

Assorted Basic Exercises

Complete all of these in a single program. Add comments to indicate which parts of the code are solutions to the different sub problems. e.g. `// Problem #1`

(1) Write for-loops to display each of the following number sequences. Please display them as shown: all on one line, with the numbers separated by commas.

(a) 5, 6, 7, 8, 101, 102

(b) 10, 15, 20, 25, 30, 35, 40, ... , 800, 805

(c) 100, 99, 98, 97, 96, -20, -21

(d) 999, 988, 977, 966, ... , 449

(2) Write the method `isFactor()` which can be used as follows

```
if ( isFactor(a, b) ) {  
  
    System.out.println(a + " is a factor " + b);  
  
}
```

This method should return true if the first argument is a factor of the second argument.

(3) Using the idea of an accumulator, write method called `countFactors()` which returns the number of factors of the argument (not including 1 or itself).

```
int count = countFactors(132);
```

(4) Consider the following 3 lines of code:

```
Random r = new random();
```

```
int a = r.nextInt(51);           // a is in the range 0 to 50
```

```
int b = 10 + r.nextInt(51);      // b is in the range 10 to 60
```

```
int c = 50 + r.nextInt(101);     // c is in the range 50 to 10
```

In general, you can think about it this way:

```
int r = minValue + r.nextInt( distance_to_max_value );    // think about this.
```

Ok, now that you've thought of that, hopefully can think of how you could write a line of code that would generate a random number in any range you want. You will use that idea in a new method that works like this:

```
int n = random(60, 190); // this should return a random int between 60 and 190 inclusive.
```

Create the static method **random** so it works this way.

(6) Write a method to translate a percentage (between 0 and 100) into a letter grade, to be used as follows:

```
double grade = 89.7;
```

```
System.out.println( "Your score of " + grade + " earns you an " + toLetterGrade( grade ) );
```

In other words, it should take a double as an argument, and return a String that says A+, A, A-, B+, B, B-, C+, C, C-, D+, D, D-, or F (let's say there are no F+'s or F-'s). Don't worry about the exact ranges for each letter grade so long as you do something reasonable. I mainly want to see if you can write the method, and the if-statement structure. If in doubt, you can always ask me.

This is a great chance for you to learn about the **switch statement**. It's an alternative to writing a bunch of if-else's. You can read about it here: <http://docs.oracle.com/javase/tutorial/java/nutsandbolts/switch.html>

(7). Fibonacci numbers

(a). Write a method that will display the first n Fibonacci numbers. For example...

```
displayFibonacci(6);    // this should display 1, 1, 2, 3, 5, 8
```

Old guard:

(b) Write another method that it will display the first n Fibonacci numbers that are ALSO square numbers. E.g.

```
displaySquareFibonacci(6);
```

```
// Displays: 1, 144, 1489728409, 321305625, 142754704, 1465894369
```