ANP-C7971

AF0400809
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Database Design for

ONLINE EXAM SYSTEM

Online Exams Database

The **Online Exams** database is designed to facilitate the creation, management, and tracking of online exams for educational institutions or training programs. The database structure supports user management, course management, exam creation, question management, and result tracking.

Purpose

The primary goals of the Online Exams database are:

1. User : To store and manage user information including credentials and roles.
2. Course : To manage courses that users can enroll in.
3. Exam : To create and manage exams associated with courses.
4. Question : To create, store, and manage questions for each exam.
5. Result : To track user performance on exams and store their results.

Database Schema

The database consists of the following tables:

1. users
This table stores user information.

user_id: Unique identifier for each user (Primary Key).
username: Unique username for the user (String).
password: Encrypted password for the user (String).

2. course
This table holds information about courses offered.

course_id: Unique identifier for each course (Primary Key).
user_id: Identifier for the user who created the course (Foreign Key).
course_name: Name of the course (String).
duration: Duration of the course (String).

3. exams
This table manages the exams associated with each course.

exam_id: Unique identifier for each exam (Primary Key).
course_id: Identifier for the associated course (Foreign Key).
exam_name: Name of the exam (String).

4. user_exams
This table tracks user exam attempts.

user_exam_id: Unique identifier for each exam attempt (Primary Key).
user_id: Identifier for the user taking the exam (Foreign Key).
exam_date: Date and time of the exam attempt.
status: Status of the exam (Enum: 'completed', 'in-progress', 'not attempted').
score: User's score on the exam.

5. questions
This table stores questions related to exams.

question_id: Unique identifier for each question (Primary Key).
exam_id: Identifier for the associated exam (Foreign Key).
question_text: Text of the question (String).
question_type: Type of the question (Enum: 'multiple_choice', 'true_false', 'open_ended').
correct_option: Reference to the correct answer option (Integer).

6. options
This table holds answer options for multiple-choice questions.

option_id: Unique identifier for each option (Primary Key).
question_id: Identifier for the associated question (Foreign Key).
option_text: Text of the answer option (String).
is_correct: Flag indicating if the option is correct (Boolean).

7. results
This table records the results of user exam attempts.

result_id: Unique identifier for each result entry (Primary Key).
user_id : Identifier for the user (Foreign Key).
exam_id: Identifier for the exam taken (Foreign Key).
score: Score obtained by the user.

Relationships in the Online Exams Database

1. Users and Courses

→ Relationship**: One-to-Many**
→ Description: Each user can create multiple courses, but each course is linked to only one instructor.
→ Foreign Key:
`user_id` in the **courses** table references `user_id` in the **users** table.

2. Courses and Exams
→ Relationship : **One-to-Many**
→ Description **:** Each course can have multiple exams associated with it, but each exam is linked to only one course.
→ Foreign Key:
`course_id` in the **exams** table references `course_id` in the **courses** table.

3. Exams and Questions
→ Relationship**: One-to-Many**
→ Description: Each exam can contain multiple questions, while each question belongs to only one exam.
→ Foreign Key:
`exam_id` in the **questions** table references `exam_id` in the **exams** table.

4. Questions and Options
→ Relationship **: One-to-Many**
→ Description : Each question can have multiple answer options (for multiple-choice questions), but each option belongs to only one question.
→ Foreign Key:
`question_id` in the **options** table references `question_id` in the **questions** table.

5. Users and User Exams
→ Relationship**: One-to-Many**
→ Description: Each user can attempt multiple exams, but each exam attempt is linked to only one user.
→ Foreign Key:
`user_id` in the **user_exams** table references `user_id` in the **users** table.

