Question1:

Given: A combination String with S,N,A,K,E

Aim: Find the maximum level of the combination that consist with x letters of S,N,A,K,E

Solve:

\* Step 1:

Initialize 5 different integer variables into a set P = {i1,i2,i3,i4,i5}, each of i’th represents the occurrence of each letter “S,N,A,K,E” correspondingly.

\* Step 2:

Count through the string, find out the occurrence of each letters

(This step will take O(n) time complexity)

\* Step 3:

Find the minimum number M among all the integers in set P. Creating a integer variable L, and L = M, the number L will be the level number where L must smaller than or equal to M.

\* Step 4:

Use the binary search method:

Step 4.1:

In the beginning of binary search. If the occurrence of each letter are equal and equal to L then L = M, so that the final answer is L.

Step 4.2:

If the occurrence of each letter are not equal, then try L =  and M = . Then Count the occurrence of each letters. If occurrences are equal to each other, then go to Step 4.2.1; If occurrences are equal to each other, then go to Step 4.2.2

Step 4.2.1:

If the occurrence of all letters are equal to each other and equal to L, Then try L =  and L <= M and M =  and count the occurrence of each letters. Check if each letter’s occurrences are equal to L and equal to each other. If so Go To Step 4.3.1. Else go to Step 4.3.2.

Step 4.2.2:

If the occurrence of all letters are not equal to each other and not equal to L, Then try Step 4.2 again, will keep divide it until L equal to 0 or find a cases the occurrences are equal to each other and equal to L and L < M.

Step 4.3.1

If the occurrence of all letters are equal to each other and equal to L, Then try L =  and L <= M and M =  and count the occurrence of each letters.

If the occurrence of each letters are equals and occurrence of each letters are equal to L and L<=M, then repeat Step 4.2.1.

Else, the final result of L is equal to the value of L in Step 4.2.1.

Step 4.3.2:

If the all letters are not equal to each other, then repeat the Step 4.2.2 until L equal to 0 or find a cases the occurrences are equal to each other and equal to L and L < M.

(These steps are using a recursion typed binary search, In the worst case it will count all letter occurrence in the String which will take O(n\*log(n)))