Database Implementation In Android Application

CS 364

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Synopsis

For project 1, I will be implementing a database into a project I have been working on for quite some time. The project itself is an Android application that teaches users how to code java and uses a custom compiler and debugger written for it. The project is light weight and is aimed at individuals in third world countries who have older phones and lack computers. Because of the devices lower specifications, it is crucial for the compiler to do the minimal amount of work on complex operations. The bulk of the overhead comes from compiling submissions for puzzles created to help the user deal with difficult coding problems. (If you have seen the website codingbat.com, this is very similar.) These puzzles require compilation with every submission and any way to reduce the number of compilations is useful. Currently, I have a server developed that takes responses and has precompiled code for seen use cases it will send back to the user. The issue is that it doesn't have a database currently and will lose all entries if it experiences a loss of power or encounters and issue. The database will keep storage of user data, so it can back up and restore users' responses for them if they move to a new device or lose their data. Also using this data, we can see which input has the fastest run time and can use it to replace the current comparison code in the application if there is a significant difference. To recap, the database will optimize a system that currently exists but could use more help.

Functionality

1. Store user information for backups:
    a. Username
    b. Completed Puzzles and code for puzzles
    c. Submission time

2. Store information for attempts:
    a. Username
    b. Submission attempt number
    c. Submission data (If pre-compiler has no errors)
        i. User code
        ii. Compiled code

3. Store information about each puzzle:
    a. Store fields such as time taken to compile
    b. Number of times completed
    c. Success rate

4. Store information about the completed information in learn
    a. Store fields such as time taken to compile
    b. Number of times completed
    c. Success rate

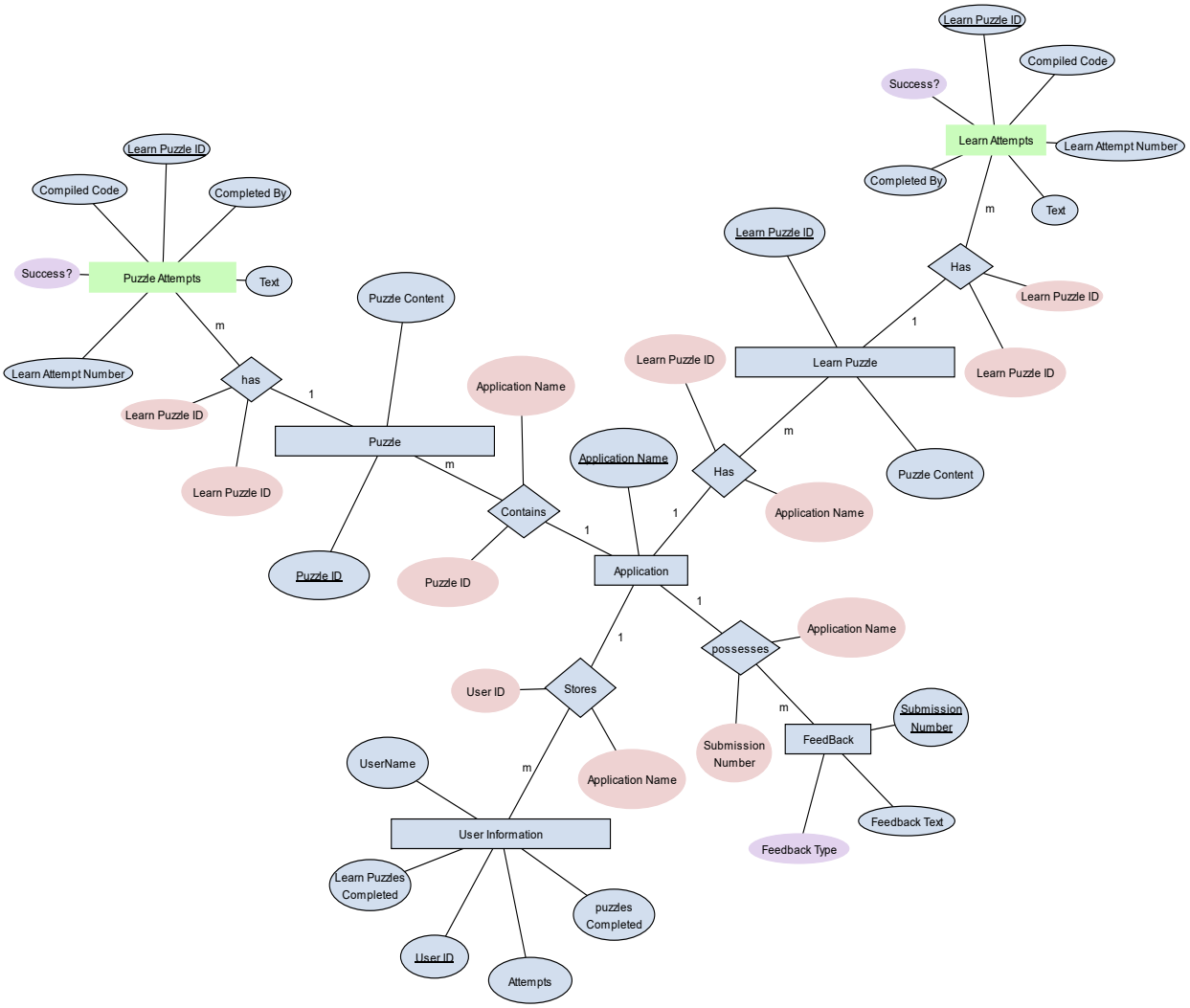
5. Store user feedback information correlating with individual puzzles

6. User will not see direct interface with the database, but will have data sent to and from it while solving puzzles.

7. The application will also periodically pull for faster compilation code based on the submittions that are already in the database.

8. The desktop application will be able to parse through the data and have ability to create orders, groups and counts of puzzles attempts and Learn attempts.

ER Diagram



Notes: The image is a vector drawing so zoom in as much as you would like.

Green Boxes indicate a weak entity type and extend to the relationship as well.

Salmon colored circles indicate a foreign key.

Purple circles indicate set-valued attributes.

Stakeholders

- App Users: The user will only interact with the application and will be submitting data to the database when submitting solutions.
- Application: The application is the users main interface with the database. While it will handle handoffs of submission data the android application will also resolve the fastest solution with the server and update the puzzle library accordingly
- Me: Can look through data and sort it is using a java FX application. Useful for looking at submissions and seeing the uses of the application. Also, ability to view feedback of the FX application.

Technological Requirements

The application I will be using will be a mobile application written in java for Android. The Development will be done in android Studio with the JDBC plugin for android. The database will be using sqlLite on a remote server running a Linux OS. The Project will be managed in a git server also included on the remote server. For the desktop side of the application there will be use of Java FX and JDBC to create a user interface for looking through the data in a visually appealing manner. I have experience in all the elements named and should do fine making them work with one another.