

## **COP 3855 – Web Systems Development**

### **C# Individual Programming Project**

Write a program that will help an elementary student learn basic math skills such as addition, subtraction, and multiplication. The program quizzes the student to perform math operations for two numbers. Two numbers used in the quiz question should be generated randomly. C# has a Random Class that can be used for generating a random number. You can find more information about Random Class at

<https://docs.microsoft.com/en-us/dotnet/api/system.random?view=netframework-4.8>.

The program, first, should get some basic information about the student, such as name and grade level. The grade levels the program supports are K1 to 5. Create a Class object to maintain student information. You may want to consider maintaining other relevant information about the student performance with the quiz within the class object such as number of questions asked and the number of correct answers. See figures 1 and 2 in relevance to obtain basic student information.

After obtaining student information, the program should display math testing options to the user. See figures 3 and 4 in regards to the display of testing menu options.

Depending upon the menu option selected, appropriate math operation quiz questions should be displayed. The program should indicate to the user whether the answer provided is correct or incorrect. The program should keep track of number math operator specific questions asked and number answers correctly provided. See figures 5 to 12 in regards to displaying math operation quiz questions and user feedback displays.

The program should iteratively quiz the student on the selected testing menu option until the user provides a key c response. If the user enters a key m response, the testing menu option should be redisplayed to the user, without breaking the iteration. See figures 13 to 15.

In case the user chooses “Surprise me” option during testing menu display, then the program should randomly select math operator to quiz (addition, subtraction, or multiplication) the student for every iteration of the test.

When the student user chooses to end the test, the program should display basic student information along with the number of questions asked and answered correctly for each math operator. See figure 16 for display details.

In this project, you are expected to apply C# programming capability such as creating classes, methods, obtaining user inputs through the console, conditional statements, iterative loops, and working with a variety of data types among other programming constructs.

Submit the visual studio solution set to the Canvas.

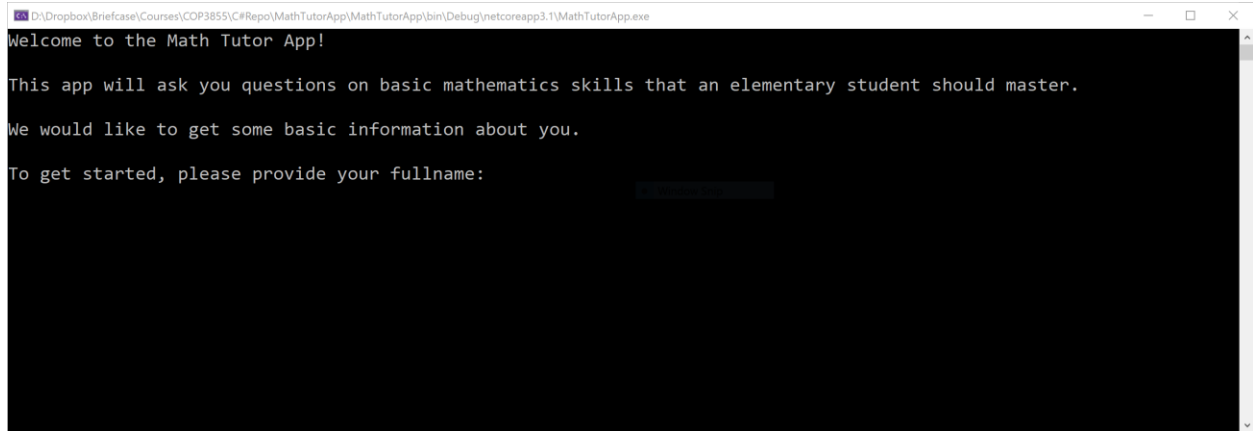


Figure 1. Welcome to the program.

