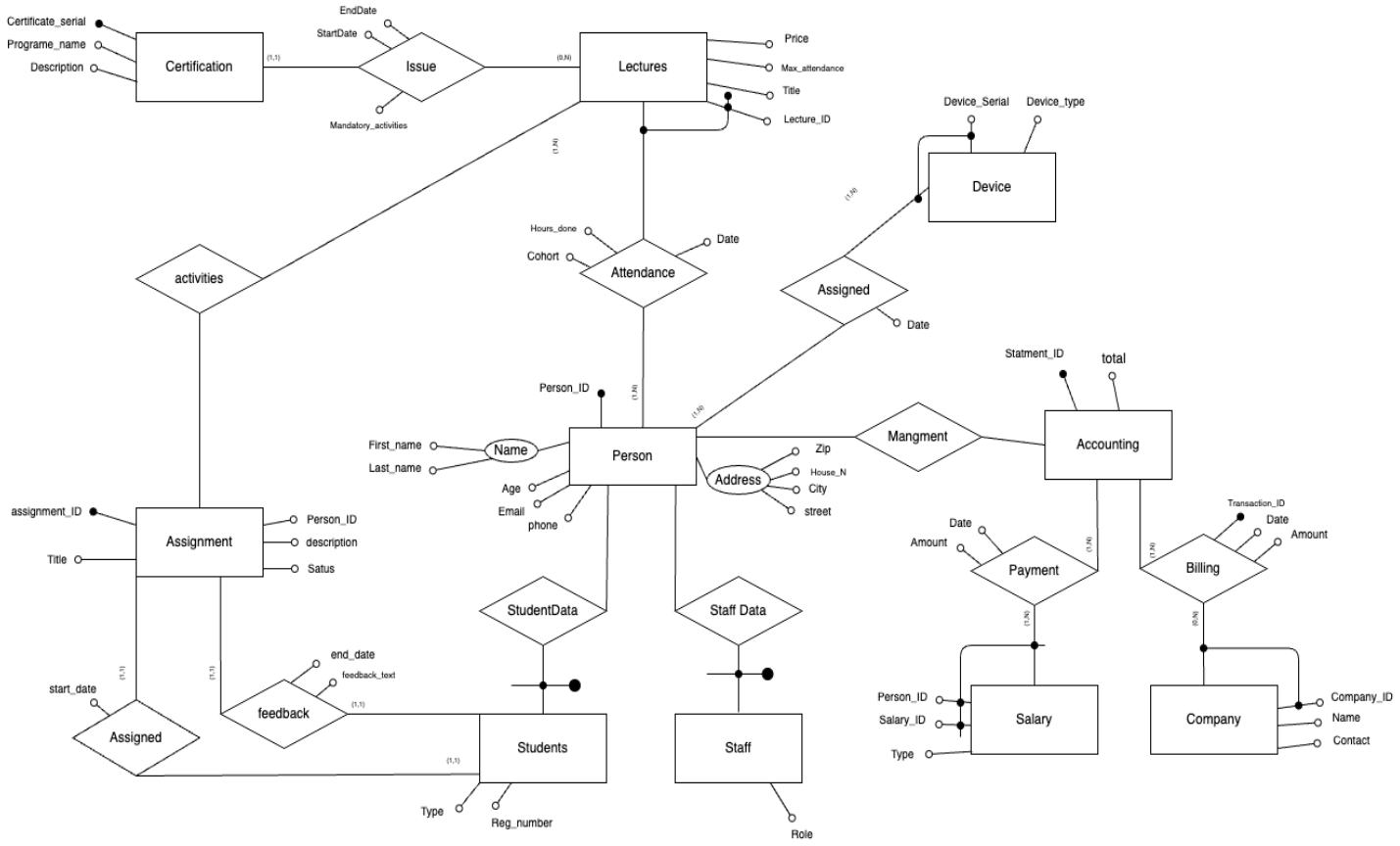
a. Search for a student by their ID
b. Search for student with name specified and type specified
c. List of external trainers
d. Calculating the total amount of money spent in academy

Data Dictionary

TERM	Description	Definition	Attributes
Person	A person that can store several information about the whole people are inside the Academy	Entity	Person ID, First Name Last Name, Email Age, Phone, City, House number, Zip code
Lecture	A lecture that can have information about the lecture that available inside the academy	Entity	Lecture ID, Price, Title Maximum Attendance
Certification	A certification is used for providing certificate for students who are taking the lectures inside the academy	Entity	Certificate Serial, Program Name, Description
Device	Every student and staff inside the academy have own devices	Entity	Device Serial, Device Type
Accounting	An Accounting considered for the managing of the billing and payments of the Academy	Entity	Statement ID, Total
Assignment	Each student has different tasks, and these tasks are considered as assignments.	Entity	Assignment ID, Title, Description, Status
Feedback	Each student will give feedback at the end of each assignment.	Relationship	End Date, Feedback Text
Attendance	An attendance is used for tracking staff and students inside the academy	Relationship	Cohort, Hours Done, Date
Payment	Payment is for tracking payments which is	Relationship	Date

	done monthly and once paid		
Company	Some companies have contract with academy, and they pay for academy for providing lecture	Entity	Company ID, Name, Contact, Address
Billing	The companies have contracts with academy to provide payment to academy for external students.	Relationship	Transaction ID, Date, Amount
Salary	Academy has scholarship and monthly payment for the staff and students	Entity	Salary ID, Type, Amount
Issue	It is used for when external students take lectures it will issue a certificate for them.	Relationship	Start Date, End Date, Mandatory Activities

