YrkesCo Database Project

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Overview

This project implements a database system for YrkesCo, a vocational school with multiple locations.

The database is designed to replace the current Excel-based management system, providing a structured solution for tracking students, teachers, courses, programs, and other essential information.

Business Requirements

Student Management

- Store personal data (name, ID number, email)
- Track class enrollment
- Protect confidential information

Program & Course Management

- Link courses to programs
- Support standalone courses
- Store course details (name, code, credits, description)
- Manage program implementations (three classes per program)

Faculty Management

- Track permanent educators and external consultants
- Store teacher information
- Assign teachers to courses

Education Manager Tracking

- Manage education managers' information
- Track class assignments (up to 3 classes per manager)

Consultant Management

- Store consultant company information
- Track contract details (tax status, hourly rates)
- Manage consultant relationships

Location Management

- Support multiple locations
- Enable future expansion to new locations
- Track program/course delivery by location

Education Manager Tracking

- Quick access to class composition
- Analysis of course distribution
- Monitor teacher and manager workloads

Conceptual Model

Key entities

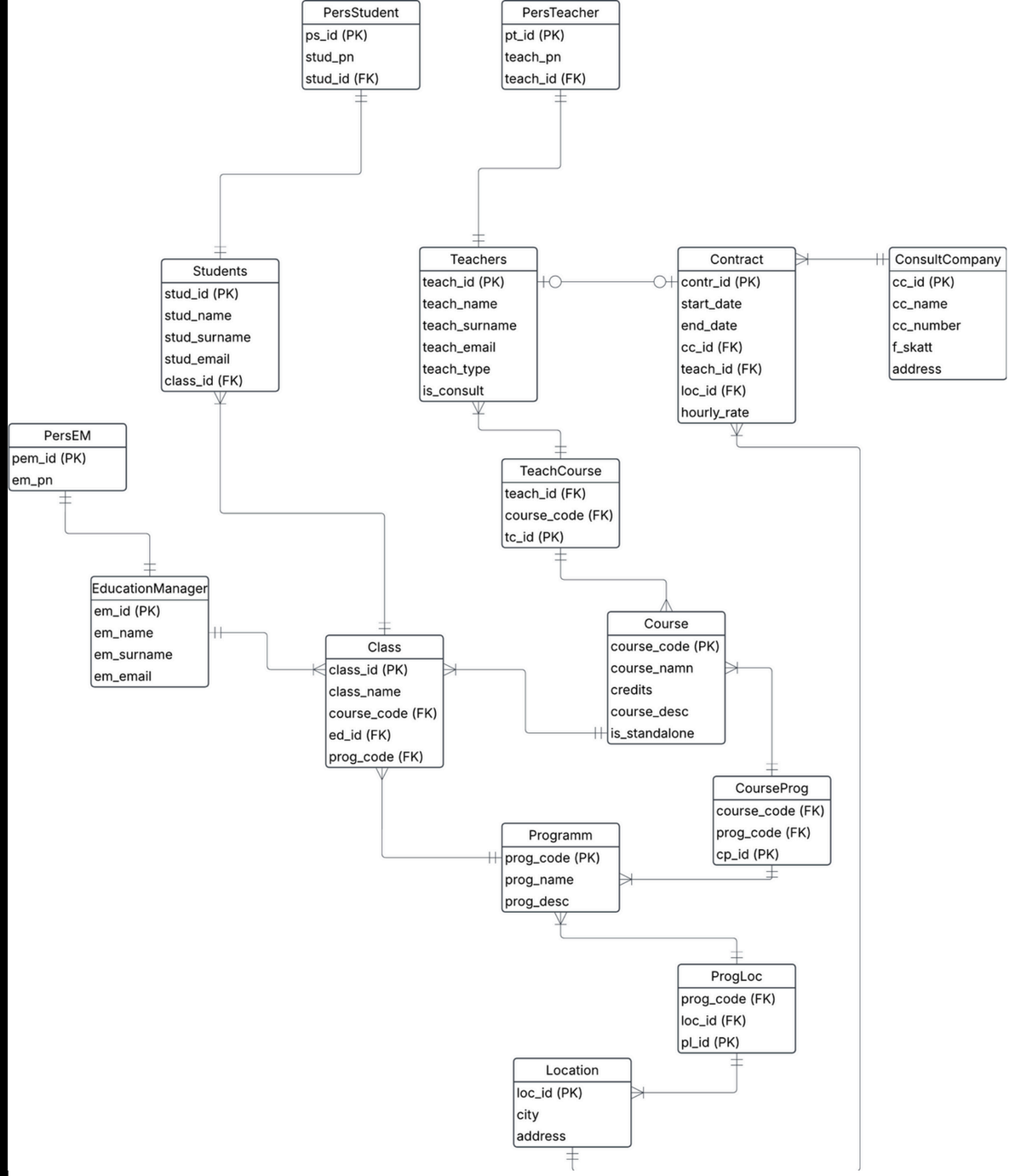
- Student
- Teacher
- Course
- Program
- Class
- EducationManager
- Location
- ConsultCompany