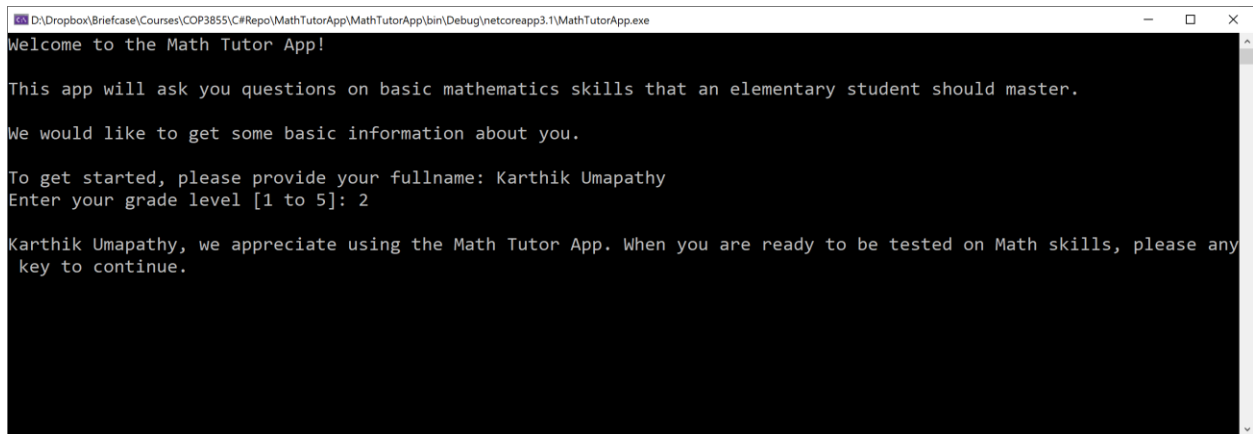


Figure 2: Obtaining basic student information.

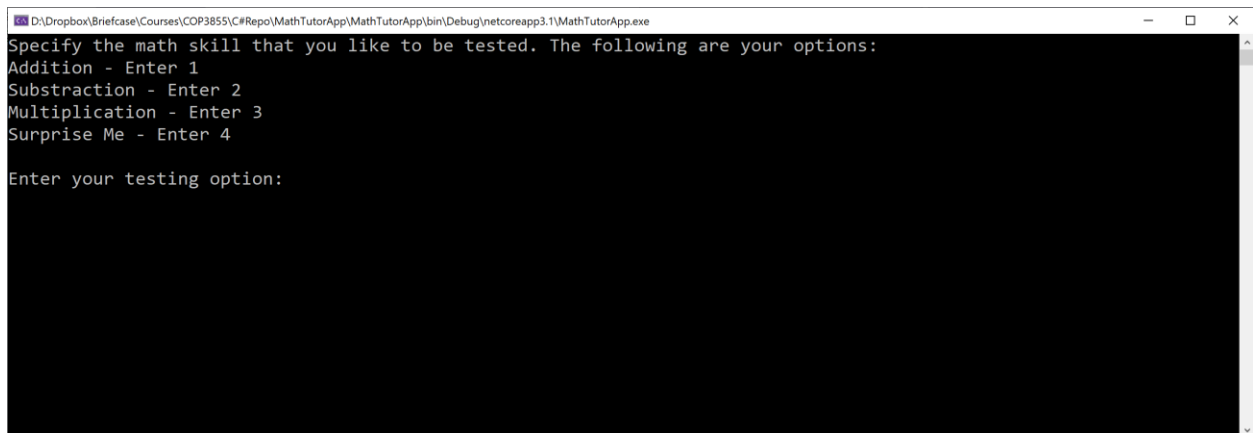
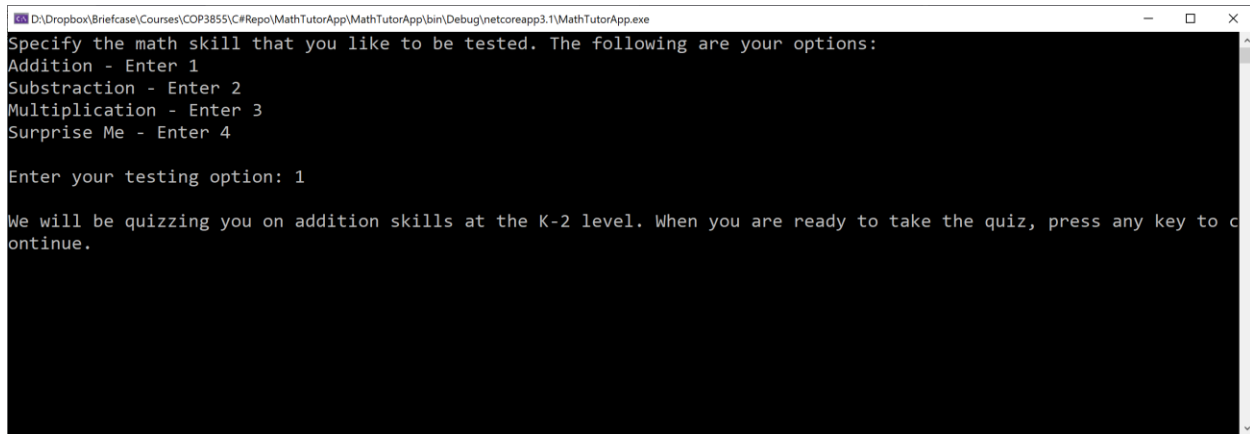


Figure 3: Display of math testing menu options.

