Sarah Wood

Tools for Software Development

Agile and Clean Code Deliverable #2

My Iteration Planning Meeting

( I recruited some family members to be imaginary clients. They tested the executable, and provided feedback.)

*From Deliverable 1:*

*If A ÷ B, then they need to be evenly divisible (%=0). That is where it sits now, but I still get problems that are unlikely in elementary school, like 75 ÷ 5.*

The client is OK with division as it stands. They thought it was an appropriate challenge for the “hard” level.

They asked me to adjust difficulty on the Easy addition problems. They felt it should be an introductory level, with little or no carrying.

They liked that answers weren’t WRONG, just mistakes. At this level, there is a lot of anxiety with math, especially for students that fall behind or have difficulty.

The client had some feedback that I did not expect. They liked that the problems stay on the screen, and that you can scroll the console window to see which problems were right/wrong. The students could write down the problems they missed, and the actual writing would help them learn.

When asked about the possibliity of an output file, they felt it wasn’t necessary, and might make the students more nervous. As it is, it’s just practice for its own sake.

When asked about a better gimmick, they felt it would be a distraction. They like it as it is: simple and to-the-point.

Final Iteration:

I cleaned up the code a bit, and polished the output formatting on the screen. I adjusted the Easy addition algorithm.

Final thoughts:

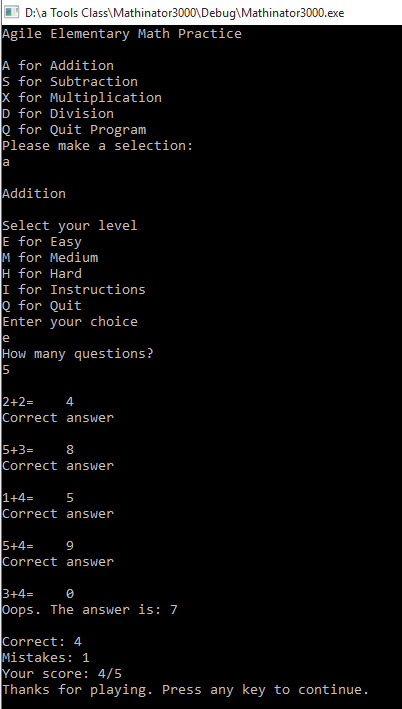
I overestimated the difficulty a bit. By generating random problems at runtime, I didn’t need to build or access “banks” of established problems.

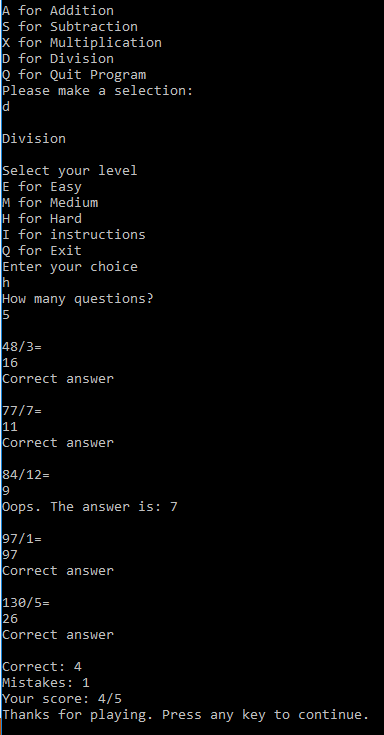
I was gearing up to make the program more “showy”, but the client liked the simplicity of the stripped-down version.

Client likes that I came in under budget. Client likes the simplicity, and innovative thinking.

Overall, this was a big win for OWATCCorp, Agile Division.

Screen Caps





Source Code

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Math Inator 3000

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Sarah Wood

Tools for Software Development

OWATC Spring 2016

Math teaching program for Agile Elementary

four basic arithmetic operators

practice problems

flexible difficulty

\*/

#include <iostream>

#include <cstdlib>

#include <time.h> //for Randomizer 3000

//no custom namespace required

using namespace std;

void main()

{

//init console

cout << "Agile Elementary Math Practice" << endl << endl;

char userEntry;

MAIN:

cout << "A for Addition" << endl;

cout << "S for Subtraction" << endl;

cout << "X for Multiplication" << endl;

cout << "D for Division" << endl;

cout << "Q for Quit Program" << endl;

cout << "Please make a selection:" << endl;

cin >> userEntry;

switch (userEntry)

{

case 'A':

case 'a':

