

Homework #2 Introduction to Computing

Due: Sept. 19, 2009 (Saturday at 11:59 PM)

For homework #2 you are to write a menu-driven Math Tutor program for small children. Your program's interaction should look something like: (Student input shown in **bold**.)

```

Math Tutor Menu

1. First Grade
2. Second Grade
3. Third Grade

Enter your grade (1-3): 3<Enter>

Problem:  395
         + 137
         ----
Answer:   422<Enter>

Sorry, your answer is incorrect.  The correct answer is 532.

```

Your program should randomly select the difficulty of the the problem according to the following table.

Grade Level	Range of the Numbers
First Grade	0 to 9
Second Grade	10 to 99
Third Grade	100 to 999

Additional things that your program should do:

- name your project MathTutor so it generates a folder containing the project with these name,
- alignment the numbers to be added,
- check for a valid menu selection. Anything other than '1', '2', or '3' should print an appropriate error message and quit the program.

Extra credit features: (You don't need to do both to get partial extra credit)

- Randomly pick the arithmetic operation based on the grade level. First grade should only be addition. Second grade can be addition or subtraction, but if subtraction is to be performed the "upper" number should be larger than the "lower" number. Third grade should allow addition, subtraction, and multiplication. Third grade subtraction should also use numbers such that the "upper" number is larger than the "lower" number.
- Ask the user for their name. In a file whose name is the user's name, keep track of the number of times they have run the program (i.e., # of problems they have tried), and the number of correct answers they have given. The first time that they run the program no file will exist with their user name, so your program will get a file open error (see section 4.16 to see how to test for a file open error). If no file exists, set the number of times that they have run the program to 0 and number of correct answers to 0.

When you write your program, be sure to use general conventions of good style:

- use meaningful variable names with good style, i.e., use CamelCase (or use underscores) (I like to declare them one per line with a following comment if necessary)
- use meaningful named constants (e.g, PI, STATE_SALES_TAX) where appropriate with good style (ALL_CAPS_AND_UNDERSCORES). Put your global constants where they can be found and changed easily in future versions of your program, e.g, after your initial comments describing the program and before your main function definition.
- use comments at the start of the program, before each function, and before any especially difficult section of code to understand (I like to label the closing set bracket, '}', with some indication of what's being closed)
- place the `main` function near the top of the program with user-defined functions below it
- use *white space* (spaces, indentation, blank lines) to make you program more readable by:
 - aligning the opening set/curly brace, '{', with the corresponding closing '}' one (I like to put the '{' on the same line with the programming construct (e.g., main function definition) with the closing '}' aligned with the start of the construct)
 - indent all the lines inside a set of of braces
 - you blank lines to separate logical units of the code, e.g., between variable declarations and executable statements

Submit your homework electronically at http://math-cs.cns.uni.edu/~schafer/submit/which_course.cgi

The steps for the homework submission system are:

1. Zip your project folder MathTutor by right-clicking on it and selecting Send To | Compressed Zipped Folder which will create a file called MathTutor.zip. This MathTutor.zip file is what you want to submit via the on-line submission system.
2. Log on to the submission system at: http://www.cs.uni.edu/~schafer/submit/which_course.cgi
Use the same AD-ITS User name and password you use to log on the lab computers.
3. Select the course and section number of "810:051, Intro to Computer, Fienup". Click the "Continue" button.
4. Select the homework that you wish to submit: "HW 2 Math Tutor". Click the "Continue" button.
5. Specify how many extra files you want to submit. Just leave it at 0. Click the "Continue" button.
6. Upload the MathTutor.zip file containing your project by Browsing and selecting MathTutor.zip. Click the "Continue" button.
7. The next page reports on the status of the upload(s). You can always continue to upload a newer version until the deadline. A newer file of the same name will replacing the older one.