Entity-Relationship Schema

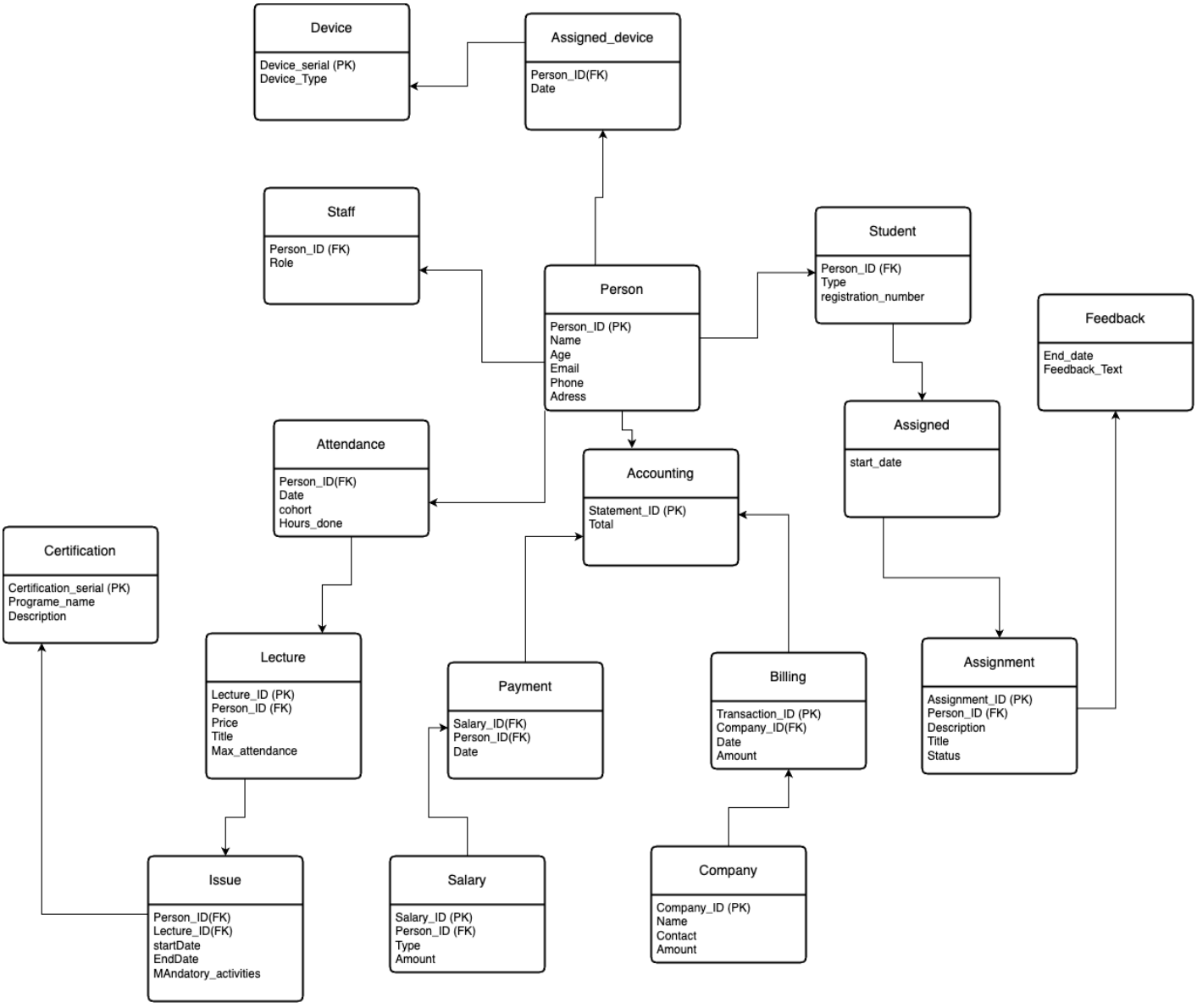


BUSINESS RULES

- Every device that is assigned to the students must be returned after 2 years.
- The person is decomposed to two different entities to remove the existence of null value inside the person entity
- It is necessary for staff and students to have email because devices are assigned their personal email addresses.
- Total entity is used to calculation of the whole payments and billings inside the academy.
- Each student can have null lectures or at most 5 lectures for the certification program.
- Cohort entity is used to recognize their time slot, because there are morning and afternoon cohorts inside the academy.

- There are two types of students inside the academy who are taking the exam and enrolled inside the with registration number or external students who are sent from companies to training.

TRANSLATION INTO RELARIONAL MODEL



SQL QUERIES

#query for searching student by their ID

```
SELECT *
FROM Person
WHERE Person_ID = '540';
```

#This query is used to find the external student with specified name

```
SELECT Assignment.Title, Assignment.Description, Assignment.Status,
Person.Person_ID, Person.First_name, Person.Last_name
FROM Assignment
JOIN Students ON Assignment.Person_ID = Students.Person_ID
JOIN Person ON Students.Person_ID = Person.Person_ID
WHERE Students.Type = 'external'
AND Person.First_name = 'Antonio'
AND Person.Last_name = 'Rossi';
```

List of external trainers

```
SELECT Person.First_name, Person.Last_name, Student.Type
FROM Person p, Staff s
WHERE Person.Person_ID = Student.Person_ID
AND Student.Type = 'external';
```

Calculating the total amount of money spent in academy

```
SELECT SUM(sal.Amount) AS Total_Salary_Paid
FROM Salary sal
WHERE Salary.Person_ID IN (
SELECT Person_ID
FROM Staff
UNION
SELECT Person_ID
FROM Students
);
```