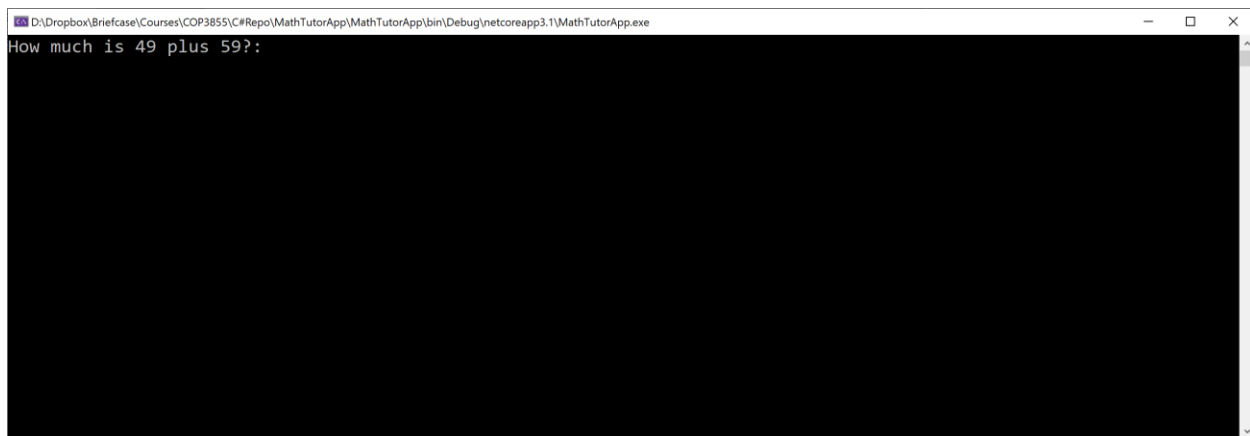


```
D:\Dropbox\Briefcase\Courses\COP3855\C#Repo\MathTutorApp\MathTutorApp\bin\Debug\netcoreapp3.1\MathTutorApp.exe
Specify the math skill that you like to be tested. The following are your options:
Addition - Enter 1
Subtraction - Enter 2
Multiplication - Enter 3
Surprise Me - Enter 4

Enter your testing option: 1

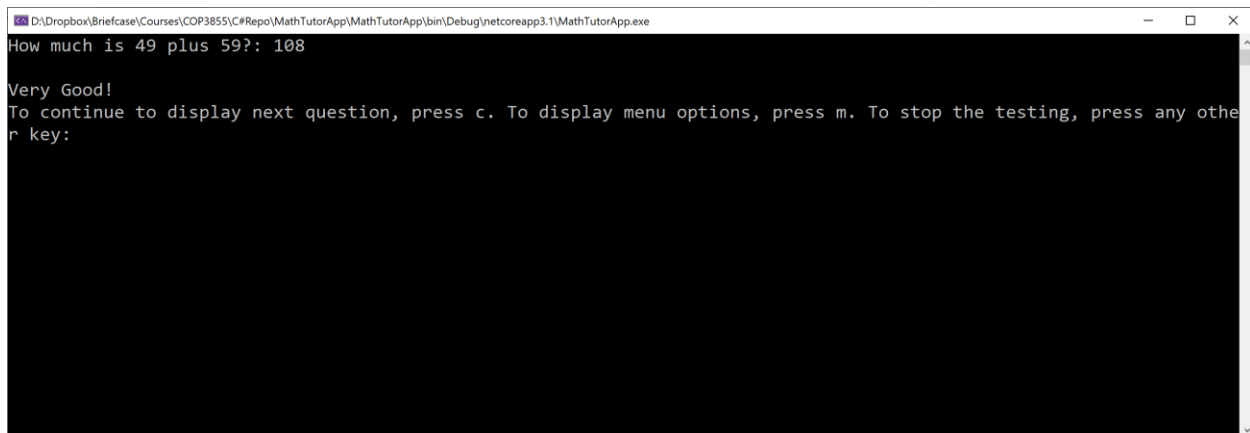
We will be quizzing you on addition skills at the K-2 level. When you are ready to take the quiz, press any key to c
ontinue.
```

