LAB EXERCISE

Permutations

Assignment:

1. Write a program that produces random permutations of the numbers 1 to 10. "Permutation" is a mathematical name for an arrangement. For example, there are six permutations of the numbers 1,2,3: 123, 132, 231, 213, 312, and 321.

2. To generate a random permutation, you need to fill an `ArrayList` with the numbers 1 to 10 so that no two entries of the array have the same contents. You could do it by brute force, by calling `Random.nextInt()` until it produces a value that is not yet in the array. Instead, you should implement a smart method. Make a second `ArrayList` and fill it with the numbers 1 to 10. Then pick one of those at random, *remove it*, and append it to the permutation `ArrayList`. Repeat ten times.

3. Implement a class `PermutationGenerator` with the following method:

```
ArrayList nextPermutation
```

Instructions:

1. Turn in your source code and a printed run output.

2. The run output will consist of 10 lists of random permutations of the number 1 to 10. Example output is shown below:

```
Random Permutation List Generator

List  1:   4  6  8  1  9  7 10  5  3  2
List  2:   6  8  1  7  3  4  9 10  5  2
List  3:   2  4  9  6  8  1 10  5  7  3
List  4:   8  5  4  3  2  9  6  7  1 10
List  5:  10  3  2  6  8  9  5  7  4  1
List  6:   9 10  3  2  1  5  6  8  4  7
List  7:   3  8  5  9  4  2 10  1  6  7
List  8:   3  2  4  5  7  6  9  8 10  1
List  9:   4  1  5 10  8  3  6  2  7  9
List 10:   3  5  2  4  1  7  9  6  8 10
```