SNS COLLEGE OF TECHNOLOGY

Coimbatore-35

An Autonomous Institution

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A++' Grade

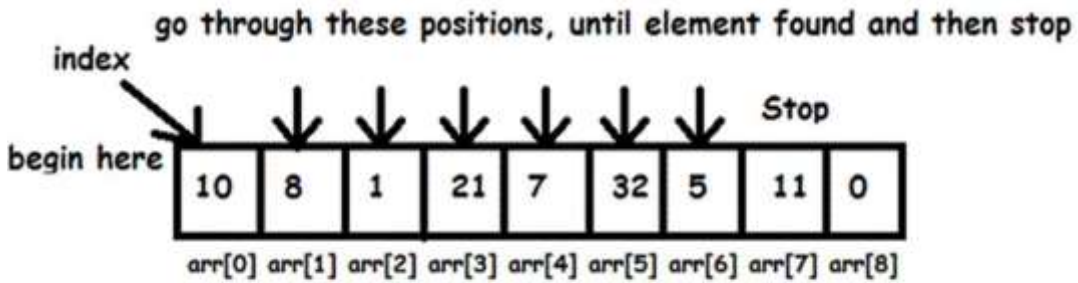
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

COURSE NAME : 23ITT201 DATA STRUCTURES

II YEAR/ III SEMESTER

Topic: *Linear Search*

Searching , Linear Search



Element to search : 5

Searching Arrays

- Linear search
  - small arrays
  - unsorted arrays
- Binary search
  - large arrays
  - sorted arrays

Searching , Linear Search

- Searching is the process of determining whether or not a given value exists in a data structure or a storage media.
- We discuss two searching methods on one-dimensional arrays: linear search and binary search.
- The linear (or sequential) search algorithm on an array is:
  - Sequentially scan the array, comparing each array item with the searched value.
  - If a match is found; return the index of the matched element; otherwise return –1.
- The algorithm translates to the following Java method:

```
public static int linearSearch(Object[] array, Object key){
  for(int k = 0; k < array.length; k++)
     if(array[k].equals(key))
        return k;
  return -1;
}
```

- Note: linear search can be applied to both sorted and unsorted arrays.

Searching , Linear Search

Linear Search Code

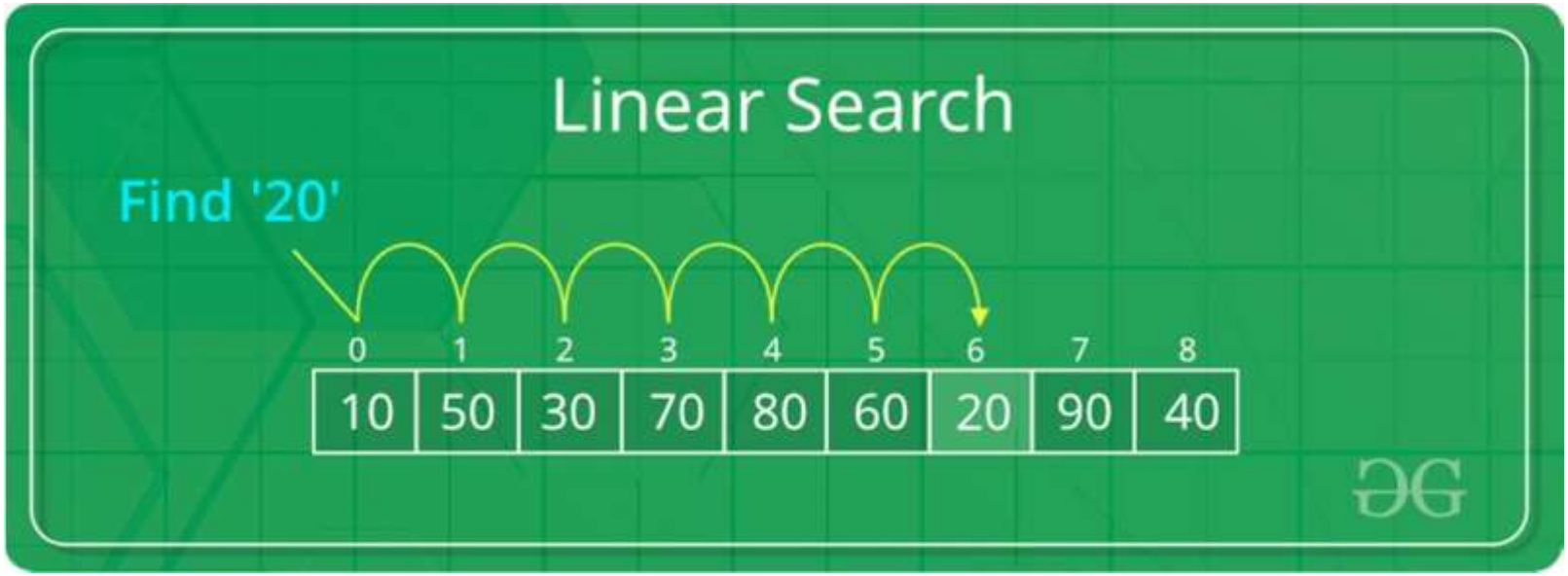
```
const int arraySize = 100;
int a[arraySize] = {1, 100, 2, 66, 55, 44, 88, 77, 12, 23, 45, 9, 87};

int key = 88;
bool found = false;

for (int i = 0; i < arraySize; i++) {
   if (a[i] == key) {
       cout << "Found it at array subscript " << i << endl;
       found = true;
       break;
   }
}
if (! found)
    cout << "Could not find element " << key << " in array a" << endl;
```

Searching , Linear Search

- Linear search is a very simple search algorithm.
- In this type of search, a sequential search is made over all items one by one. Every item is checked and if a match is found then that particular item is returned, otherwise the search continues till the end of the data collection



Searching , Linear Search

Algorithm

- Linear Search (Array A, Value x)
- Step 1: Set i to 1
- Step 2: if i > n then go to step 7
- Step 3: if A[i] = x then go to step 6
- Step 4: Set i to i + 1
- Step 5: Go to Step 2
- Step 6: Print Element x Found at index i and go to step 8
- Step 7: Print element not found
- Step 8: Exit

Searching , Linear Search

Pseudocode

```
procedure linear_search (list, value)
   for each item in the list
      if match item == value
         return the item's location
      end if
   end for

end procedure
```

Searching , Linear Search