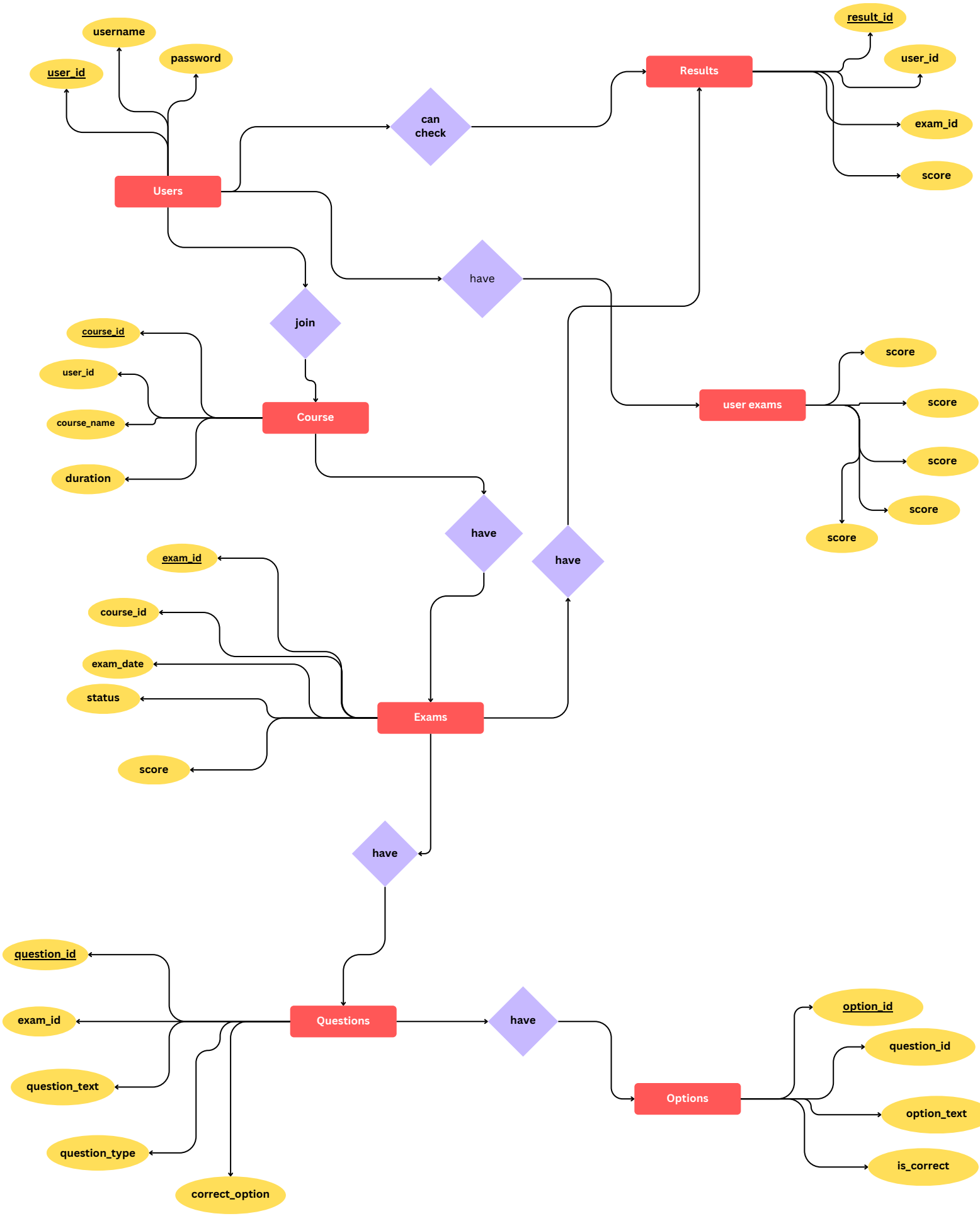
6. Exams and User Exams
→ Relationship**: One-to-Many**
→ Description: Each exam can be attempted by multiple users, but each user exam attempt is linked to only one specific exam.
→ Foreign Key:
`exam_id` in the **user_exams** table is implicitly linked through the user's attempt, but generally is linked through the results recorded.

7. Users and Results
→ Relationship**: One-to-Many**
→ Description: Each user can have multiple results recorded for different exams, but each result entry corresponds to only one user.
→ Foreign Key:
`user_id` in the **results** table references `user_id` in the **users** table.

8. Exams and Results
→ Relationship**: One-to-Many**
→ Description: Each exam can have multiple results recorded for different users, but each result entry corresponds to only one specific exam.
→ Foreign Key:
`exam_id` in the **results** table references `exam_id` in the **exams** table.