Figure 4: User makes a menu selection.



```
D:\Dropbox\Briefcase\Courses\COP3855\C#Repo\MathTutorApp\MathTutorApp\bin\Debug\netcoreapp3.1\MathTutorApp.exe
How much is 49 plus 59?:
```

Figure 5: Display of addition quiz question.



```
D:\Dropbox\Briefcase\Courses\COP3855\C#Repo\MathTutorApp\MathTutorApp\bin\Debug\netcoreapp3.1\MathTutorApp.exe
How much is 49 plus 59?: 108

Very Good!
To continue to display next question, press c. To display menu options, press m. To stop the testing, press any othe
r key:
```

Figure 6: Display for answering addition question correctly.

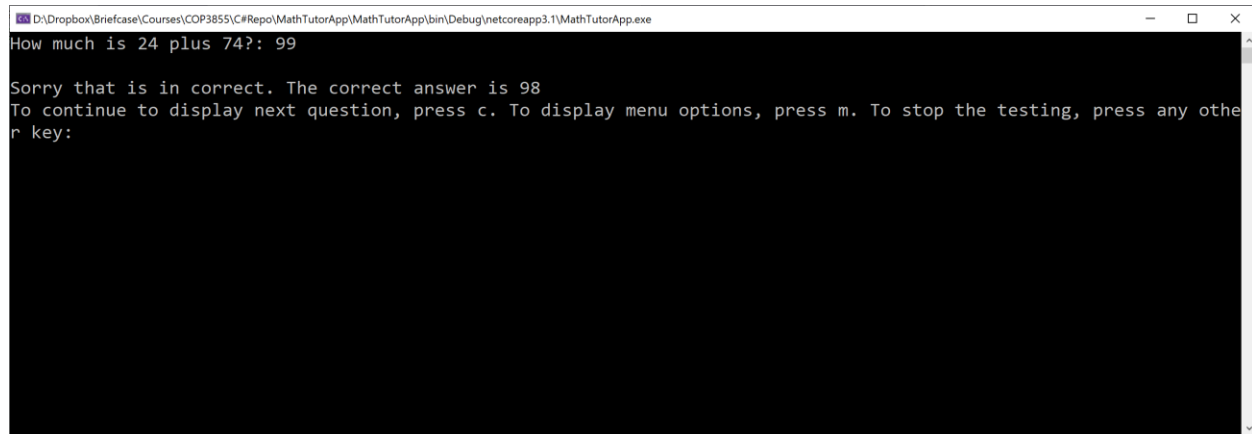


Figure 7: Display for answering addition question incorrectly.

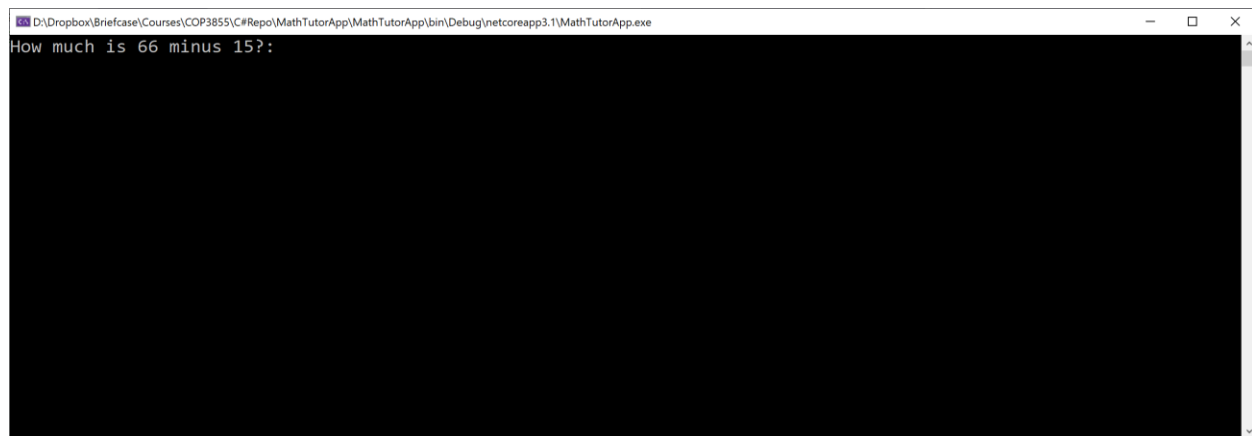


Figure 8: Display of subtraction quiz question.