{

A:

cout <<endl<< "Addition" << endl << endl;

char addLevelChoice;

cout << "Select your level" << endl;

cout << "E for Easy" << endl;

cout << "M for Medium" << endl;

cout << "H for Hard" << endl;

cout << "I for Instructions" << endl;

cout << "Q for Quit" << endl;

cout << "Enter your choice" << endl;

cin >> addLevelChoice;

switch (addLevelChoice)

{

case 'E':

case 'e':

{

unsigned int a, b, userResponse, correctAnswer, correctCounter = 0, mistakeCounter = 0, numOfProblems = 1, problemCounter = 0;

cout << "How many questions?" << endl;

cin >> numOfProblems;

for (int i = 0; i < numOfProblems; i++)

{

srand(time(NULL)); //init Randomizer 3000

a = rand() % 5 + 1; //random number

b = rand() % 4 + 1; //random number

problemCounter++;

cout << '\n' << a << "+" << b << "= " << '\t';

cin >> userResponse;

correctAnswer = a + b;

if (userResponse == correctAnswer)

{

cout << "Correct answer" << endl;

correctCounter++;

}

else

{

cout << "Oops. The answer is: " << correctAnswer << endl;

mistakeCounter++;

}

}

cout << endl << "Correct: " << correctCounter << endl;

cout << "Mistakes: " << mistakeCounter << endl;

cout << "Your score: " << correctCounter << "/" << numOfProblems << endl;

cout << "Thanks for playing. Press any key to continue." << endl;

cin.ignore();

cin.get();

goto MAIN;

}

case 'M':

case 'm':

{

unsigned int a, b, userResponse, correctAnswer, correctCounter = 0, mistakeCounter = 0, numOfProblems, problemCounter = 0;

cout << "How many questions?" << endl;

cin >> numOfProblems;

for (int i = 0; i < numOfProblems;i++)

{

srand(time(NULL));//init Randomizer 3000

a = rand() % 25 + 1; //random number

b = rand() % 20 + 1; //random number

problemCounter++;

cout << '\n' << a << "+" << b << "= " << '\t';

cin >> userResponse;

correctAnswer = a + b;

if (userResponse == correctAnswer)

{

cout << "Correct answer" << endl;

correctCounter++;

}

else

{

cout << "Oops. The answer is: " << correctAnswer << endl;

mistakeCounter++;

}

}

cout << endl << "Correct: " << correctCounter << endl;

cout << "Mistakes: " << mistakeCounter << endl;

cout << "Your score: " << correctCounter << "/" << numOfProblems << endl;

cout << "Thanks for playing. Press any key to continue." << endl;

cin.ignore();

cin.get();

goto MAIN;

}

case 'H':

case 'h':

{

unsigned int a, b, userResponse, correctAnswer, correctCounter = 0, mistakeCounter = 0, numOfProblems, problemCounter = 0;

cout << "How many questions?" << endl;

cin >> numOfProblems;

for (int i = 0;i < numOfProblems;i++)

{

srand(time(NULL));//init Randomizer 3000

a = rand() % 50 + 1; //random number

b = rand() % 50 + 1; //random number

problemCounter++;

cout << '\n' << a << "+" << b << "= " << '\t';

cin >> userResponse;

correctAnswer = a + b;

if (userResponse == correctAnswer)

{

cout << "Correct answer" << endl;

correctCounter++;

}

else

{

cout << "Oops. The answer is: " << correctAnswer << endl;

mistakeCounter++;

}

}

cout << endl << "Correct: " << correctCounter << endl;

cout << "Mistakes: " << mistakeCounter << endl;

cout << "Your score: " << correctCounter << "/" << numOfProblems << endl;

cout << "Thanks for playing. Press any key to continue." << endl;

cin.ignore();

cin.get();

goto MAIN;

}

case'I':

case 'i':

{

cout << endl << "Instructions" << endl<<endl;

cout << "Select a level: Easy, Medium, or Hard." << endl;

cout << "Enter the number of problems you'd like to do." << endl << endl;

cout << "The program will display a math problem." << endl;

cout << "Type in your best answer and press ENTER." << endl;

cout << "If you make a mistake, we will give you the right answer." << endl << endl;

cout << "When you've completed your problems, we" << endl;

cout << "will display the number of problems with CORRECT answers." << endl << endl;

goto A;

}

case'Q':

case 'q':

{

goto MAIN;

}

}//close level choice

break;

}//close addition

case 'S':

case 's':

