

Pammi Pammi

Date _____
Page _____

Binary Search

Search 25

2	7	9	11	20	25	27	50	51	60
0	1	2	3	4	5	6	7	8	9

↑

Start

↑

end

$$\text{Mid} = \frac{0+9}{2} = (4)$$

2	7	9	11	20	25	27	50	51	60
0	1	2	3	4	5	6	7	8	9

↑

Mid.

$$20 < 25$$

↳ Search Right

$$\text{Start} = \text{mid} + 1$$

$$4+1=5$$

2	7	9	11	20	25	27	50	51	60
0	1	2	3	4	5	6	7	8	9

Start/↑

Mid.

End

$$\frac{5+9}{2} = (7)$$

$$50 > 25 \rightarrow \text{search left}$$

$$\text{end} = \text{mid} - 1 = 7 - 1 = 6$$

25	27
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Mid. \leftarrow 5 6

$$\text{Mid.} \Rightarrow \frac{5+6}{2} = \frac{11}{2} = 5.5$$

25 = 25 element
Searched

① Define Start & End

② Find middle
$$= \frac{\text{Start} + \text{End}}{2}$$

③ if $A[\text{mid}] < \text{element}$,
Search to the right of
the middle element
 $\text{Start} = \text{mid} + 1$, $\text{end} = \text{end}$

④ if $A[\text{mid}] > \text{element}$,
Search to the left of
the middle element.

$$\text{Start} = \text{Start},$$

$$\text{end} = \text{mid} - 1$$

⑤ if $A[\text{mid}] = \text{element}$,
Found!
return mid.

index of
mid will be returned.

Handwritten title: Handwritten

⇒ if $start = end$, 1 element left -

$A[start] \neq element$,
Not found! return -1



Handwritten notes and diagrams illustrating a recursive search algorithm on an array.

Initial array: $[5, 1, 2, 4, 3, 6]$

Step 1: $start = 0, end = 5$. $A[start] = 5 \neq 3$. $start = start + 1 = 1$.

Step 2: $start = 1, end = 5$. $A[start] = 1 \neq 3$. $start = start + 1 = 2$.

Step 3: $start = 2, end = 5$. $A[start] = 2 = 3$. Found!

Step 4: $start = 3, end = 5$. $A[start] = 4 \neq 3$. $start = start + 1 = 4$.

Step 5: $start = 4, end = 5$. $A[start] = 3 = 3$. Found!

Step 6: $start = 5, end = 5$. $A[start] = 6 \neq 3$. Not found! return -1.