Coimbatore-35
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RTMENT OF INFORMATION TECHNOLOGY

TB201 – Design and Analysis of Algorithms

II YEAR IV SEM

UNIT 2 – Brute Force and Divide and Conquer

TOPIC 7 – Divide and Conquer-Binary search

Find Ass
way to T
Assam?

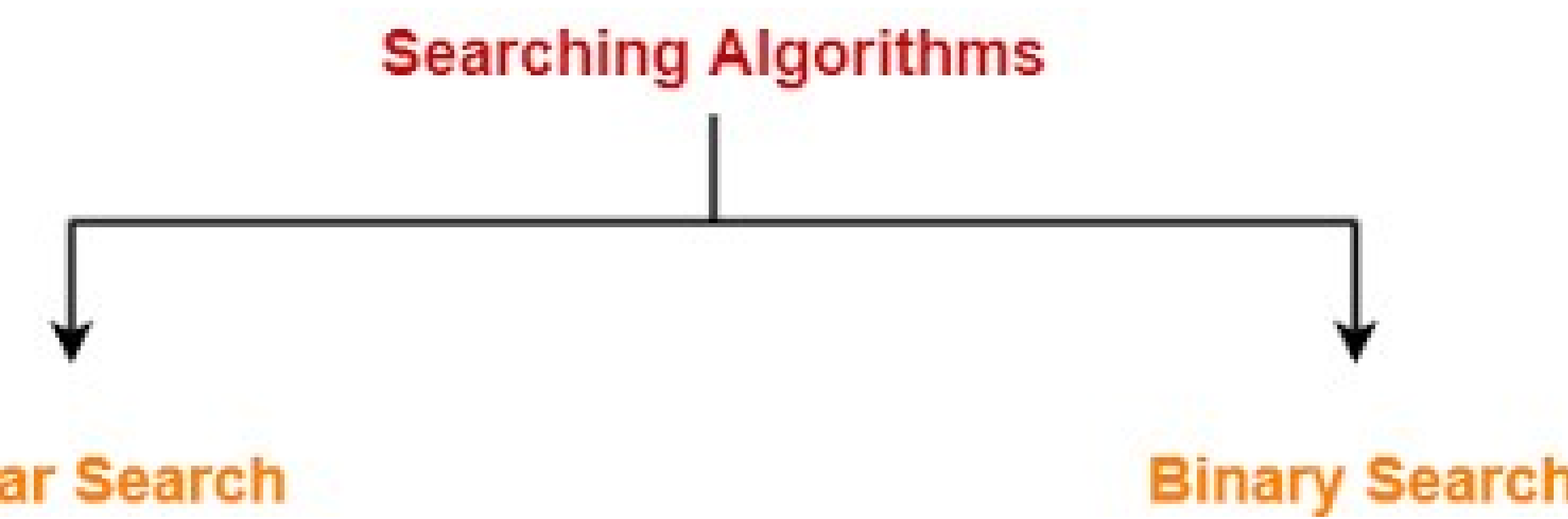
Route finding p

Tour t

Touring

rching

ess of finding a given value **position** in a list of values. It
a search key is present in the **data** or not.



