Assignment Number: 12

Problem statement:

Searching: Write a C++ program to store roll numbers of students in an array who attended online lectures in random order. Write function for searching, whether a particular student attended lecture or not using
1. Linear search
2. Binary search
3. Jump search
Compare the searching methods based on complexities of an algorithm Provide choice to user to take input from user or using random numbers. Use Visual C++ compiler to compile and execute the program.

Objectives:

- To know the searching techniques
- To understand the binary search, Fibonacci search

Theory:

A simple approach for searching is to do linear search**.** The time complexity of this algorithm is O(n). Another approach to perform the same task is using Binary Search.

Binary Search: Search a sorted array by repeatedly dividing the search interval in half. Begin with an interval covering the whole array. If the value of the search key is less than the item in the middle of the interval, narrow the interval to the lower half. Otherwise narrow it to the upper half. Repeatedly check until the value is found or the interval is empty.

Algorithm for binary search :

Input: Array and the name of students to be search

Output: Position of student name in array

Step 1: Start

Step 2: Read the name and mobile no of your friend

Step 3: Read the name which you want to search

Step 2: Compare name with the middle position name.

Step 3: If name matches with middle position name, we return the mid index.

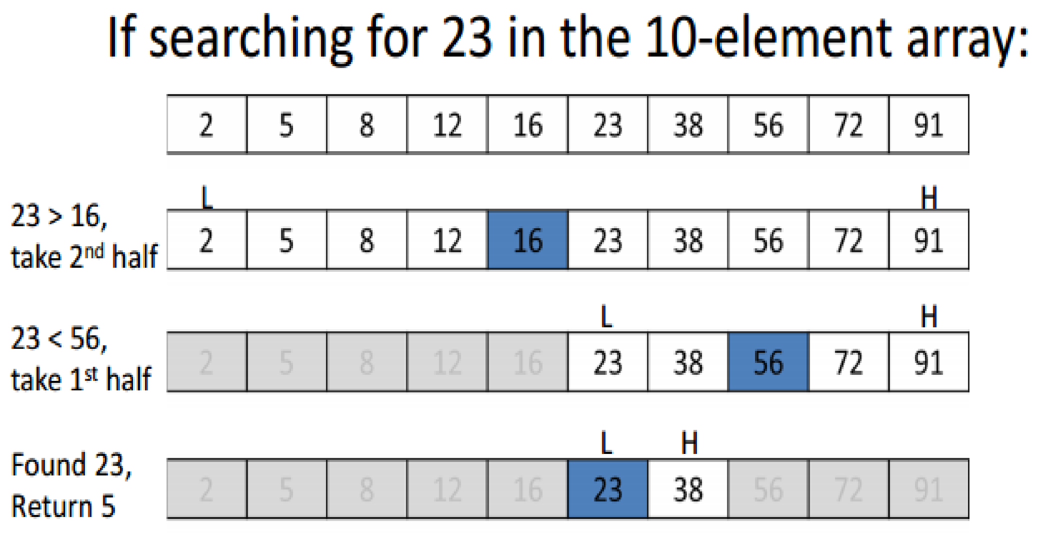
Step 4: Else If name is greater than the mid position name, then name can only lie in right

half sub array after the mid name. So we recur for right half.

Step 5: Else recur for the left half.

Step 6:Stop

Graphical representation of binary search:



Time complexity:

1. Linear search :
2. Binary search :
3. Jump search :

Conclusion:

Test Cases : (Prerequisite :)

1) 6 8 23 21 13 70 34 16 2

(key 23 Number of Comparison : ………..)

(Key 99 Number of Comparison : ………..)

2) 1 2 3 4 5 6 7 8 9 10

(key 2 Number of Comparison : ………..)

(key 15 Number of Comparison : ………..)

(key 9 Number of Comparison : ………..)

(key 5 Number of Comparison : ………..)

Practice problem:

Write algorithm to search number using Fibonacci search, jump Search.