

Assignment 06 – Java Concepts Chapter 07: Arrays & Array Lists

Due: Nov 11

Exercise P7.9 (modified)

Write a program that produces random permutations of an array of integers. To generate a random permutation, you need to make a new array that has the same contents of the original, but the order should be randomized. Implement a class **RandomPermutationGenerator**. The constructor should take an array of integers as a parameter. The class should have a method called **nextPermutation** to produce permutations of it.

Notes: this assignment requires use of random numbers – refer to page 224.

Note: the **nextPermutation** method could operate by brute force, by calling **Random.nextInt** until it produces a value that is not yet in the array. Here's a more efficient approach: Using a second array, randomly pick elements from the first array, and copy them to the second array. 'Move' the copied element & repeat until every element has been copied.

See the page course home page for some starting code. Note: even though the assignment indicates using an array containing numbers 1 to 10, your class should work with any array of integers. Add any missing documentation commenting and pay close attention to any loops in your code. Include a couple of comments around each describing what it does.

Extra credit: Write an additional new class called **ListPermutationGenerator**. It should work the same way as your **RandomPermutationGenerator** except it should use an **ArrayList** of integers instead of an array of integers. You'll need to supply an additional tester as well.

Extra credit: Look through the Java API for a method called **shuffle**. Write an additional new class called **EasyPermutationGenerator**. It should work the same way as **RandomPermutationGenerator** but should use the **shuffle** method to randomly permute its array. Again, you'll need an additional tester for it.

Put a copy of your **entire project folder** into a **.zip** file named **CS125-AXX-YOURNAME.zip**, replacing **YOURNAME** with your actual first and last name & **XX** with the assignment number.

Upload the **.zip** file to Moodle.

The following rubric will be used for grading:

Description	Points
Correct filename(s) are used	1
Source code content – classes implemented as indicated	4
Source code compiles without errors	3
Program executes	2
Program output is correct	5
PermutationGenerator uses Random.nextInt	1
Main method is documented (including parameters)	3
Loops are briefly commented	4
TOTAL POSSIBLE POINTS:	25
Extra credit, working, documented ListPermutationGenerator	4
Extra credit, working, documented EasyPermutationGenerator	1