

Stationard Similarly Series

IS STATE INSUMMENT OF TREETMOLOGY

Subject :- ADSAA

SEM -V (I.T)

Binary Search

To search the data using binary search array should be sorted.

Let's take an example to understand the working principle of binary search.

n=10 Search data = 59

a 5 9 17 23 25 45 59 63 71 89

Binary search uses divide & conquer approach to it recursively divides the

First find middle element of an array.

$$l=0$$
 mid = $l+r$ (take floor)
 $r=9$ 2 value

mid = 0+9 = 4

As mi After finding mid there are 3 cases:

1) Data to scarch is equal to mid element.

2) Data to search is less than mid element.

3) Data to search is greater than mid element.

Stationers Sentially Senters



D. SHANI INSHHUUME OF TECHNOL

(Approved by AICTE New Bollo & Covt. of Mahareshtra, Affiliated to University of Muni (Religious Jain Minority)

Subject :- ADSAA

SEM -V (I.T)

case 7: data = a [mid]

case II: data > a [mid]

case II: data < a [mid]

In our case o[mid] = a [4] = 25

data > a o [mid] 59 > 25

case I

As the array is is sorted duta is present on the right side of mid

After 1st companision our sample space divided into half earier we had to nosto search & now we need to find between 6 nos.

Now 1 = midt1 = 5 r = g mid = 5 + g = 7

a[mid] = a[7] = 63

data < a[mid]
59 563

Case III

Now 1 = 5

 $\gamma = \text{mid} - 1 = 7 - 1 = 6$ $\text{mid} = 1 + \gamma = 5 + 6 = 11 = 5$ $\frac{1}{2} = 5$

a[mid] = a[5] = 45



Surfaceable Controls Courses

A. P. SHAND INSHHRUMB OF TREE HOLDINGS

(Approved by AICTE New Bellsi & Cort. of Maharuchtra, Affiliated to University of Mumbal)

Subject :- ADSAA

(Religious Jain Minority)

SEM -V (I.T)

we need to check to the night side of mid.

Now,
$$J = mid + 1 = 6$$

 $z = 6$

$$mid = 6+6 = 6$$

$$data = a[mid]$$
 Case I
59 = 59

and the data is found return is the indexe 6 at which 59 is present.

If the data is not present then how binary search works

			-	
	1	~	mid	
	0	9	4	Iteration 1
	5	9	7	Iteration 2
	5	6	.5_	Iteration 3
1	6	6	6	Iteration4
1	7	6		Iteration 5



Section with Minnieglia Territo

D. SHAH HASHIMUMD OF MXCHAO

Subject :- ADSAA

SEM -V (I.T)

We need to stop searching at Iterations and conculde that the elements present in the array

So the stopping condition for binary search is 1>r.

if (1 > r) then data is not present

Binary Search (a, n, data

while (1<7) 2 mid = (1+7)/2

if (data = = a [mid] return mid; else if (data < a [mid] else if

1= mid +1;

¿ return - 1;

Time complexity

As our sample space divereduced to half after every companision are, binary search has worst case time complexity as O (Jog n)



Service districtly districtly

A. P. SHAH HASHINGE OF TROUBLOCK

(Approved by AICTE New Bellii & Cort. of Maharushtra, Affiliated to University of Mumbai) (Religious Jain Misoetry)

Subject :- ADSAA

SEM -V (I.T)

In best case the time complexity of binary secret as O(1).