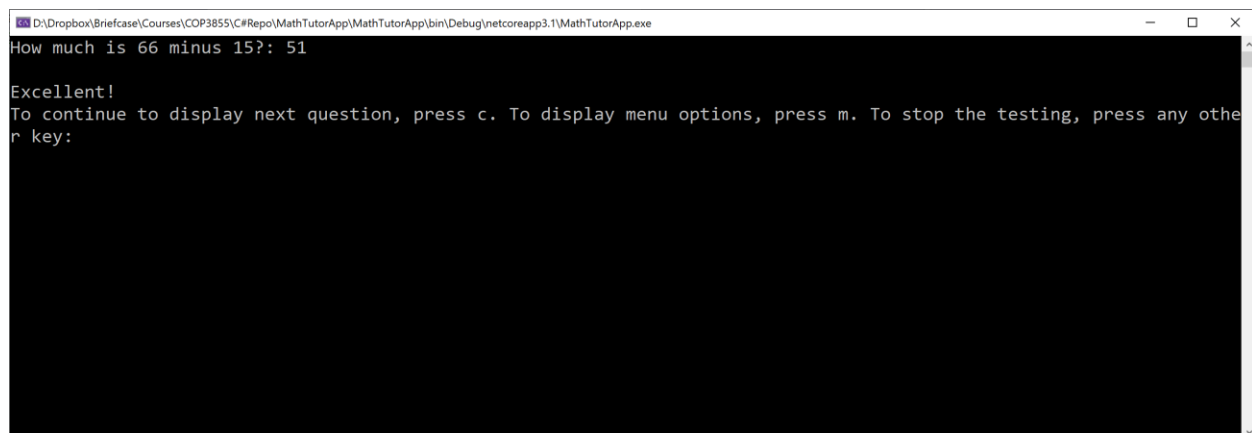


Figure 9: Display for answering subtraction question correctly.

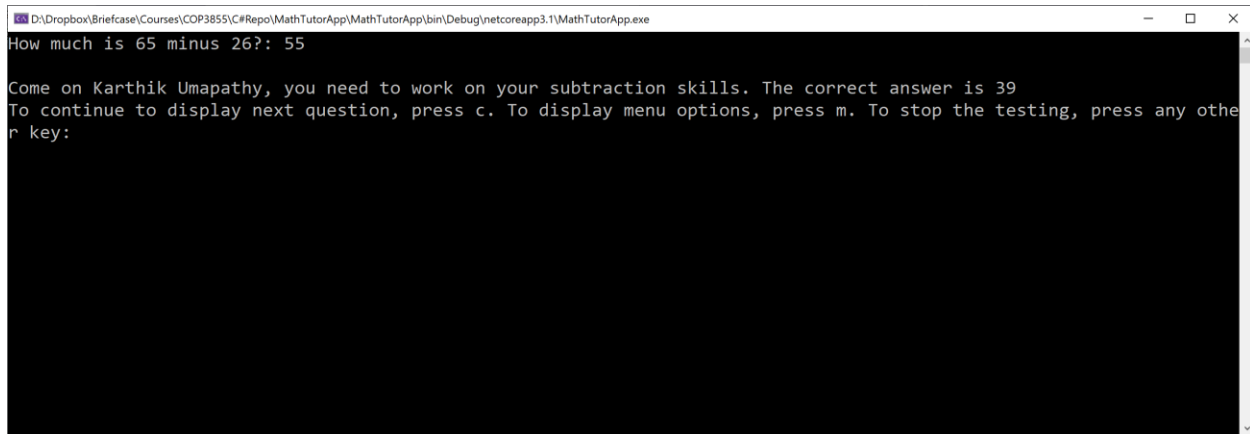


Figure 10: Display for answering subtraction question incorrectly.

