IE531: Algorithms for Data Analytics
Spring, 2016
Programming Assignment 1: Listing the n-th Lexicographic Permutation of a Symbol-Set with m Symbols
Due Date: February 29, 2016

This assignment is a generalization of Problem 24 of Project Euler. The objective is to retrieve (or, reconstruct) a cataloged-object from a (large) collection of such objects that are ordered lexicographically (i.e. in "dictionary-order"). We will restrict attention to the case where the "alphabet" (over which the lexicographic/dictionary-order is maintained) is the numbers $\{0, 1, \ldots, m\} (m \leq 9)$, where 0 is the first-member, 1 is second-member, 2 is the third-member etc. of the "alphabet." The objective is to generate the n-th member of the lexicographic list.

You are going to write a C++ program that will take the numbers n and m are command-line variables. A sample output is shown in figure 1. I have uploaded a hint.cpp file on Compass, in case you need help. Before you attempt this problem make sure you view the flipped-classroom video on this assignment, and the video that covers the Academic Integrity issues that are important to this course.

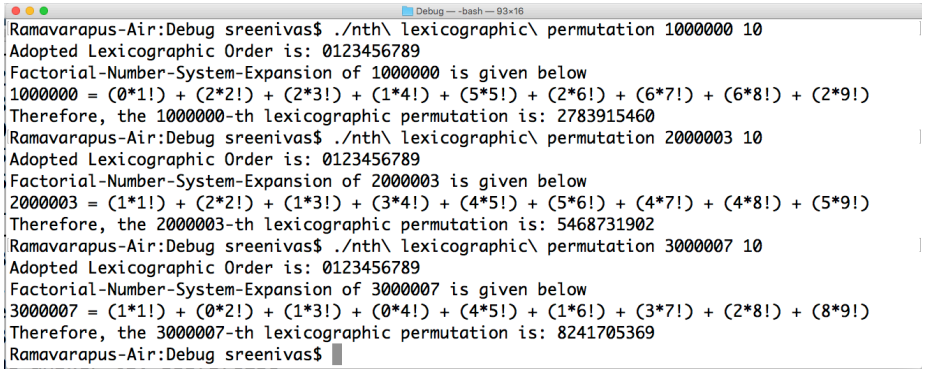

Figure 1: Sample output for this assignment. In all of these illustrative examples $m = 10$ (i.e. the "alphabet" is $\{0, 2, \ldots, 8\}$. I have presented the results for three cases here (viz. $n = 1000000$, $n = 2000003$ and $n = 3000007$)

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