Assignment #3
Course: CPSC-442 (Python for Data Science)

1. Remove duplicates from a list **without** the use of any loops, i.e., for, while or if statements.

```
Input: [1,3,2,5,1,3,7,6,2,3]
Output: [1, 2, 3, 5, 6, 7]
```

2. You are given a matrix, which needs to be horizontally flipped and inverted.
   Flipping the matrix horizontally means each row is reversed. Example, row [1 0 0] would be flipped to [0 0 1].
   Then you need to invert the matrix i.e., replace 0 by 1 and 1 by 0.
   Write a function for the above task.
   Do not use numpy or pandas for this question.

   Example:

```
Example 1:
Input: [[1,1,0],[1,0,1],[0,0,0]]
Output: [[1,0,0],[0,1,0],[1,1,1]]
Explanation: First reverse each row: [[0,1,1],[1,0,1],[0,0,0]].
             Then, invert the image: [[1,0,0],[0,1,0],[1,1,1]]
Example 2:
Input: [[1,1,0,0],[1,0,0,1],[0,1,1,1],[1,0,1,0]]
Output: [[1,1,0,0],[0,1,1,0],[0,0,0,1],[1,0,1,0]]
```

3. Every website has subdomains associated with it. Your task is to count the number of hits to each of the sub-domains.
   The input would be like “100 www.facebook.com”, integer and string pair. 100 is the number of hits to each of the subdomain.
   Write a function to accomplish this task.

```
Example 1:
Input:
["100 www.facebook.com"]
Output:
["100 www.facebook.com", "100 facebook.com", "100 com"]
```

Explanation:

www.facebook.com is the website domain. So along with the main domain, the related sub-domains would also be visited, i.e., “facebook.com” and “com.” So they will all be visited 100 times.

Example 2:

Input:

```
["900 google.mail.com", "50 yahoo.com", "1 intel.mail.com", "5 wiki.org"]
```

Output:

```
["901 mail.com","50 yahoo.com","900 google.mail.com","5 wiki.org","5 org","1 intel.mail.com","951 com"]
```

Explanation:

We will visit "google.mail.com" 900 times, "yahoo.com" 50 times, "intel.mail.com" once and "wiki.org" 5 times. For the subdomains, we will visit "mail.com" 900 + 1 = 901 times, "com" 900 + 50 + 1 = 951 times, and "org" 5 times.

4. You are given two strings, and you need to find the uncommon words. A word is uncommon if it appears exactly once in one of the strings and does not appear in the other string.

   You need to write a function for this task to return a list of uncommon words.

Example 1:

Input: A = "this apple is sweet", B = "this apple is sour"

Output: ["sweet","sour"]

Example 2:

Input: A = "apple apple", B = "banana"

Output: ["banana"]

5. You are given a square 2-D array, and each value is termed as the height of each building. We can increase the height of each building. However, the increase should not exceed the height of the tallest building in the same row and column.

   Write a function to return a new 2-D array that shows the maximum possible heights. Also, you need to return the total sum of height changes.

   Following example would clarify the requirement:

   Do not use numpy or pandas for this question.

```
Example:
Input: grid = [[3,0,8,4],[2,4,5,7],[9,2,6,3],[0,3,1,0]]
Output: 35
Explanation:
The grid is:
[ [3, 0, 8, 4],
  [2, 4, 5, 7],
  [9, 2, 6, 3],
  [0, 3, 1, 0] ]

The view of highest buildings from the top or bottom is (in Red): [9, 4, 8, 7]
The view of highest buildings from left or right is(underscored): [8, 7, 9, 3]
The grid after adjusting the height of the buildings:

gridNew = [ [8, 4, 8, 7],
            [7, 4, 7, 7],
            [9, 4, 8, 7],
            [3, 3, 3, 3] ]
Total Sum = 35
```

6. Given an array of strings, group anagrams together. Your task is to write a function to accomplish this task.

```
Example:
Input: ["eat", "tea", "tan", "ate", "nat", "bat"],
Output:
[
  ["ate","eat","tea"],
  ["nat","tan"],
  ["bat"]
]
```

7. You are given a sorted array of integers. Every element appears twice except for one element. Your task is to write a function to find that one element appearing only once in the array.
   Do not use numpy, pandas, dictionary for this question.

   Optional Requirement:
   Try to write the code for this question with minimal number of lines, i.e. not more than 3-4 lines.

```
Example 1:

Input: [1,1,2,3,3,4,4,8,8]

Output: 2
```

```
Example 2:

Input: [3,3,7,7,10,11,11]

Output: 10
```