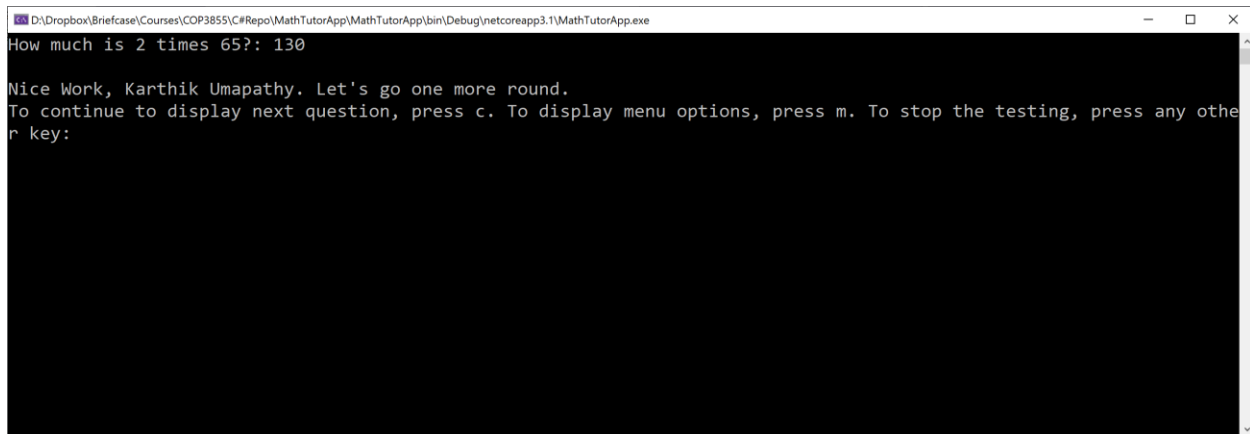


Figure 11: Display for answering multiplication question correctly.

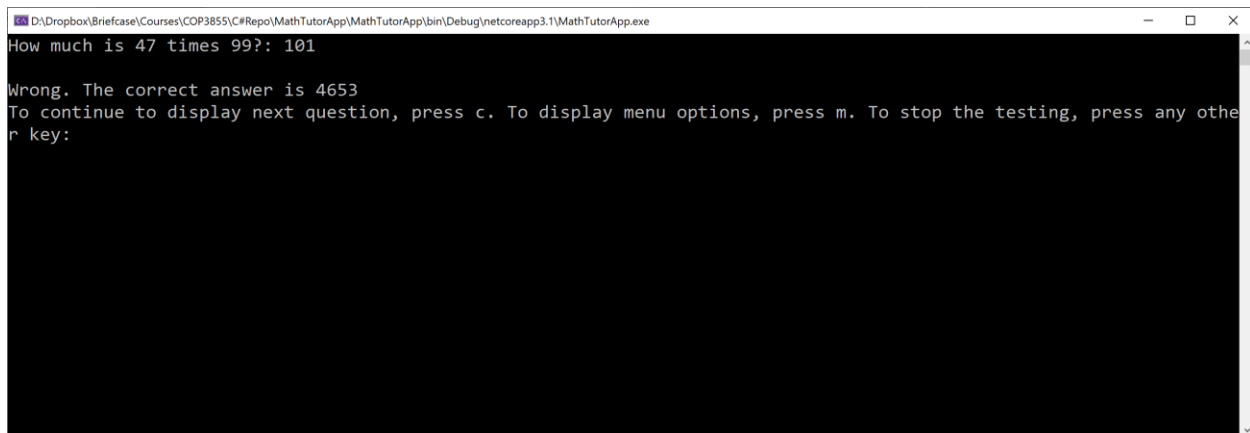
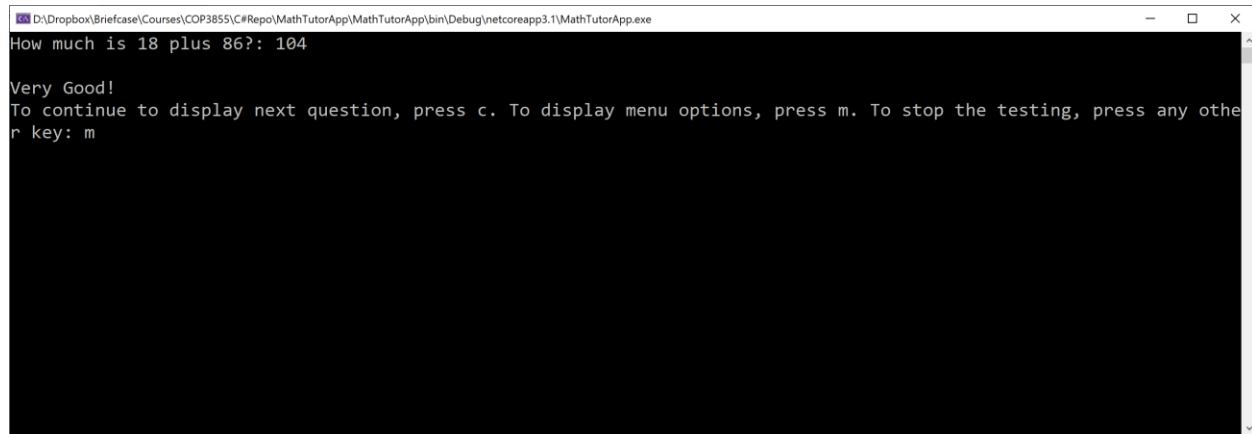