Summary of Relationships

Users → Courses **:** One instructor can create many courses.
Courses → Exams **:** One course can have many exams.
Exams → Questions **:** One exam can contain many questions.
Questions → Options **:** One question can have many options.
Users → User Exams **:** One user can attempt many exams.
Exams → User Exams **:** One exam can be attempted by many users.
Users → Results **:** One user can have multiple exam results.
Exams → Results **:** One exam can have multiple results recorded.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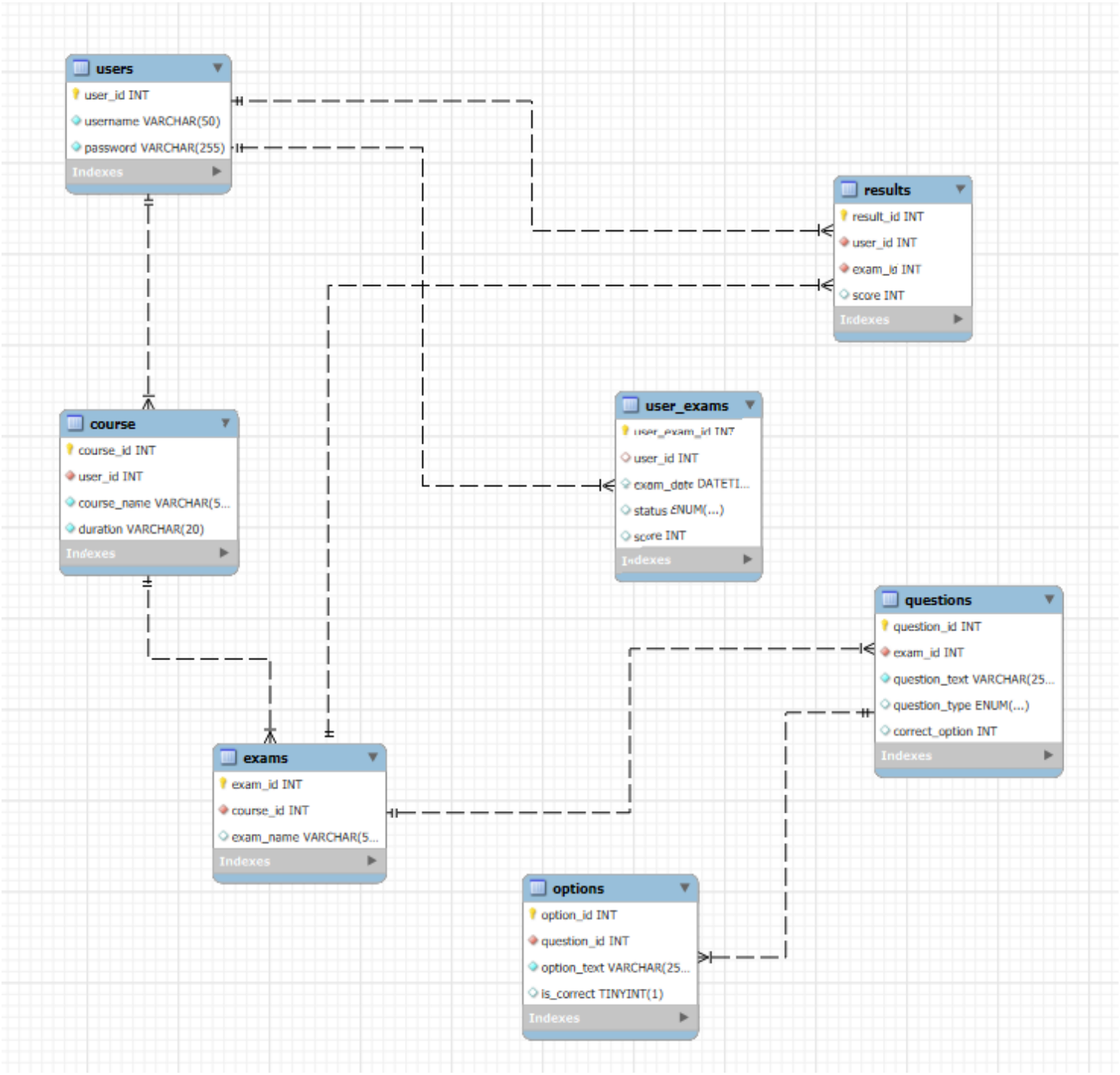
users
user_id INT
username VARCHAR(50)
password VARCHAR(255)
Indexes
results
result_id INT
user_id INT
exam_id INT
score INT
Indexes
course
course_id INT
user_id INT
course_name VARCHAR(5...
duration VARCHAR(20)
Indexes
user_exams
user_id INT
exam_date DATETI...
status ENUM(...)
score INT
Indexes
questions
question_id INT
exam_id INT
question_text VARCHAR(25...
question_type ENUM(...)
correct_option INT
Indexes
exams
exam_id INT
course_id INT
exam_name VARCHAR(5...
Indexes
options
option_id INT
question_id INT
option_text VARCHAR(25...
is_correct TINYINT(1)
Indexes