

SNS COLLEGE OF ENGINEERING

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Department of Artificial Intelligence and Data Science

Course Name: 23ITB201 Data structures and Algorithms

II Year / III semester

Unit III – Searching, Sorting and Hashing

Topic: Linear and Binary search

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Search is the simplest search algorithm and often called sequential

searching, we simply traverse the list completely and match

each element of the list with the item whose location is to be found.

If the item is found then location of the item is returned otherwise the algorithm

returns

Search is mostly used to search an unordered list in which the items are

The algorithm of linear search is given as follows.

search

, 23, 40, 1, 2, 0, 14, 13, 50, 9};

Item which is to be searched\n");

em);

); i++)

m)

;

```
if(flag != 0)
```

```
{
```

```
printf("\nItem found at location %d\n", fla
```

```
}
```

```
else
```

```
{
```

```
printf("\nItem not found\n");
```

```
}
```

```
}
```

is the search technique which works efficiently on the sorted list. To search an element into some list by using binary search, we must ensure that the list is sorted.

It follows divide and conquer approach in which, the list is divided into two halves. The item is compared with the middle element of the list. If the item is equal to the middle element, then the location of middle element is returned otherwise, we divide the list into two halves depending upon the result produced through the match.

lower_bound, upper_bound, VAL)

SET BEG = lower_bound

POS = - 1

and 4 while BEG <=END

(BEG + END)/2

VAL

AL

◦ ELSE

SET BEG = MID + 1

[END OF IF]

[END OF LOOP]

◦ **Step 5:** IF POS = -1

PRINT "VALUE IS NOT PRESENT"

[END OF IF]

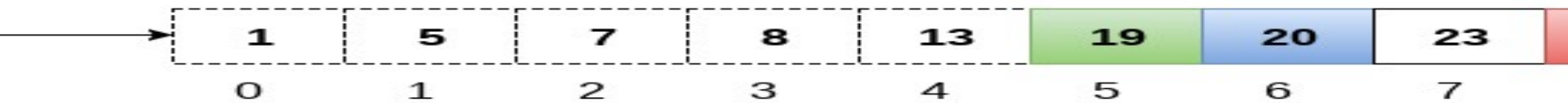
◦ **Step 6:** EXIT

an array $\text{arr} = \{1, 5, 7, 8, 13, 19, 20, 23, 29\}$. Find the location
array.

Item to be searched = 23



$a[\text{mid}] = 13$
 $13 < 23$
 $\text{beg} = \text{mid} + 1 = 5$
 $\text{end} = 8$
 $\text{mid} = (\text{beg} + \text{end})/2 = 13$



$a[\text{mid}] = 20$
 $20 < 23$
 $\text{beg} = \text{mid} + 1 = 7$
 $\text{end} = 8$
 $\text{mid} = (\text{beg} + \text{end})/2 = 15$



$a[\text{mid}] = 23$
 $23 = 23$
 $\text{loc} = \text{mid}$

Return location 7