The Capella's Song Database

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Introduction

The Games2Learn project has various games that teach material from early computer science courses. In order to track the progress of the students playing the games I have designed and implemented a database. Then I created GUIs that access the database, and run MySQL queries on the database. Finally I created an XML parser that takes an XML file, retrieves data from the file, and passes the data into the database. The GUIs are important because they allow us to access information in the database through a graphical setting. The parser is important because it will allow Dr. Barnes to quickly and efficiently load data into the database without having to do it by hand.

Background

The Games2Learn lab has created several games over the past few years that teach early computer science concepts. For example last year a student named Taylor Dubois created a game called Bunny Arrayser which taught loops. Bunny Arrayser used loops to change evil bunnies into good bunnies.

Amanda Chaffin was originally working on the design for this database in one of her classes, and when it wasn't finished she decided to have a REU Student work on it during a summer internship. Amanda had a basic design for how she envisioned the database, as well as a design document. Amanda also had prototypes of how the GUIs could look and written ideas on how they should function.

Background Cont'd

The XML standard for the parser was originally designed by Michael Eagle. He created the XML standard so that the Games2Learn games data could all be easily passed into the database through the parser I created this summer so that the data would not have to be passed in by hand.

Research

We began this project by determining the best design for the database. It is important to have a good design for a database because then the data can be more easily accessed. As we were designing I made design prototypes using Microsoft Access. Once the design was complete I implemented the database on the Arena computer in the Game lab using MySQL.

While I was working on the database design I was also working on the GUIs in Microsoft Visual C#. The first GUI I created was the start screen for student which asks if the student is an existing user or if they need to sign up. The second GUI I created was the Existing user login screen, which checks the novell username and password against information in the database in order to log the student in so they can play the Games2Learn games. Next I worked on the report generating GUI which generates a MySQL query based upon which information the user checks that they wish to view. The reports generating GUI will allow Dr. Barnes to run studies on the students whom play the Games2Learn games. The final GUI I worked on is the common queries GUI, which allows the user to pick a pre-made MySQL query and run it. The common queries GUI will make it so that Dr. Barnes does not always have to create a GUI using the reports generator, the more common ones that she wants to run can be done in the common queries GUI.

Research Cont'd

I was also required to make an XML parser. The XML parser takes data from an XML file and puts the data into the database. The Parser was originally going to be made using Java, however not far into the creation of the Parser I discovered that the Arena computer does not have the correct drivers to connect a Java project to the MySQL database. We therefore decided to convert the Parser into Microsoft Visual C#.

Impact

The database will hold valuable information that will help us understand where students have trouble with early computer science concepts. The database will hold important information such as how many times a student plays a Games2Learn game, how long it takes a student to complete a task in a Games2Learn game, demographical information about the students playing the Games2Learn games.

The GUIs used to access the database will allow Professor Barnes to run studies on the data within the database without having to go through the data herself. This will allow her to get more work done faster and with more efficiency than she would if she did have to go through all of the data by hand.

The parser will make it so that Dr. Barnes doesn't have to enter all of the data for the database by hand. It will pass the data into the database quickly and efficiently through reading what is between the XML tags and putting the information into the proper place in the database.

The Activity Data Table in the database holds data about questions answered by the students

Conclusions

Database:
- For each new game a new game data table, mission data table, interaction data table, and activity data table will have to be added to the database.

GUIs:
- Creating the GUIs in Microsoft Visual C# Windows Forms was ideal because it allowed easy access to the database with a graphical interface.
- Separating the Reports Generator into four forms, one for choosing keys, one for choosing fields, one for choosing tables, and one for choosing joins made the GUI more efficient for creating MySQL queries and running them.
- The common queries GUI is useful for getting data quickly and efficiently without having to fill out the report generating GUI forms or having to write the MySQL statement out yourself.
- Hooking the sign-up sheet to the database so that all new students are automatically entered into it made the database more efficient.

Parser:
- The parser will allow Dr. Barnes to enter data into the database without having to do it manually
- Java was not ideal for building the parser
- Using Microsoft Visual Basic C# was ideal for building the parser because it allows you to quickly and efficiently enter data into the database.

Future Work

In the future the reports GUI should be completed. The XML parser should be altered as needed for Dr. Barnes. For all new Games2Learn games there will have to be a new Game Data, Mission Data, Interaction Data and Activity Data table added to the database. The database, GUIs and parser should be tested further. Once they are fully ready for it, studies should also be run on the GUIs, the parser and the database.