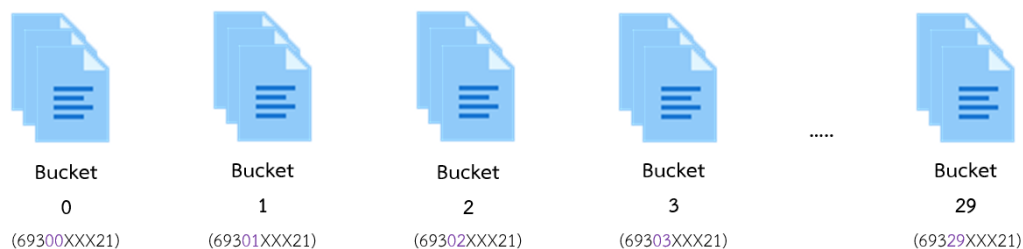


When Professor Goes Beyond

In room 201A at 100-year building, in the final examination of Computer Security class for CP, professor was thinking about how to organize and sort more than hundreds of exam papers by using the least time. Suddenly, the professor thought that using bucket sort may help for this cruel task because he could tell students to help him to sort buckets.

He found that every student has 10-digit student ID which are in the format of 693XXXXX21 and the fourth digit can only be 0, 1, and 2. In the other meaning, the student ID of students in the class can be between 6930000021 to 6932999921 (inclusive). Therefore, he decided to create 30 buckets (bucket 0 to 29), bucket AB (2 digits) stored exam papers of student ID 693ABXX21 (which is 693AB00021 to 693AB99921). For example, student ID 6932157321 should go to bucket 21.



He separated a bunch of exam papers into each bucket, and then performed selection sort on each bucket. Finally, he merged/collected all buckets together.

In class **ExamSorter**, implement 4 methods:

1. `public void insert(long[] data)`

This method will do a bucket sort by appending each element in data on suitable bucket (according to student ID). The data contains all student ID of students in the class.

2. `public void sort(int bucketNumber)`

This method will perform selection sort on specific bucket number. Guarantee that the bucket number is between 0 and 29 (inclusive).

3. `public long[] collect()`

This method will merge all buckets into 1 long array. Return this merged sorted array. The result should be arranged in ascending order.

4. `public long[] perform(long[] data)`

This method will perform the whole flow of this problem, which will use methods 1 to 3. Starting from doing bucket sort by separating all data into each bucket. Then, sort each bucket using selection sort. Finally, all buckets will be merged and return as sorted array.

Guarantee that every element in data array is in the format of 693XXXXX21 when the fourth and fifth digits are between 00 to 29 (inclusive). Also guarantee that the size of the data array is not more than 1000.

Note: We recommend working on each method, starting from 1, then 2, and 3. Finally, use all methods written above in method 4.