Relationship statements

- A Student belongs to one Class
- A Class belongs to one Program and has many Students
- A Program consists of many Courses and has many Classes
- A Course can be part of many Programs or standalone
- A Teacher can teach many Courses
- An EducationManager manages up to 3 Classes
- A Location hosts many Programs
- A ConsultCompany employs many consultants Teachers

Logical Model

- Key Attributes & Relationships
- Primary keys identified (student_id, course_code, etc.)
- Foreign keys for relationships
- Many-to-many relationships identified
- Attribute types defined



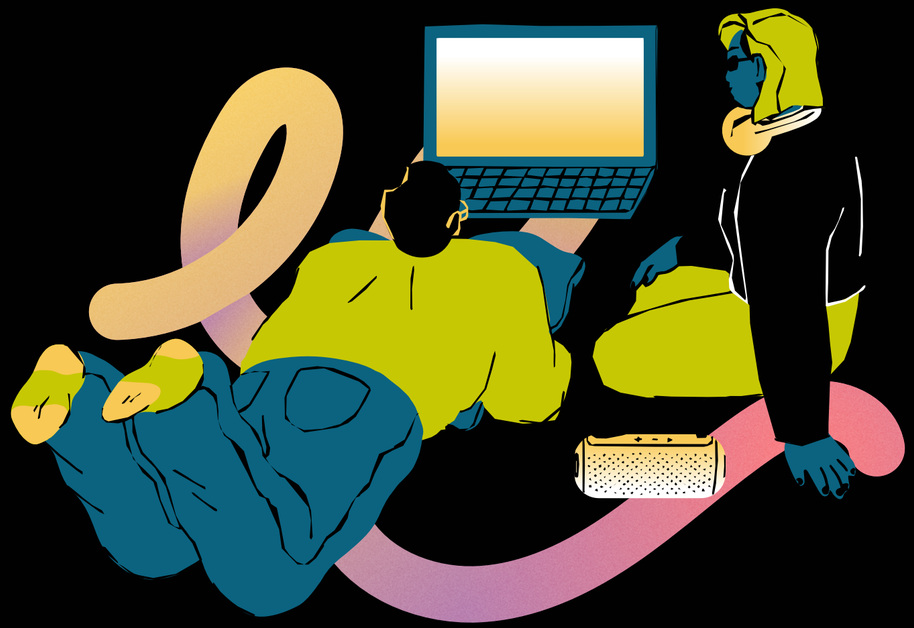
Physical Model

Implementation Environment

- PostgreSQL database
- Deployed using Docker container
- SQL scripts for table creation and data manipulation

Database structure features

- Proper primary and foreign key constraints
- NOT NULL constraints for data integrity
- Separation of sensitive data
- Support for all business requirements
- The database achieves 3NF



Project Structure

1. **yh_create_table.sql**
   Contains SQL commands to create all database tables

2. **yh_insert_data.sql**
   Contains SQL commands to insert sample data

3. **yh_testing.sql**
   Contains test queries to validate database functionality

4. **additional_operations.sql**
   Contains examples of inserting new records (locations, teachers, courses)

Database tables examples overview

teach_id	teach_name	teach_surname	teach_email	teach_type	is_consult
1	Erik	Andersson	erik.andersson@yrkesco.se	Senior Lecturer	f
2	Anna	Lindberg	anna.lindberg@consult.se	Guest Lecturer	t
3	Jonas	Bergström	jonas.bergstrom@yrkesco.se	Senior Lecturer	f

course_code	course_name	credits	course_desc	is_standalone
WEB101	Web Development Basics	30	Introduction to HTML, CSS and JavaScript	f
DB201	Database Design	20	Relational databases, SQL and data modeling	f
STAT301	Statistics for Data Science	25	Statistical methods and their applications in data analysis	f
PYTHON101	Python Programming Fundamentals	15	Basic programming concepts using Python language	t
UX101	UX/UI Design Basics	10	Introduction to user experience and interface design principles	t
AI101	Introduction to Artificial Intelligence	15	Basic concepts of AI, machine learning, and neural networks	t

(6 rows)

prog_code	prog_name	prog_desc
FSDEV	Full Stack Development	Comprehensive program covering both frontend and backend development technologies
DATSC	Data Science	Program focused on data analysis, machine learning and AI applications

(2 rows)

class_id	class_name	prog_code	em_id	loc_id
1	A-2023	FSDEV	1	1
2	B-2023	DATSC	1	2
3	A-2024	FSDEV	1	1
4	B-2024	DATSC	1	2

