Programming Logic - Beginning

152-101

Math Enhanced Program

35 points

General Program Requirements

Your friend would like you to enhance a Math application for her students to use on their computers. The application gives her students assistance on basic math skills (addition, subtraction, multiplication, division, integer division and modulus). She wants you to develop an application that will generate two numbers and allow the user to select the math operation they want to use. Your program will display the equation with the proper operator. The user will enter the result and check the answer.

Provide the user the ability to create a new problem, which will generate 2 new numbers. Give the user the choices of math operations to complete the problem. Allow the user the ability to check their entered answer against your calculated answer. Display a message letting the user know if the answer is correct or not. Provide a means for the user to give up on a problem and show them the correct answer.

Since we will be working with a range of skill levels, provide a means to allow the user to enter the largest number that should be used in the equations. Use this number to generate the two random numbers. At form load or at design time, set the initial maximum value to 10.

For this application, the user can only select one of the math operations: addition, subtraction, multiplication, division, integer division and modulus. The integer division and modulus will be optional choices – only display these choices if the user indicates they want to see these options. If they do not select this option, do not display these additional choices. If they do select these options, display these choices as part of the main add, subtract, multiply and divide choices.

We are working with decision constructs. Pick the appropriate controls based on the description above. Your logic will include the appropriate decision control statements as well.

Program Design

- I encourage you to develop a TOE chart and screen layout before tackling the program design, but you are not required to submit them.
- Provide a flowchart (not hand drawn) for each procedure in the main form
- Provide pseudocode (typed) for each procedure in the main form

Detailed Program Requirements

Use group boxes (appropriately labeled) to group similar data.

Provide a button to generate and display two numbers. Display those numbers immediately so the user can determine which operation they want to use. Determine if any math operations need to be hidden. Since division by zero is not possible – your program should prevent the user from selecting division, integer division or modulus if the second number is zero.

When the user selects the operation, display the correct equation on the screen and give the user the ability to enter the answer.

Provide a button to check their entered answer. Let the user know if the answer is correct or incorrect. Provide another button that allows the user to give up. This button should display the correct answer to the problem.

Make the check answer button the form's Accept Button. Make the new numbers button the form's Cancel button.

All equations should be processed as integers EXCEPT the results of division (however, not integer division or modulus). When you calculate the correct answer for a division problem, round the answer to one decimal place. Format the answer of the division equation to display one decimal place if the user gives up.

Insert an appropriate piece of clip art on the form. Create a professional appearance for the form.

If the user enters invalid numeric data, display an appropriate error message.

Include a Welcome Screen for this project. You may use your Unit 3 Welcome screen, but customize the welcome screen for this program. Display the Welcome Screen for an appropriate number of seconds before launching the main program automatically. Provide buttons to exit the program without launching the main form and another button to start the program immediately, without waiting for the timer.

Follow the class programming standards, incorporating all standards except those designated for Unit 6 or Programming Logic - Intermediate.

Challenge Points - 3 points

Research on the progress bar control. Add a check box to the form to display the progress bar as a visible timer. When the user selects the **operation** for the problem, activate a timer that keeps track of how long it takes the user to answer the problem (click the check answer). If the user does not answer the problem in a set amount of time (such as 30 seconds), let the user know the time is up.