

Examination System Database

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Examination System Database

Description:

The Online Examination System Database is a relational database designed to manage and organize the entire exam process in an efficient and digital way. This system helps both instructors and students by making exam creation, management, and evaluation easier and faster.

Key Features:

- **For Instructors:**
 - Instructors can add exam questions to a centralized question pool.
 - They can create multiple versions of the same exam, making each version slightly different by choosing random questions for fairness or to reduce cheating.
 - Instructors can manage the exams and automatically calculate scores after students finish.
- **For Students:**
 - Students can register for exams and take them online.
 - After completing an exam, students may view their scores.

System Components:

The system is built using various database elements such as:

- Tables – to store data like students, questions, exams, and answers.
- Views – to provide summarized or filtered information for easier access.
- Stored Procedures – to automate tasks like creating exams, grading answers, or registering students.
- Triggers – to enforce rules and automatically perform actions when certain changes happen in the database (e.g., updating total score when a student submits an answer).

Objectives:

- Facilitate structured storage and retrieval of examination-related data.
- Automate the process of creating and managing exams.
- Ensure accurate tracking of student performance and exam results.
- Enable instructors to assign courses, prepare questions, and correct exams efficiently.

System Users

Our Online Examination System is designed to support four different types of users, each with specific roles and responsibilities. Here's a clear explanation of each user type:

1. Instructor

The Instructor is responsible for creating and managing exams. Their main tasks include:

- Adding questions to the question bank.
- Creating different versions of exams to avoid cheating.
- Assigning exams to students.
- Reviewing student performance and results.

2. Student

The Student is the main user who takes the exams. Their responsibilities include:

- Registering in the system and for specific exams.
- Accessing and taking online exams.
- Viewing their exam results and feedback after submission.

3. Admin

The Admin manages the overall system and its users. This user has the highest level of control. Their tasks include:

- Creating and managing user accounts (instructors, students, etc.).
- Handling system settings and permissions.
- Editing track data .
- Ensuring the system is working properly and securely.

4. Training Manager

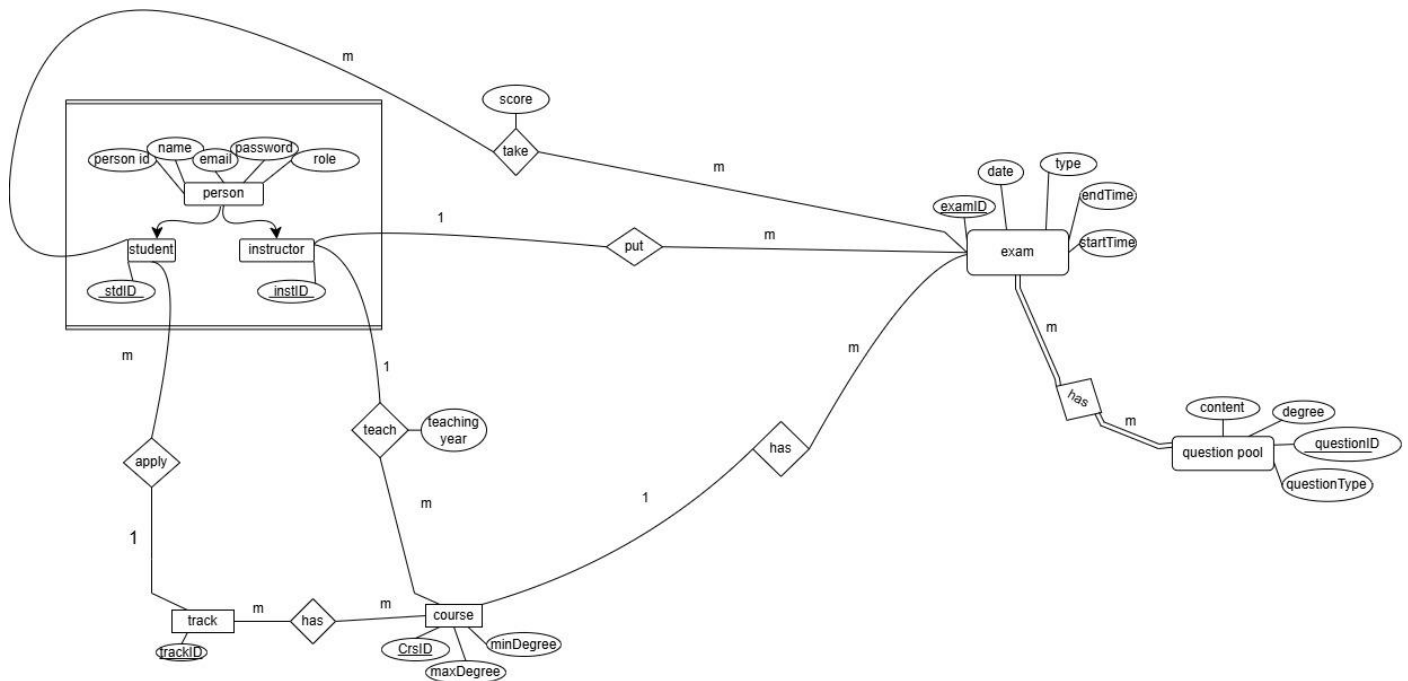
The Training Manager oversees the educational programs and training tracks. Their responsibilities include:

