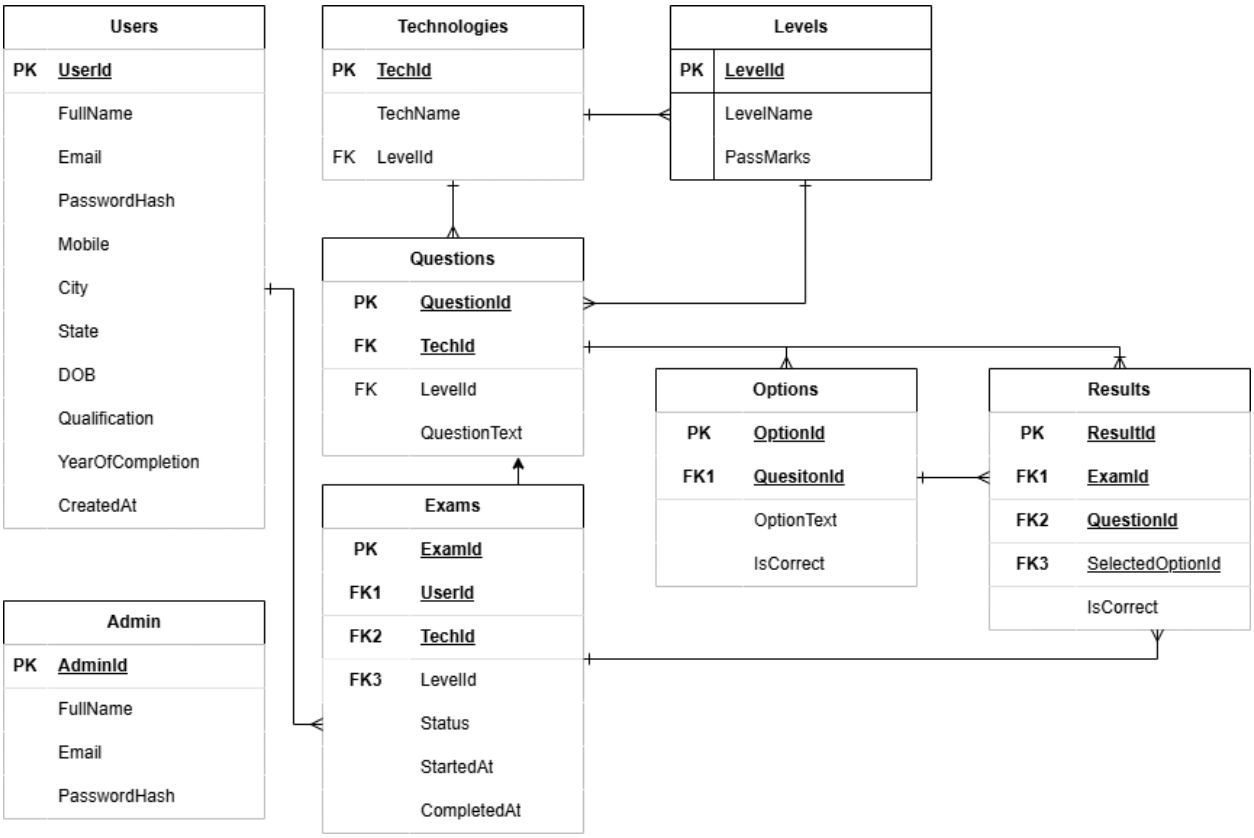
ONLINE EXAM SYSTEM – DB Design

ER Diagram



Tables

1. Users

Column Name	Data Type	Constraints	Description
UserId	INT	PK, Identity	Unique ID for user
FullName	NVARCHAR(100)	NOT NULL	User full name
Email	NVARCHAR(100)	NOT NULL, UNIQUE	User email
PasswordHash	NVARCHAR(256)	NOT NULL	Hashed password
Mobile	NVARCHAR(15)	NULL	Contact number
City	NVARCHAR(50)	NULL	City
State	NVARCHAR(50)	NULL	State
DOB	DATE	NULL	Date of Birth
Qualification	NVARCHAR(100)	NULL	Qualification
YearOfCompletion	INT	NULL	Year completed
CreatedAt	DATETIME	DEFAULT GETDATE()	Account creation time