y search

y **search** algorithm finds the position of a specifi

he search "key") within a sorted array . For binary

should be arranged in ascending or descending o

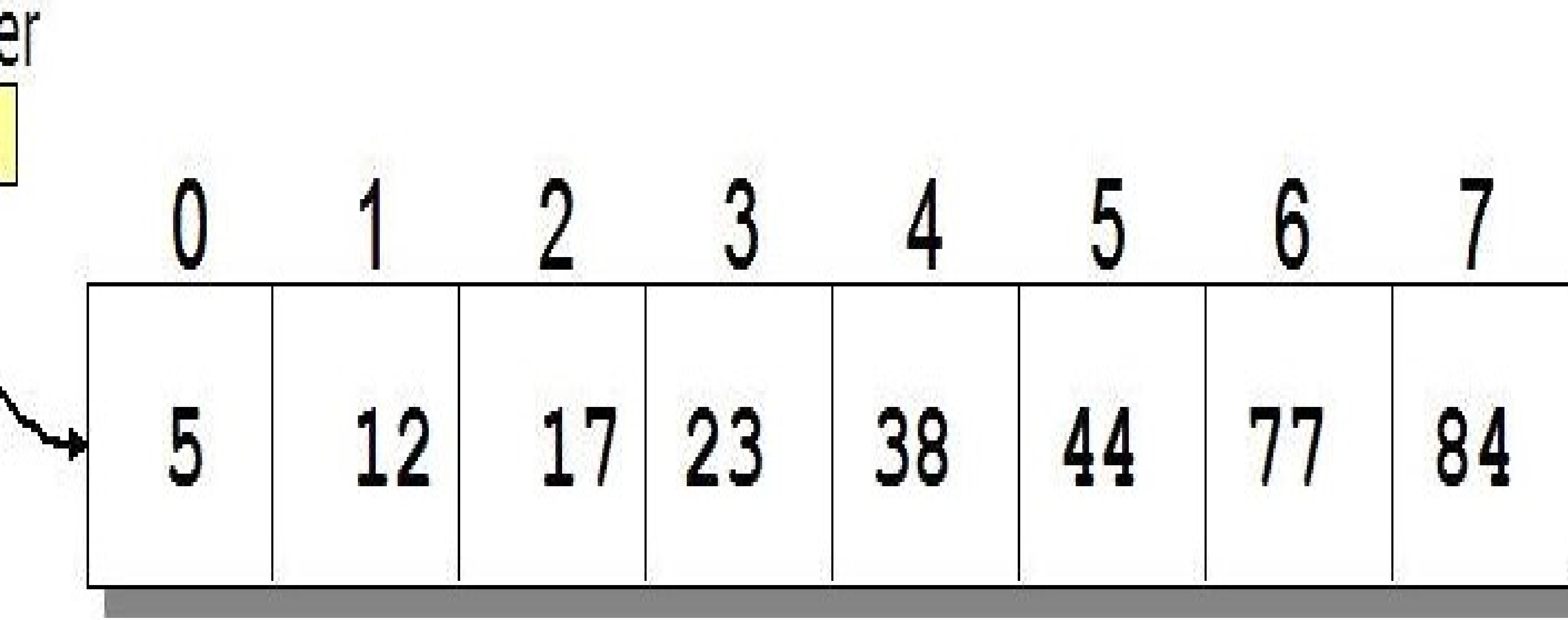
ch ?

rch works by **looking at each element in a list** o
ds the target or reaches the end. This results in **O(**
ce on a given list.

arch comes with the prerequisite that the **data mu**
can use this information to decrease the number
k at to find our target.

ary Search is **fast as compared to linear search** b

mple :



ow	high	mid
0	8	4

search(44

$$mid = \left\lfloor \frac{low + high}{2} \right\rfloor$$

0	1	2	3	4	5	6	7	8
5	12	17	23	38	44	77	84	90

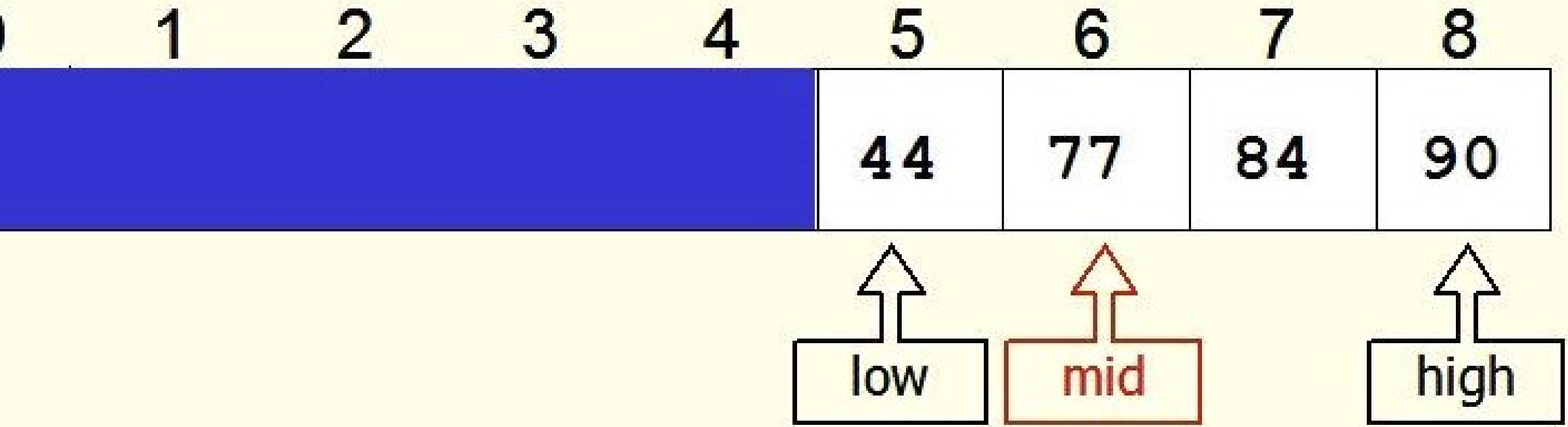
ow | mid | high

2

w	high	mid
	8	4
	8	6

search(44)

