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CST 370, Spring 2017
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Design/Analysis
of Algorithms

Linear and Binary Search

Objective: After completion of this lab, you will be able to write binary search algorithm in C++.
Lab Exercise

Assume that you have an array of numbers sorted in ascending order.

(a) Write a function called LinearSearch() which searches the function linearly and determines if a particular element is in the array. The function returns true is the element is in the array, otherwise it returns false. Call the LinearSearch() function from the main.

Given a method called, **bool** LinearSearch(**int** A[], **int** size_of_A, **int** search_key_A), which searches a function linearly and determines if a particular element is in the array; the function returns true if an element is present in a given array or otherwise it returns true. Thus, give the array, **int** A[] = { -1, 2, 3, 4, 6, 8, 9, 10, 11}, we get two valid outcomes.

Figure 1 For true

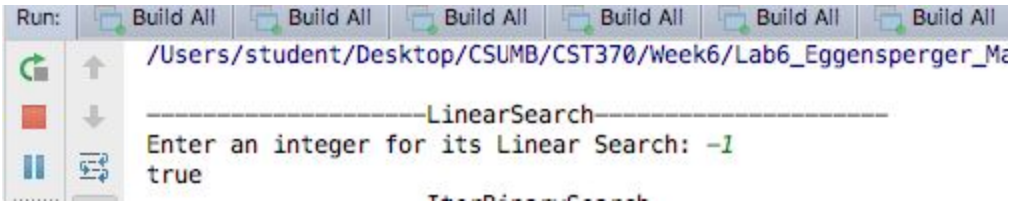
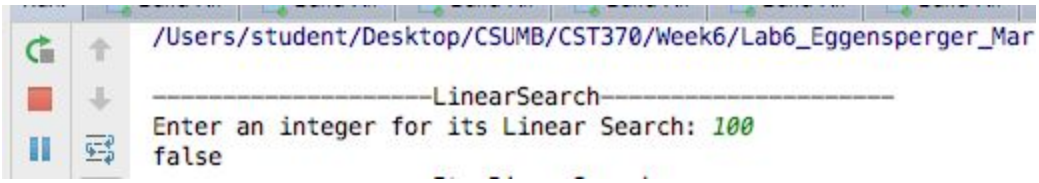


Figure 2 For false



(b) Write a function called IterBinarySearch() which iteratively performs a binary search and de- termines if a particular element is in the array. The function returns true is the element is in the ar- ray, otherwise it returns false. Call the IterBinarySearch() function from the main.

Given a method called, **bool** IterBinarySearch(**int** B[], **int** size_of_B, **int** search_key_B) which iteratively performs a binary search and determines if a particular element is in the array; the function therefore, returns true if the element is in the array; otherwise, it returns false. Thus given the array, **int** B[] = { -11, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 } we get two valid outcomes.

Figure 1 for true

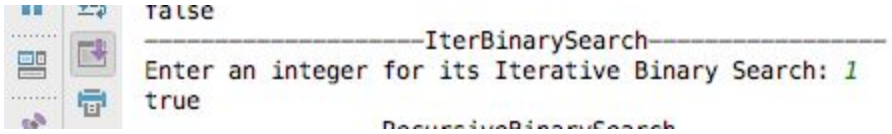
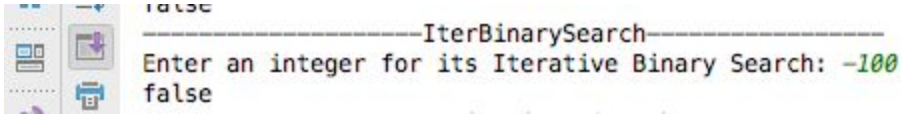


Figure 2 for false



(c) Write a function called RecursiveBinarySearch() which recursively performs a binary search and determines if a particular element is in the array. The function returns true is the element is in the array, otherwise it returns false. Call the RecursiveBinarySearch() function from the main.

Given a method called, **bool** RecursiveBinarySearch(**int** C[], **int** low, **int** high, **int** search_key_C) which recursively performs a binary search and determines if a particular element is in the array. The function returns a true if the element is in the array; otherwise, the function returns false. Thus, given an array, **int** C[] = { -20, 1, 2, 3, 4, 5, 6 } we get two outcomes.

Figure 1 for true

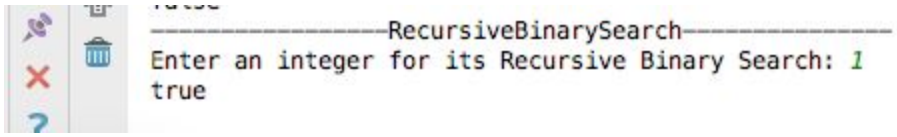


Figure 2 for false