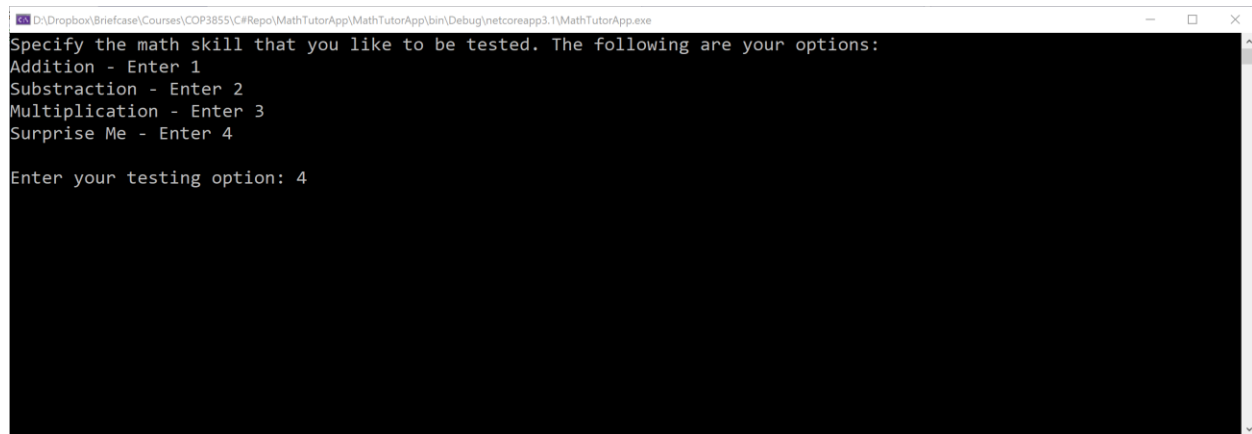
Figure 12: Display for answering multiplication question incorrectly.



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D:\Dropbox\Briefcase\Courses\COP3855\C#Repo\MathTutorApp\MathTutorApp\bin\Debug\netcoreapp3.1\MathTutorApp.exe
How much is 18 plus 86?: 104

Very Good!
To continue to display next question, press c. To display menu options, press m. To stop the testing, press any other key: m
```

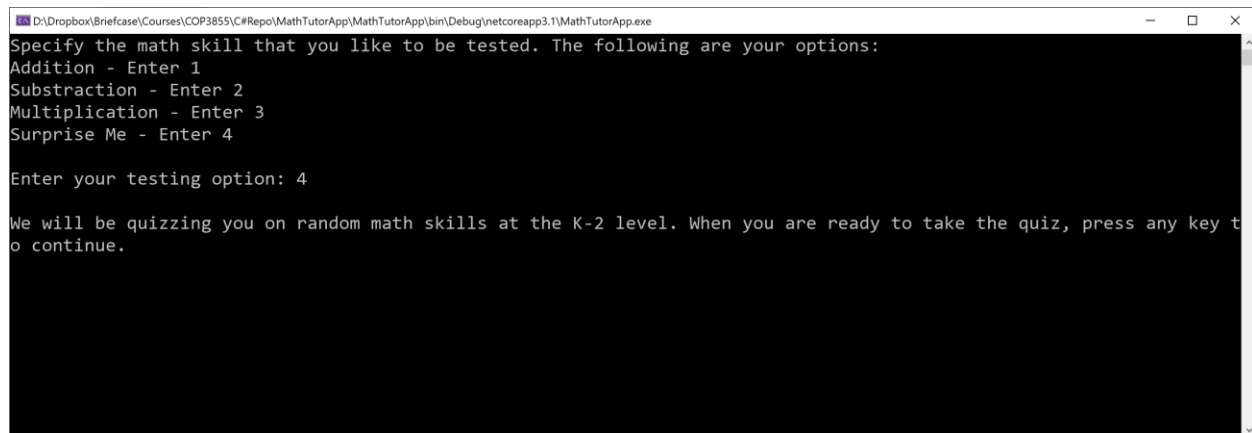
Figure 13: User selecting option to display testing menu again.



