DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY

Algorithm Laboratory (CSLR41)

Assignment 1

Problem Statement: Given a set of records $R_1, \ldots, R_n$ identified by keys $K_1, \ldots, K_n$ and a key K, decide whether the record corresponding to key K exists or not.

Scenarios: Write a program to implement the searching algorithms for each of the following situations:

1. The input records are not sorted based on the keys and each key has equal probability of getting searched.

2. The input records are not sorted based on the keys, but each key K_i, $1 \leq i \leq n-1$, has a probability p_i of getting searched.

3. The input records are sorted based on the keys.

Input: *n* random integers, K is another random integer where n = 10, 100, 1000, 10000, 100000.

Output: For each of the above programs do the following tasks for both when

a. The key is not present
b. Key is present at some random location

Tasks:

1. Show the number of comparisons required to decide the result.
2. Find the time required for each of the instances.
3. Plot the graph for the inputs considering both the above cases where time is in Y axis and *n* is in X axis.

Write your observations and derive possible conclusions.