- Assigning students to specific tracks or courses.
- Monitoring progress and performance across departments.
- Coordinating with instructors to ensure proper exam scheduling and content.

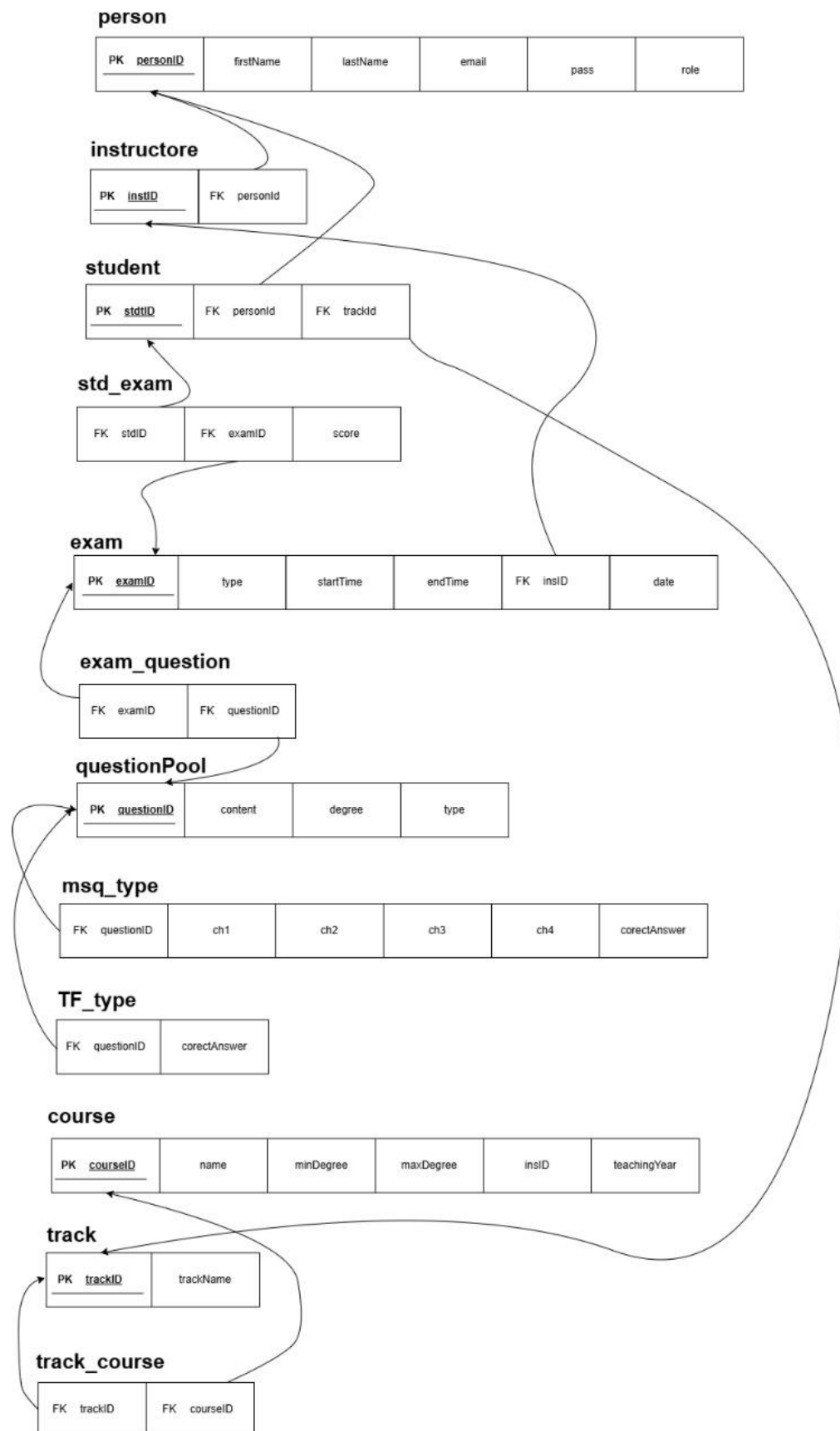
Main Features:

