**AP Computer Science – Algebra Test Project**

Description – You will build a program called AlgebraTest. The program will allow the user to enter their name and number of questions for their test. The program will then randomly generate algebra questions, which the user will answer. Each question will be graded with the correct answer being provided if the user gets it wrong. At the completion of the test, the results are outputted.

**Question Format** – The questions asked will required 3 randomly generated numbers and will be in the form:

7x + 3 = 24 or 6x - 5 = 85

The first random number is in the range from 2 to 9 and will be placed in front of the “x”. (coefficient) (Above 7 and 6)

The second random number will be in the range -9 to + 9 and will appear after the first number. (Above, + 3 and -5)

The third random number will be in the range 10 to 99 and will appear after the equals sign. (24 and 85 above)

However, the answer to the question asked **MUST** be an integer (whole number). A while loop must be used here, so if the result of the random equation is not an integer, the while loop continues and new numbers are generated and tested. The process of testing for a valid algebraic expression will likely use the mod (%) operator.

**Possible Variables Used**

String name – Holds the user’s name (provided by user)

int numQuestions – Holds the number of test questions (provided by user)

int coefficient – Holds the coefficient (number before X in above equation)

int num1 – Holds the number added (or subtracted) from random1.

int num2 – Holds the number to the right of the equal sign.

int numRight – Holds the number of correct answers by the user.

int answer – Holds the answer for the current question being asked

int userAnswer – Holds the user’s answer to the current question.

double percentRight – Holds the user’s correct answer percentage on the test.

char operator – Holds whether to output an addition or subtraction operator is displayed in the formula.

boolean legit – true if randomly generated equation has an integer answer, otherwise false.

**Program Pseudocode**

<Get user name and number of test questions>

For Loop (Loops as many times as there are questions)

 While Loop (Loops until a legitimate equation is calculated)

 <Generate random equation and answer>

 End While

 <Output the question>

 <Get user’s answer>

 <Evaluate user’s answer vs. actual answer>

End For Loop

<Output User’s Test Results>

**Details**

1. Make sure the Test Percentage is rounded to 3 decimal places.
2. Use the grading scale from handbook for letter grade percentages.
3. All output should be formatted and lined up as seen in sample output.



Sample output:

**Algebra Project Rubric**

|  |  |  |
| --- | --- | --- |
| **Objective** | **Points Possible** | **Points Earned** |
| Is the user prompted for their name? | 1 |  |
| Is the user’s name used when asked for the number of test questions? | 2 |  |
| Does the question number appear with the equation? | 2 |  |
| Are only questions with integer answers created? | 20 |  |
| Does the program ask the correct number of questions? | 5 |  |
| Are questions outputted properly with proper spacing? Ex: 3x – 5 = 20 | 10 |  |
| After each question is outputted, is the user prompted for an answer? | 3 |  |
| Does the program correctly grade the user’s answer? | 5 |  |
| Does the program output the correct answer, if the user gets it wrong? | 5 |  |
| Does the program tell the user when the test is finished? | 1 |  |
| Does the program output the user’s name as part of the final output? | 2 |  |
| Does the program output the Results correctly? (matching what is shown above) | 4 |  |
| Does the program output the Test Percent correctly? (must show 3 decimal places and % sign) | 5 |  |
| Does the program output the Letter Grade correctly? | 7 |  |
| Do all four lines of output line up perfectly, regardless of the results? | 3 |  |
| **Totals** | **75** |  |

Directions: Have a student in the class run your Algebra project and score it based on the rubric below. They will sign their name in the box below the rubric when they are done. You will also print out a copy of your code and attach it to this rubric.