

Math Practice

For this project, you will write a program that allows the user to practice their basic arithmetic skills. Specifically, the program will repeatedly present the user with simple, randomly generated math problems. The problems cover simple integer arithmetic operations: +, -, *, /, and %.

Problems are grouped into sets of questions where the number of questions in each set is specified by the user. At the end of a set of questions, the user is presented with statistics on how well they did and is given the option to execute another set. The user can execute as many sets as they want, after which they are presented with statistics for the entire session (i.e., for all question sets combined).

You should develop your project using Eclipse. Create a new project in Eclipse called **MathPractice<lastname>** where <lastname> is replaced by *your* last name. For example, if your last name is Turing, your project should be named MathPracticeTuring.

The MathPractice class

Your program should have one class file containing three methods. You should name this class `MathPractice`. The main method will be where most of your code will be, but you should use separate methods that ask for and validate the following two questions asked at the beginning of each set of questions.

- A method called `getNumberOfQuestions` to ask the user how many questions they want. The user should be repeatedly asked this question until a positive integer is entered. This value should be returned to the calling program.
- A method called `getQuestionDifficulty` to ask the user their desired question difficulty level. The user should be repeatedly asked this question until they enter a 1 or 2. This value should be returned to the calling program.

Level 1 questions should consist of integer arithmetic problems using the standard Java operators: +, -, *, and /. The operands should be randomly generated integers in the range 0 to 9. Although 0 is a valid operand, it should never be used as a divisor in problems involving division.

Level 2 questions should consist of integer arithmetic problems using the operators used for level 1 and *also* the % operator. For level 2, the operands should be randomly generated integers in the expanded range -9 to 9.

Once presented with a problem (e.g., “What is 9 - 5?”) users can enter an answer. After they enter their answer, they should receive an appropriate message indicating that their answer was correct or wrong, and the count of correct and/or incorrect answers should be incremented.

Once the specified number of questions has been presented and answered, a message should be displayed informing the user the number of questions they answered correctly and the percentage correct. The user should then be asked if they would like another set of questions. If they do,

the process begins anew with the user being asked how many questions they want, etc. If they do not, the user should be presented with statistics summarizing all of the question sets and questions presented. These statistics should include the number of sessions, the total number of questions, the total correct, the total incorrect, and the percentage correct.

Submitting your project

At that time you need to hand in a **printout** of the following (stapled together):

- Your source code for `MathPractice.java`
- Output from running your program. Your output should demonstrate the various features of your program. Your output example should include as many rounds as necessary to demonstrate the various conditions in your program.

Sample run 1

```
How many questions do you want? 0
The number of questions must be 1 or more.
How many questions do you want? 2
What difficulty level do you want (1=low or 2=high)? 3
Valid levels are 1 or 2. Please reenter.
What difficulty level do you want (1=low or 2=high)? 0
Valid levels are 1 or 2. Please reenter.
What difficulty level do you want (1=low or 2=high)? 1
Question #1: What is 4 + 4? 8
Correct!
Question #2: What is 9 - 7? 2
Correct!
```

```
You answered 2 out of 2 correctly (100.00%).
Would you like another set of questions? (y/n) n
```

Session Statistics

```
-----
# of Question Sets   : 1
# of Questions       : 2
# of Correct Answers : 2
Percent Correct      : 100.00%
```

Goodbye!

Sample run 2

How many questions do you want? 3
What difficulty level do you want (1=low or 2=high)? 2
Question #1: What is $-8 + -1$? -9
Correct!
Question #2: What is $9 * -6$? -54
Correct!
Question #3: What is $-2 * 8$? -16
Correct!

You answered 3 out of 3 correctly (100.00%).
Would you like another set of questions? (y/n) y

How many questions do you want? 4
What difficulty level do you want (1=low or 2=high)? 1
Question #1: What is $3 - 3$? 0
Correct!
Question #2: What is $2 - 1$? 2
Wrong... The answer is 1
Question #3: What is $3 + 3$? 66
Wrong... The answer is 6
Question #4: What is $6 + 2$? 8
Correct!

You answered 2 out of 4 correctly (50.00%).
Would you like another set of questions? (y/n) n

Session Statistics

```
-----  
# of Question Sets   : 2  
# of Questions       : 7  
# of Correct Answers : 5  
Percent Correct      : 71.43%
```

Goodbye!