1. Let A be a list of n (not necessarily distinct) integers. Write a program by using User  
Defined Function(UDF)s to test whether any item occurs more than n/2 times in A.

a) UDF should take O(n2) time and use no additional space.  
b) UDF should take O(n) time and use O(1) additional space.

2. Write a program to search an element x in an array of n integers using binary searchalgorithm that uses divide and conquer technique. Find out the best case, worst case and  
average case time complexities for different values of n and plot a graph of the time  
taken versus n. The n integers can be generated randomly and x can be choosen  
randomly, or any element of the array or middle or last element of the array depending  
on type of time complexity analysis.