QUESTION #3

FIBONACCI SEARCH

A comparision-based search technique that uses Fibonacci numbers to search an element in a sorted array.

SEARCHING

Solution

Let a[n] = input array and k=element to be searched.

1. Find the smallest Fibonacci Number >= n. Let this number be fm [m'th Fibonacci Number]. Let fm1=[(m-1)'th Fibonacci Number] and fm2=[(m-2)'th Fibonacci Number].
2. While the array has elements to be inspected:
    2.1 Compare k with the last element of the range covered by fm2
    2.2 If k matches, return index.
    2.3 Else If k < element, move the three Fibonacci variables two Fibonacci down, indicating elimination of approximately rear two-third of the remaining array.
    2.4 Else k > element, move the three Fibonacci variables one Fibonacci down. Reset offset to index. Together these indicate elimination of approximately front one-third of the remaining array.
3. Since there might be a single element remaining for comparison, check if fm1 is 1. If Yes, compare k with that remaining element. If match, return index.