Solution to CSE143 Section #14 Problems

1. One possible solution appears below.

   public static void printJumbles(Dictionary words, List<String> options, int numWords) {
       printJumbles(words, options, numWords, "");
   }

   public static void printJumbles(Dictionary words, List<String> options, int choices, String soFar) {
       if (choices == 0) {
           if (words.contains(soFar)) {
               System.out.println(soFar);
           } else {
               for (String word : options) {
                   printJumbles(words, options, choices - 1, soFar + word);
               }
           }
       }
   }

2. One possible solution appears below.

   public static void printJumbles2(Dictionary words, List<String> options) {
       printJumbles2(words, options, "");
   }

   // pre : words contains the prefix soFar
   public static void printJumbles2(Dictionary words, List<String> options, String soFar) {
       if (words.contains(soFar)) {
           System.out.println(soFar);
       } else {
           String newString = soFar + word;
           if (words.containsPrefix(newString)) {
               printJumbles2(words, options, newString);
           }
       }
   }

3. One possible solution appears below.

   public static void printJumbles3(Dictionary words, List<String> options) {
       printJumbles3(words, options, "", new TreeSet<>());
   }

   public static void printJumbles3(Dictionary words, List<String> options, String soFar, Set<String> used) {
       if (words.contains(soFar)) {
           System.out.println(soFar);
       } else {
           String newString = soFar + word;
           if (!used.contains(word) && words.containsPrefix(newString)) {
               used.add(word);
               printJumbles3(words, options, newString, used);
               used.remove(word);
           }
       }
   }
In terms of efficiency, when working with the 50 state abbreviations, the printJumbles method calls the dictionary's contains method 125,000 times. The printJumbles2 method calls the contains method 790 times and the containsPrefix method 39,500 times.

For students who are interested, the complete code for Dictionary.java and the sample solution Jumble.java are available along with the data files dictionary.txt and states.txt.

https://courses.cs.washington.edu/courses/cse143/22wi/lectures/Jumble.java
https://courses.cs.washington.edu/courses/cse143/22wi/lectures/dictionary.txt
https://courses.cs.washington.edu/courses/cse143/22wi/lectures/states.txt