- **Student & Instructor Management:** Store and manage information about students and instructors.
- **Course & Subject Management:** Link instructors to the courses they teach and students to the courses they study.
- **Question Bank:** Maintain a categorized repository of questions with types, levels, and associated topics.
- **Exam Generation:** Automatically generate exams with a balanced mix of questions based on defined criteria.
- **Exam Correction:** Automatically correct objective questions and allow manual grading for subjective ones.
- **Reporting:** Generate reports and views showing student results, performance by course.

ERD:



Mapping



Technical Implementation:

- **Tools Used:** SQL Server Management Studio (SSMS)
- **Database Objects:**
 - Tables: Students, Instructors, Courses, Subjects, Questions, Exams, Exam_Results, etc.
 - Stored Procedures: For adding students, assigning instructors, generating exams, correcting exams.
 - Views: For reporting student results and analyzing performance.
 - Triggers: To ensure data consistency and automatic updates upon certain actions.

Stored Procedures and Views – explanation

1. InsertQuestionsToPool

- Adds a group of questions to the question pool (a shared set of exam questions).
- we provide a table of questions (@MyQuestions), and the procedure inserts them into the database.

EXEC InsertQuestionsToPool @Questions = @MyQuestions

2. Exams.InsertExam

- Creates a new exam in the system with specific settings.
- **Exam data:**
 - @examID: Unique ID of the exam.
 - @examType: Type of exam (e.g., "Corrective", "Normal").
 - @startTime & @endTime: When the exam starts and ends.
 - @insID: ID of the instructor creating the exam.
 - @examDate: The date the exam will be held.
 - @csrID: ID of the course the exam belongs to.

EXEC Exams.InsertExam

@examID = 11,

@examType = 'Corrective',

@startTime = '09:00',

```
@endTime = '11:00',  
@insID = 1,  
@examDate = '2025-05-12',  
@csrID = 1;
```

3. Exams.AddRandomMCQ_TF_QuestionsToExam

- Adds a set number of random True/False or Multiple Choice questions to a specific exam.
- **What you provide:**
 - @examID: ID of the exam you're adding questions to.
 - @numberOfQuestions: How many questions to add.

EXEC Exams.AddRandomMCQ_TF_QuestionsToExam

```
@examID = 11,  
@numberOfQuestions = 5;
```

4. Exams.vw_ExamWithQuestion (View)

- Displays all details about an exam, including its questions.
Helpful for reviewing the full content of an exam in a readable format.
-

5. creatExamView @examId

- Generates a visual layout of a specific exam using its ID.
 - @examId: The ID of the exam to view.
 - Used before an exam starts to confirm its contents.
-

6. answerSheet @stdID, @examID

- Creates an empty answer sheet for a student when they start the exam.
- @stdID: Student's ID.
 - @examID: Exam ID.

7. addAnswer @stdID, @examID, @qID, @stdAnswer

- Allows a student to submit an answer to a specific question.
- **Input:**
 - @stdID: Student's ID.
 - @examID: Exam ID.
 - @qID: Question ID.
 - @stdAnswer: The student's answer.

8. student_results_proc @examID, @stdID

- Calculates the student's score after the exam and updates the result in the system.
- **Input:**
 - @examID: Exam ID.
 - @stdID: Student's ID.

9. CheckExamAccess

- Verifies whether the current date and time allows the student to access the exam.
- Ensures students cannot take the exam before or after the allowed time.