```
D:\Dropbox\Briefcase\Courses\COP3855\C#Repo\MathTutorApp\MathTutorApp\bin\Debug\netcoreapp3.1\MathTutorApp.exe
Specify the math skill that you like to be tested. The following are your options:
Addition - Enter 1
Subtraction - Enter 2
Multiplication - Enter 3
Surprise Me - Enter 4

Enter your testing option: 4
```

Figure 14: User selecting surprise me option

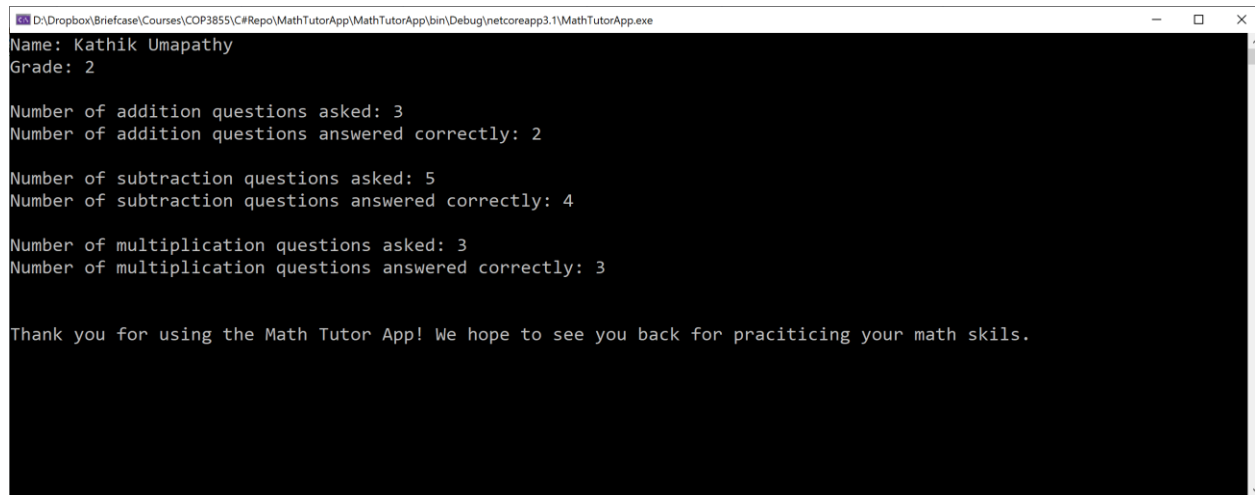


```
D:\Dropbox\Briefcase\Courses\COP3855\C#Repo\MathTutorApp\MathTutorApp\bin\Debug\netcoreapp3.1\MathTutorApp.exe
Specify the math skill that you like to be tested. The following are your options:
Addition - Enter 1
Subtraction - Enter 2
Multiplication - Enter 3
Surprise Me - Enter 4

Enter your testing option: 4

We will be quizzing you on random math skills at the K-2 level. When you are ready to take the quiz, press any key to continue.
```

Figure 15: Program display for surprise me menu option selection by the user.



The screenshot shows a Windows application window with a black background and white text. The title bar at the top reads 'D:\Dropbox\Briefcase\Courses\COP3855\C#Repo\MathTutorApp\MathTutorApp\bin\Debug\netcoreapp3.1\MathTutorApp.exe'. The main content area displays the following text:

```
Name: Kathik Umapathy
Grade: 2

Number of addition questions asked: 3
Number of addition questions answered correctly: 2

Number of subtraction questions asked: 5
Number of subtraction questions answered correctly: 4

Number of multiplication questions asked: 3
Number of multiplication questions answered correctly: 3

Thank you for using the Math Tutor App! We hope to see you back for practicing your math skills.
```

Figure 16: Display of student object information.