How it works

Get a list of all students with information about their classes and programs

```
 stud_id | stud_name | stud_surname |          stud_email          | class_name |       prog_name
---------+-----------+--------------+------------------------------+------------+-----------------------
       1 | Johan     | Svensson     | johan.svensson@student.se    | A-2023     | Full Stack Development
       2 | Emma      | Nilsson      | emma.nilsson@student.se      | A-2023     | Full Stack Development
       3 | Oscar     | Eriksson     | oscar.eriksson@student.se    | A-2023     | Full Stack Development
       4 | Lisa      | Larsson      | lisa.larsson@student.se      | A-2023     | Full Stack Development
       5 | Simon     | Björk        | simon.bjork@student.se       | A-2023     | Full Stack Development
       6 | Sofia     | Lundgren     | sofia.lundgren@student.se    | B-2023     | Data Science
       7 | Alexander | Bergman      | alexander.bergman@student.se | B-2023     | Data Science
       8 | Elin      | Ek           | elin.ek@student.se           | B-2023     | Data Science
       9 | Lucas     | Lind         | lucas.lind@student.se        | B-2023     | Data Science
      10 | Amanda    | Holm         | amanda.holm@student.se       | B-2023     | Data Science
      11 | Gustav    | Gustafsson   | gustav.gustafsson@student.se | A-2024     | Full Stack Development
      12 | Maja      | Malmström    | maja.malmstrom@student.se    | A-2024     | Full Stack Development
      13 | Viktor    | Vinter       | viktor.vinter@student.se     | A-2024     | Full Stack Development
      14 | Hanna     | Holmberg     | hanna.holmberg@student.se    | A-2024     | Full Stack Development
      15 | Axel      | Axelsson     | axel.axelsson@student.se     | A-2024     | Full Stack Development
      16 | Klara     | Karlsson     | klara.karlsson@student.se    | B-2024     | Data Science
      17 | Nils      | Nordin       | nils.nordin@student.se       | B-2024     | Data Science
      18 | Isabelle  | Isaksson     | isabelle.isaksson@student.se | B-2024     | Data Science
      19 | Felix     | Fransson     | felix.fransson@student.se    | B-2024     | Data Science
      20 | Julia     | Jakobsson    | julia.jakobsson@student.se   | B-2024     | Data Science
(20 rows)

~
```

Get a list of teachers and the courses they teach

```
ORDER BY t.teach_surname;
 teach_name | teach_surname |                course_name                | course_code
------------+---------------+-------------------------------------------+-------------
 Erik       | Andersson     | Database Design                           | DB201
 Erik       | Andersson     | Web Development Basics                    | WEB101
 Jonas      | Bergström     | UX/UI Design Basics                       | UX101
 Jonas      | Bergström     | Python Programming Fundamentals           | PYTHON101
 Helena     | Ekström       | Introduction to Artificial Intelligence   | AI101
 Anna       | Lindberg      | Database Design                           | DB201
 Anna       | Lindberg      | Statistics for Data Science               | STAT301
(7 rows)
```

Adding a new location Malmö

```
yh_lab_db=# SELECT * FROM "Location";
 loc_id |   city    |       address
--------+-----------+----------------------
      1 | Stockholm | Kungsgatan 65, 11122
      2 | Göteborg  | Avenyn 12, 41103
      3 | Malmö     | Stortorget 8, 21134
```

Get a list of courses for each program

```
      prog_name        | course_code |         course_name          | credits
-----------------------+-------------+------------------------------+---------
 Data Science          | STAT301     | Statistics for Data Science  |      25
 Data Science          | DB201       | Database Design              |      20
 Full Stack Development | WEB101     | Web Development Basics       |      30
 Full Stack Development | DB201      | Database Design              |      20
(4 rows)
```

Adding a full-time teacher (not a consultant)

```
 teach_id | teach_name | teach_surname |        teach_email          |   teach_type    | is_consult
----------+------------+---------------+-----------------------------+-----------------+------------
        1 | Erik       | Andersson     | erik.andersson@yrkesco.se   | Senior Lecturer | f
        2 | Anna       | Lindberg      | anna.lindberg@consult.se    | Guest Lecturer  | t
        3 | Jonas      | Bergström     | jonas.bergstrom@yrkesco.se  | Senior Lecturer | f
        4 | Helena     | Ekström       | helena.ekstrom@yrkesco.se   | Senior Lecturer | f
(4 rows)
```

Conclusion

- Created a database system for YrkesCo
- Replaced Excel files with a structured, relational database
- Implemented all requirements
- Designed with scalability and data integrity in mind
- Database follows 3NF normalization principles

Contact

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