Note: To store student information

2. Admin

Column Name	Data Type	Constraints	Description
AdminId	INT	PK, Identity	Unique admin ID
FullName	NVARCHAR(100)	NULL	Admin name
Email	NVARCHAR(100)	NOT NULL, UNIQUE	Admin email
PasswordHash	NVARCHAR(256)	NOT NULL	Hashed password

Note: To Store admin credentials

3. Technologies

Column Name	Data Type	Constraints	Description
TechId	INT	PK, Identity	Unique Tech ID

Name	NVARCHAR(50)	NOT NULL, UNIQUE	Technology name (C#, Java, SQL, etc.)
LevelId	INT	FK - Levels	

Note: To store subject or technology of the exam

4. Levels

Column Name	Data Type	Constraints	Description
LevelId	INT	PK, Identity	Unique level identifier
LevelName	NVARCHAR(50)	NOT NULL, UNIQUE	Beginner / Intermediate / Advanced
PassMarks	INT	NOT NULL	Minimum marks required to pass

5. Questions

Column Name	Data Type	Constraints	Description
QuestionId	INT	PK, Identity	Unique question ID
TechId	INT	FK - Technologies(TechId)	Subject/technology
LevelId	INT	FK – Levels(LevelId)	Exam level 1,2,3
QuestionText	NVARCHAR(MAX)	NOT NULL	Question content
CreatedAt	DATETIME	DEFAULT GETDATE()	Question creation timestamp

Note: Stores all questions

6. Options

Column Name	Data Type	Constraints	Description

OptionId	INT	PK, Identity	Unique option ID
QuestionId	INT	FK - Questions(QuestionId)	Question this option belongs to
OptionText	NVARCHAR(255)	NOT NULL	Text of the option
IsCorrect	BIT	NOT NULL	1 = correct, 0 = wrong

Note: Stores multiple choice options for each question

7. Exams

Column Name	Data Type	Constraints	Description
ExamId	INT	PK, Identity	Unique exam ID
UserId	INT	FK - Users(UserId)	User taking exam
TechId	INT	FK - Technologies(TechId)	Technology/subject
LevelId	INT	FK - Levels	Exam level
Score	INT	NOT NULL	Number of correct answers
Status	BIT / BOOL	NOT NULL	For “Pass” / “Fail”
StartedAt	DATETIME	NOT NULL	Exam start timestamp
CompletedAt	DATETIME	NOT NULL	Exam completion timestamp

Note: Stores each attempt of a user for a specific level & technology

8. Results

Column Name	Data Type	Constraints	Description
ResultId	INT	PK, Identity	Unique result ID
ExamId	INT	FK - Exams(ExamId)	Exam reference
QuestionId	INT	FK - Questions(QuestionId)	Question reference
SelectedOptionId	INT	FK - Options(OptionId)	Option chosen by user
IsCorrect	BIT	NOT NULL	1 = correct, 0 = wrong

Note: Stores user answers per question, useful for analytics

Relationships

Parent Table	Child Table	Relationship Type	Foreign Key (in Child)	Notes
Users	Exams	One-to-Many (1:N)	Exams.UserId	One user can attempt multiple exams
Admins	Questions	Optional / Indirect	—	Admin manages questions via backend
Technologies	Questions	One-to-Many (1:N)	Questions.TechId	Each technology has multiple questions
Questions	Options	One-to-Many (1:N)	Options.QuestionId	Each question has multiple options
Exams	Results	One-to-Many (1:N)	Results.ExamId	Each exam attempt has multiple answered questions
Questions	Results	One-to-Many (1:N)	Results.QuestionId	Each question can appear in multiple results

Options	Results	One-to-Many (1:N)	Results.SelectedOptionId	Each option can be selected in many results