Algorithms – Exercise 1

1. Given an array of integers print the missing elements that lie in range 0-99. If there are more than one missing, collate them, otherwise just print the number.

   Note that the input array may not be sorted and may contain numbers outside the range [0-99], but only this range is to be considered for printing missing elements.

   Examples

   #1 - Input: {88, 105, 3, 2, 200, 0, 10}

       Output: 1

           4-9

           11-87

           89-99

   #2 - Input: {9, 6, 900, 850, 5, 90, 100, 99}

       Output: 0-4

           7-8

           10-89

           91-98

   Expected time complexity O(n), where n is the size of the input array.

2. Given an unsorted array with repetitions, the task is to group multiple occurrence of individual elements. The grouping should happen in a way that the order of first occurrences of all elements is maintained.

   Examples:

   Input: arr[] = {5, 3, 5, 1, 3, 3}

   Output:　　{5, 5, 3, 3, 3, 1}

   Input: arr[] = {4, 6, 9, 2, 3, 4, 9, 6, 10, 4}

   Output:　　{4, 4, 4, 6, 6, 9, 9, 2, 3, 10}

3. Given an unsorted array that may contain duplicates. Also given a number k which is smaller than size of array. Write a function that returns true if array contains duplicates within k distance.

Examples:

Input: k = 3, arr[] = {1, 2, 3, 4, 1, 2, 3, 4}

Output: false

All duplicates are more than k distance away.

Input: k = 3, arr[] = {1, 2, 3, 1, 4, 5}

Output: true

1 is repeated at distance 3.

Input: k = 3, arr[] = {1, 2, 3, 4, 5}

Output: false

Input: k = 3, arr[] = {1, 2, 3, 4, 4}

Output: true