{ S:

cout << endl<<"Subtraction" << endl << endl;

char subtractLevelChoice;

cout << "Select your level" << endl;

cout << "E for Easy" << endl;

cout << "M for Medium" << endl;

cout << "H for Hard" << endl;

cout << "I for Instructions" << endl;

cout << "Q for Exit" << endl;

cout << "Enter your choice" << endl;

cin >> subtractLevelChoice;

switch (subtractLevelChoice)

{

case 'E':

case 'e':

{

unsigned int a, b, userResponse, correctAnswer, correctCounter = 0, mistakeCounter = 0, numOfProblems, problemCounter = 0;

cout << "How many questions?" << endl;

cin >> numOfProblems;

for (int i = 0;i < numOfProblems;i++)

{

do

{

srand(time(NULL));//init Randomizer 3000

a = rand() % 10 + 2; //random number

b = rand() % 10 + 1; //random number

} while (b > a);

problemCounter++;

cout << '\n' << a << "-" << b << "= " << endl;

cin >> userResponse;

correctAnswer = a - b;

if (userResponse == correctAnswer)

{

cout << "Correct answer" << endl;

correctCounter++;

}

else

{

cout << "Oops. The answer is: " << correctAnswer << endl;

mistakeCounter++;

}

}

cout << endl << "Correct: " << correctCounter << endl;

cout << "Mistakes: " << mistakeCounter << endl;

cout << "Your score: " << correctCounter << "/" << numOfProblems << endl;

cout << "Thanks for playing. Press any key to continue." << endl;

cin.ignore();

cin.get();

goto MAIN;

}

case 'M':

case 'm':

{

unsigned int a, b, userResponse, correctAnswer, correctCounter = 0, mistakeCounter = 0, numOfProblems, problemCounter = 0;

cout << "How many questions?" << endl;

cin >> numOfProblems;

for (int i = 0;i < numOfProblems;i++)

{

do

{

srand(time(NULL));//init Randomizer 3000

a = rand() % 20 + 2; //random number

b = rand() % 20 + 1; //random number

} while (b > a);

problemCounter++;

cout << '\n' << a << "-" << b << "= " << endl;

cin >> userResponse;

correctAnswer = a - b;

if (userResponse == correctAnswer)

{

cout << "Correct answer" << endl;

correctCounter++;

}

else

{

cout << "Oops. The answer is: " << correctAnswer << endl;

mistakeCounter++;

}

}

cout << endl << "Correct: " << correctCounter << endl;

cout << "Mistakes: " << mistakeCounter << endl;

cout << "Your score: " << correctCounter << "/" << numOfProblems << endl;

cout << "Thanks for playing. Press any key to continue." << endl;

cin.ignore();

cin.get();

goto MAIN;

}

case 'H':

case 'h':

{

unsigned int a, b, userResponse, correctAnswer, correctCounter = 0, mistakeCounter = 0, numOfProblems, problemCounter = 0;

cout << "How many questions?" << endl;

cin >> numOfProblems;

for (int i = 0;i < numOfProblems;i++)

{

do

{

srand(time(NULL));//init Randomizer 3000

a = rand() % 50 + 2; //random number

b = rand() % 50 + 1; //random number

} while (b > a);

problemCounter++;

cout << '\n' << a << "-" << b << "= " << endl;

cin >> userResponse;

correctAnswer = a - b;

if (userResponse == correctAnswer)

{

cout << "Correct answer" << endl;

correctCounter++;

}

else

{

cout << "Oops. The answer is: " << correctAnswer << endl;

mistakeCounter++;

}

}

cout << endl << "Correct: " << correctCounter << endl;

cout << "Mistakes: " << mistakeCounter << endl;

cout << "Your score: " << correctCounter << "/" << numOfProblems << endl;

cout << "Thanks for playing. Press any key to continue." << endl;

cin.ignore();

cin.get();

goto MAIN;

}

case'I':

case 'i':

{

cout << endl << "Instructions" << endl << endl;

cout << "Select a level: Easy, Medium, or Hard." << endl;

cout << "Enter the number of problems you'd like to do." << endl << endl;

cout << "The program will display a math problem." << endl;

cout << "Type in your best answer and press ENTER." << endl;

cout << "If you make a mistake, we will give you the right answer." << endl << endl;

cout << "When you've completed your problems, we" << endl;

cout << "will display the number of problems with CORRECT answers." << endl << endl;

goto S;

}

case 'Q':

case 'q':

{

goto MAIN;

}

}//close level choice

}//close subtraction

case 'X':

case 'x':