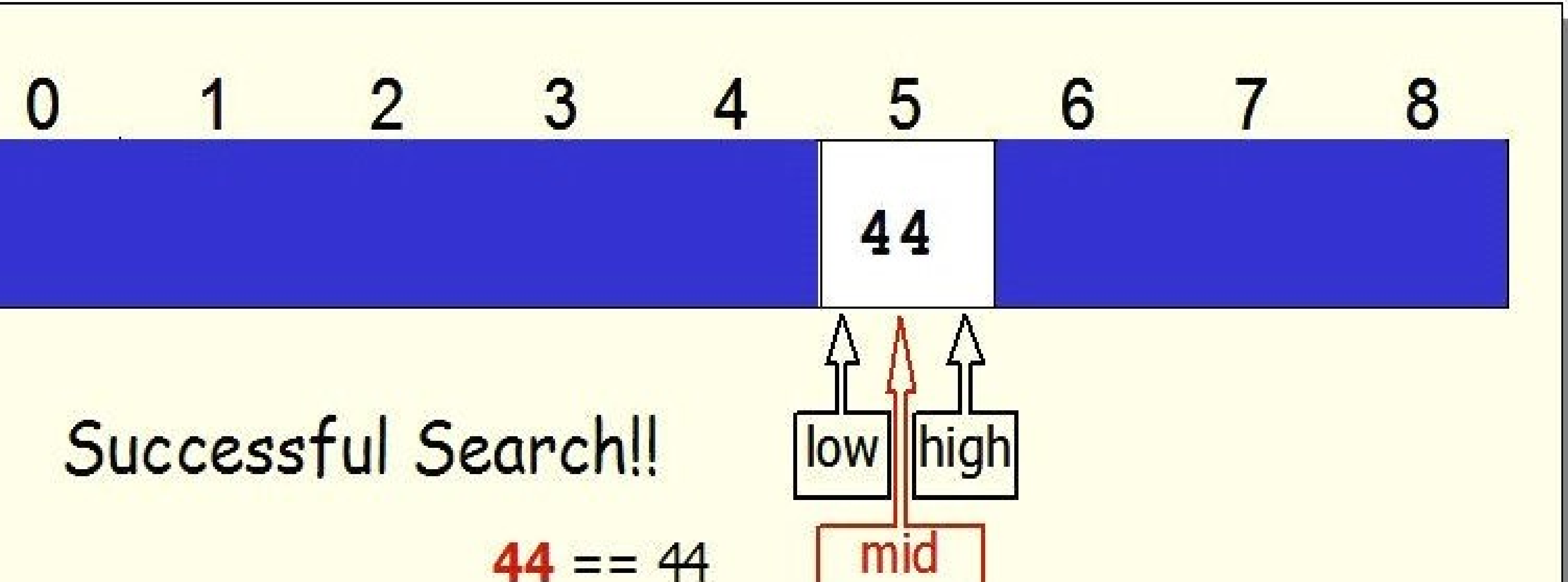
$$mid = \left\lfloor \frac{low + high}{2} \right\rfloor$$



ow	high	mid
0	8	4
5	8	6
5	5	5

search(44)

$$mid = \left\lfloor \frac{low + high}{2} \right\rfloor$$



```
ivebinarysearch(int A[], int first, int last, int ke
first  index=-1

l = (first + last) / 2
A[mid]
mid
key<A[mid]
recursivebinarysearch(A, first, mid – 1, key)  e
recursivebinarysearch(A, mid + 1, last, key)
index
```

is

arch runs in ***O(n)*** time. Whereas binary search produces
time

be the number of comparisons in worst-case in an array

$(n2)+1 if n=1 otherwise$
s recurrence relation $T(n)=logn$

n array arr = {45,77,89,90,94,99,100} and key = 99

lues(corresponding array elements) in the first ar

ecursion?

99

94

99

94

the average case time complexity of binary search

?

n)


Thank You