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Exercise 18 – MySQL Part A

Objective

To understand database design, to use data definition language statements, and use agile practices within a team.

Tasks

Throughout this database project your team should utilise various Agile practices. You should plan the number and duration of your sprints plus the processes you will use to conduct rituals such as stand-ups, reviews and retrospectives.

Consider how you will prioritize your tasks and whether you need a scrum master.

**Recommendation**: use Trello to create a scrum board.

In a small group of approximately 4 people, draft a list of user stories for a library application:

*As a <type of user>,*

*I want <some goal>*

*So that <some reason>*

This collection of user stories should provide a good breadth of the functionality required for a library application and identify the different roles within the business.

From these user stories extract a list of candidate table, column and role names for a database design. Create some sample data for each candidate table to help validate your design. Identify any data redundancy and consider further normalization if necessary.

Sketch out your database design to include datatypes, primary and foreign keys, constraints such as default and check constraints and nullability. Document the relationships to denote whether they are one-to-one or one-to-many. Ensure you use meaningful identifiers throughout your design.

Create this database within MySQL.

Exercise 19 – MySQL Part B

Objective

To utilise data control language and data manipulation language statements.

Tasks

Take your collection of user stories from the previous exercise and create the necessary SELECT, INSERT, UPDATE and DELETE statements required to fulfil the story activities.

Research stored procedures and create one or two procedures within the database.

Take the library roles identified within the stories and create database roles for each of these. Assign the appropriate privileges for these roles to the different tables and procedures.

Create test scripts to demonstrate the use of the statements and procedures created within the database.

Exercise 20 – OOP Part C

Objective

To practice creating classes and instantiating objects.

Tasks

Create a list of classes including constructors, attributes and methods for the Library application.

Use good encapsulation to control visibility.

Identify and implement any potential uses of inheritance and polymorphism.

Create a simple command line application to test the objects.

Exercise 21 – OOP Part D

Objective

To practice working with abstract classes, interfaces, and traits and to use namespaces and autoloading.

Tasks

Re-evaluate your design to incorporate the use of interfaces, abstract classes and traits.

Ensure you structure your project files and utilise namespaces to aid code re-use.

Register an autoloader and test its functionality.

Revisit your Library user stories to create wireframes for a web application. Ensure you include both “sunny” and “rainy” day scenarios.

Prioritise these stories from a business perspective, taking into account any technical constraints.

In NetBeans, create a web project and implement your wireframes utilising HTML / CSS / Bootstrap etc as appropriate.

Exercise 22 – PDO Part E

Objective

To practice working with PDO to interact with a database from PHP code.

To implement exception handling in PHP.

Task A

Revisit the SQL scripts you created in Part B and incorporate these into PDO code within a simple command line application to test. Add exception handling code to your application.

Task B

Open your wireframe web project from Part D and create a PHP back-end to implement the above tested PDO statements.