{X:

cout << endl<< "Multiplication" << endl << endl;

char multLevelChoice;

cout << "Select your level" << endl;

cout << "E for Easy" << endl;

cout << "M for Medium" << endl;

cout << "H for Hard" << endl;

cout << "I for instructions" << endl;

cout << "Q for Exit" << endl;

cout << "Enter your choice" << endl;

cin >> multLevelChoice;

switch (multLevelChoice)

{

case 'E':

case 'e':

{

unsigned int a, b, userResponse, correctAnswer, correctCounter = 0, mistakeCounter = 0, numOfProblems, problemCounter = 0;

cout << "How many questions?" << endl;

cin >> numOfProblems;

for (int i = 0;i < numOfProblems;i++)

{

srand(time(NULL));//init Randomizer 3000

a = rand() % 6 + 1; //random number

b = rand() % 6 + 1; //random number

problemCounter++;

cout << '\n' << a << "X" << b << "= " << endl;

cin >> userResponse;

correctAnswer = a \* b;

if (userResponse == correctAnswer)

{

cout << "Correct answer" << endl;

correctCounter++;

}

else

{

cout << "Oops. The answer is: " << correctAnswer << endl;

mistakeCounter++;

}

}

cout << endl << "Correct: " << correctCounter << endl;

cout << "Mistakes: " << mistakeCounter << endl;

cout << "Your score: " << correctCounter << "/" << numOfProblems << endl;

cout << "Thanks for playing. Press any key to continue." << endl;

cin.ignore();

cin.get();

goto MAIN;

}

case 'M':

case 'm':

{

unsigned int a, b, userResponse, correctAnswer, correctCounter = 0, mistakeCounter = 0, numOfProblems, problemCounter = 0;

cout << "How many questions?" << endl;

cin >> numOfProblems;

for (int i = 0;i < numOfProblems;i++)

{

srand(time(NULL));//init Randomizer 3000

a = rand() % 9 + 1; //random number

b = rand() % 10 + 1; //random number

problemCounter++;

cout << '\n' << a << "X" << b << "= " << endl;

cin >> userResponse;

correctAnswer = a \* b;

if (userResponse == correctAnswer)

{

cout << "Correct answer" << endl;

correctCounter++;

}

else

{

cout << "Oops. The answer is: " << correctAnswer << endl;

mistakeCounter++;

}

}

cout << endl << "Correct: " << correctCounter << endl;

cout << "Mistakes: " << mistakeCounter << endl;

cout << "Your score: " << correctCounter << "/" << numOfProblems << endl;

cout << "Thanks for playing. Press any key to continue." << endl;

cin.ignore();

cin.get();

goto MAIN;

}

case 'H':

case 'h':

{

unsigned int a, b, userResponse, correctAnswer, correctCounter = 0, mistakeCounter = 0, numOfProblems, problemCounter = 0;

cout << "How many questions?" << endl;

cin >> numOfProblems;

for (int i = 0;i < numOfProblems;i++)

{

srand(time(NULL));//init Randomizer 3000

a = rand() % 12 + 1; //random number

b = rand() % 12 + 1; //random number

problemCounter++;

cout << '\n' << a << "X" << b << "= " << endl;

cin >> userResponse;

correctAnswer = a \* b;

if (userResponse == correctAnswer)

{

cout << "Correct answer" << endl;

correctCounter++;

}

else

{

cout << "Oops. The answer is: " << correctAnswer << endl;

mistakeCounter++;

}

}

cout << endl << "Correct: " << correctCounter << endl;

cout << "Mistakes: " << mistakeCounter << endl;

cout << "Your score: " << correctCounter << "/" << numOfProblems << endl;

cout << "Thanks for playing. Press any key to continue." << endl;

cin.ignore();

cin.get();

goto MAIN;

}

case'I':

case 'i':

{

cout << endl << "Instructions" << endl << endl;

cout << "Select a level: Easy, Medium, or Hard." << endl;

cout << "Enter the number of problems you'd like to do." << endl << endl;

cout << "The program will display a math problem." << endl;

cout << "Type in your best answer and press ENTER." << endl;

cout << "If you make a mistake, we will give you the right answer." << endl << endl;

cout << "When you've completed your problems, we" << endl;

cout << "will display the number of problems with CORRECT answers." << endl << endl;

goto X;

}

case 'Q':

case 'q':

{

goto MAIN;

}

}//close mult level choice

}//close Mult

case 'D':

case 'd':

{D:

char divLevelChoice;

cout <<endl<< "Division" << endl << endl;

cout << "Select your level" << endl;

cout << "E for Easy" << endl;

cout << "M for Medium" << endl;

cout << "H for Hard" << endl;

cout << "I for instructions" << endl;

cout << "Q for Exit" << endl;

cout << "Enter your choice" << endl;

cin >> divLevelChoice;

switch (divLevelChoice)

