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Perfecting Math Skills

We want to make digital flashcards to reinforce math skills for kindergarten to second grade students. The purpose of the program is not to teach math skills; we are assuming the user knows some math. Kids are attached to electronics these days and this is a way to allow them to use their electronics to learn. We will do this by creating basic math problems (addition or subtraction), and a text box for answers. We will use checkboxes to select a category so that multiple categories can be combined to work in. If the answer is wrong, they will get two more attempts before being given the correct answer. We know when we are done with a problem when all the postconditions are met. As in, the correct answer is calculated and the appropriate pop up is shown to the user as right or wrong. This program will have several challenges with incorporating sound files, picture or animation file as well as a file to hold high score information. Having the timer pause when the congratulations box pops up will also be a challenge.

In order to make the problems, we will create two random integers. Solve the problem and store the answer in a variable to check against the user's answer. Because multiplication problem solutions can easily surpass 100 (we believe most of our clients may not be able to count beyond 100), we will solve the problem inside the program first and if the solution is greater than 100 it will keep the lower of the two integers and pull another integer until the solution is less than 100. Have a bound set to keep subtraction solutions positive. We do this by checking the right hand side and making sure it is less than the left hand side. If the answer is correct the program will proceed to the next problem by creating two more random integers. The user will get three attempts at a problem before the correct answer is given. If the problem is successfully answered then the user will get a pop up with an animation and sound that congratulates them for solving the problem. Based off of the number of attempts the animation and sound will be something different. The program will run for 2 minutes and generate problems and count correct solutions to be considered for a high-score list in each category or combination of categories. The scoreboard will be saved to a file so that high scores are not lost when the program terminates.

Proposed Audience:

Kindergarten - 2nd Grade Students

Basic Contract:

Preconditions:

- GUI to select addition or subtraction
- Gets two random integers 0 - 25 except multiplication
- Multiplication gets integers 0 - 12.
- Program calculates the two numbers' sum, difference, or product and stores the value for checking later.

Postconditions:

- Check for correct answer
- Let the user know if they got it right or not.

Stretch Goals:

- Adding Divisibility
- Adding Multiplication (COMPLETED)
- Adding Order of Operations

Use Case 1:

- Selects Addition
- Play again (with current settings) or return to menu.

Use Case 2:

- Selects Subtraction
- Play again (with current settings) or return to menu.

Use Case 3:

- Selects Addition
- Play again (with current settings) or return to menu.

Use Case 4:

- Selects Subtraction
- Play again (with current settings) or return to menu.

Functional:

- Ethical Requirement: Don’t lead users astray.
- Authentication: Scoreboard with list of initials.
- Admin Functions: Have a hidden textbox to clear scoreboard.
- Ability to Modify: Clear scoreboard.

Non-Functional:

- Reliability: Have the correct answers.
- Availability: Everyone and anyone can use it.
- Usability: Simple interface to understand.

How to Use:

1. Launch executable directly or from Visual Studio
2. Select mode
3. Solve arithmetic problems