**Title:** Subscription-Based Learning App  
**Course:** Database design 344  
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**How Requirements Were Determined**

I began with the **mini-world description**: learners subscribe monthly/annually to access courses. Courses have modules and lessons, learners enroll, track lesson progress, take quizzes, and earn certificates. Instructors create courses, admins manage content and users. Payments only record receipt numbers.

**user stories**

Learners subscribe to plans and enroll in courses.

Instructors author courses, modules, and lessons.

Learner’s complete lessons, quizzes, and receive certificates.

Subscriptions and payments must be tracked.

**entities, attributes, and relationships**.

1. User accounts with their specific roles like learner, instructor, admin.
2. Instructors create courses, modules, lessons.
3. Learners subscribe to a plan and enroll in courses.
4. Lesson progress tracked by user.
5. Quizzes per lesson with attempts and answers.
6. Certificates issued upon course completion.
7. Payments recorded with receipt number.
8. Admins manage users, courses, and plans.

Integrity is enforced through FKs and constraints.

**Chen ER Diagram**

Entities are User, Course, Module, Lesson, Subscription Plan, Subscription, Payment, Enrollment, Lesson Progress, QuizQuestion, Quiz Option, Quiz attempt, Attempt answer, Certificate.

**Relationships**

User *authors* Course.

Course *has* Module and Module *has* Lesson.

User *enrolls in* Course.

User *progresses* through Lesson.

Lesson *has* Quiz and Quiz *has* Questions also Question *has* Options.

User *attempts* Quiz and Attempt *has* Answers.

User *subscribes to* Plan via Subscription → *pays* Payment.

User *earns* Certificate for Course.

**Database Creation in MySQL Workbench**

Database name: learning App.

Tables: users,

courses,

modules,

lessons,

subscription\_plans,

subscriptions,

payments,

enrollments,

lesson\_progress,

Quizzes,

Quiz\_questions,

quiz\_options,

quiz\_attempts,

attempt\_answers,

certificates.

**Constraints**

PKs,

FKs,

UNIQUE,

CHECK,

ENUM,

NOT NULL.

Engine: InnoDB.