{

case 'E':

case 'e':

{

unsigned int a, b, userResponse = 0, correctAnswer, correctCounter = 0, mistakeCounter = 0, numOfProblems, problemCounter = 0;

cout << "How many questions?" << endl;

cin >> numOfProblems;

for (int i = 0;i < numOfProblems;i++)

{

do {

srand(time(NULL));//init Randomizer 3000

a = rand() % 12 + 1; //random number

b = rand() % 6 + 1; //random number

} while ((a%b) != 0);

problemCounter++;

cout << '\n' << a << "/" << b << "= " << endl;

cin >> userResponse;

correctAnswer = a / b;

if (userResponse == correctAnswer)

{

cout << "Correct answer" << endl;

correctCounter++;

}

else

{

cout << "Oops. The answer is: " << correctAnswer << endl;

mistakeCounter++;

}

}

cout << endl << "Correct: " << correctCounter << endl;

cout << "Mistakes: " << mistakeCounter << endl;

cout << "Your score: " << correctCounter << "/" << numOfProblems << endl;

cout << "Thanks for playing. Press any key to continue." << endl;

cin.ignore();

cin.get();

goto MAIN;

}

case 'M':

case 'm':

{

unsigned int a, b, userResponse = 0, correctAnswer, correctCounter = 0, mistakeCounter = 0, numOfProblems, problemCounter = 0;

cout << "How many questions?" << endl;

cin >> numOfProblems;

for (int i = 0;i < numOfProblems;i++)

{

do {

srand(time(NULL));//init Randomizer 3000

a = rand() % 50 + 1; //random number

b = rand() % 10 + 1; //random number

} while ((a%b) != 0);

problemCounter++;

cout << '\n' << a << "/" << b << "= " << endl;

cin >> userResponse;

correctAnswer = a / b;

if (userResponse == correctAnswer)

{

cout << "Correct answer" << endl;

correctCounter++;

}

else

{

cout << "Oops. The answer is: " << correctAnswer << endl;

mistakeCounter++;

}

}

cout << endl << "Correct: " << correctCounter << endl;

cout << "Mistakes: " << mistakeCounter << endl;

cout << "Your score: " << correctCounter << "/" << numOfProblems << endl;

cout << "Thanks for playing. Press any key to continue." << endl;

cin.ignore();

cin.get();

goto MAIN;

}

case 'H':

case 'h':

{

unsigned int a, b, userResponse = 0, correctAnswer, correctCounter = 0, mistakeCounter = 0, numOfProblems, problemCounter = 0;

cout << "How many questions?" << endl;

cin >> numOfProblems;

for (int i = 0;i < numOfProblems;i++)

{

do {

srand(time(NULL));//init Randomizer 3000

a = rand() % 144 + 1; //random number

b = rand() % 12 + 1; //random number

} while ((a%b) != 0);

problemCounter++;

cout << '\n' << a << "/" << b << "= " << endl;

cin >> userResponse;

correctAnswer = a / b;

if (userResponse == correctAnswer)

{

cout << "Correct answer" << endl;

correctCounter++;

}

else

{

cout << "Oops. The answer is: " << correctAnswer << endl;

mistakeCounter++;

}

}

cout << endl << "Correct: " << correctCounter << endl;

cout << "Mistakes: " << mistakeCounter << endl;

cout << "Your score: " << correctCounter << "/" << numOfProblems << endl;

cout << "Thanks for playing. Press any key to continue." << endl;

cin.ignore();

cin.get();

goto MAIN;

}

case'I':

case 'i':

{

cout << endl << "Instructions" << endl << endl;

cout << "Select a level: Easy, Medium, or Hard." << endl;

cout << "Enter the number of problems you'd like to do." << endl << endl;

cout << "The program will display a math problem." << endl;

cout << "Type in your best answer and press ENTER." << endl;

cout << "If you make a mistake, we will give you the right answer." << endl << endl;

cout << "When you've completed your problems, we" << endl;

cout << "will display the number of problems with CORRECT answers." << endl << endl;

goto D;

}

case 'Q':

case 'q':

{

goto MAIN;

}

}//close Div level

}//close Div

case 'Q':

case 'q':

{

cout << endl << "Thank you for using the Mathinator 3000." << endl;

cout << "Please press ENTER to close program." << endl;

cin.ignore(256, '\n'); //ignore up to 256 characters, stop ignoring at any instance of '\n'

cin.get();

}

}

}