

Diagram illustrating a C-style array and pointer arithmetic:

- A variable `arrayname` is shown with an arrow pointing to its `address`.
- The variable `arrayname` is annotated with a pink circle and a pointer symbol (`*`).
- The expression `arrayname -` is shown with an arrow pointing to the `1st element`.
- The expression `arrayname[0]` is shown with an arrow pointing to the `1st element`.

Linear Search

etf = 7

is not present 6

arr = [2, 1, 1, 3, 5, 5, 7, 9]

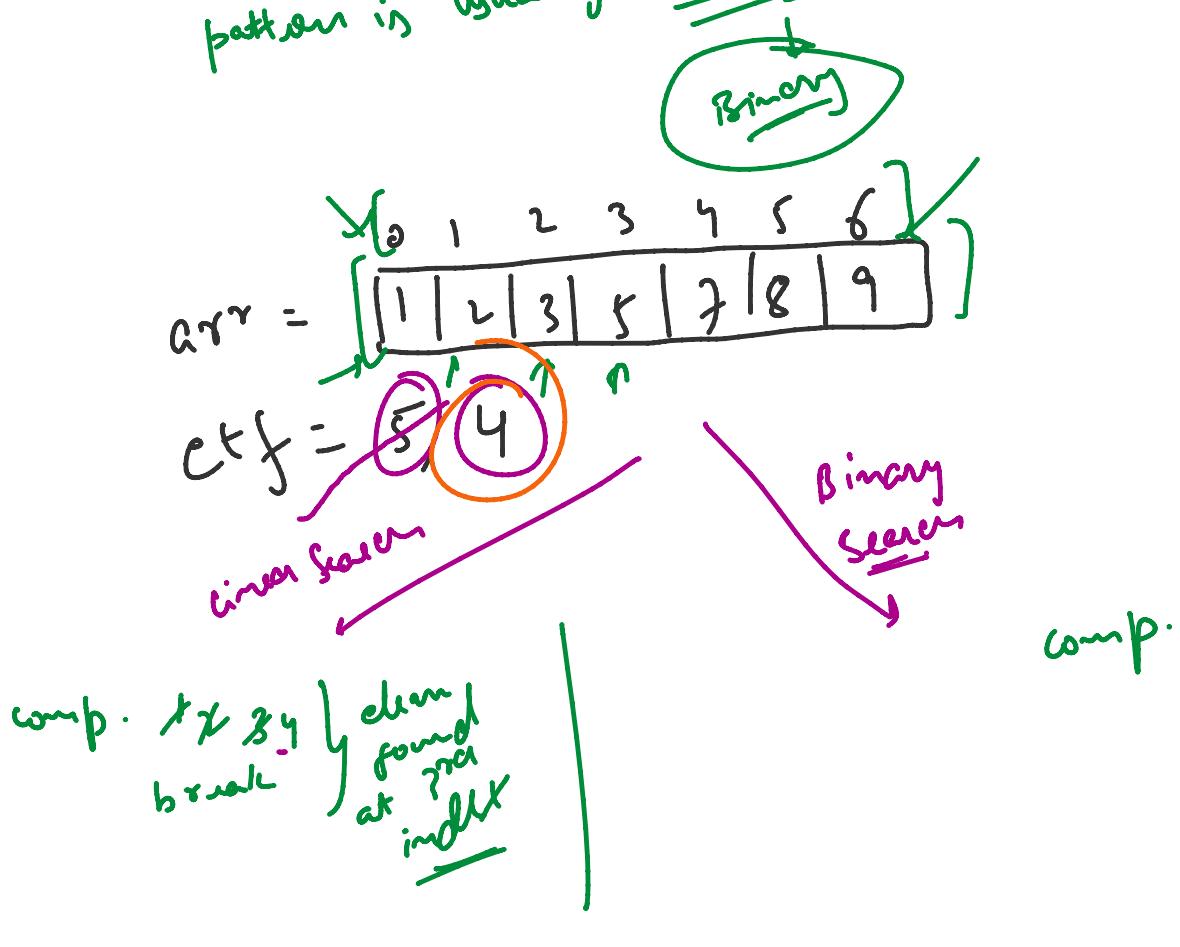
break out

## Binary Search

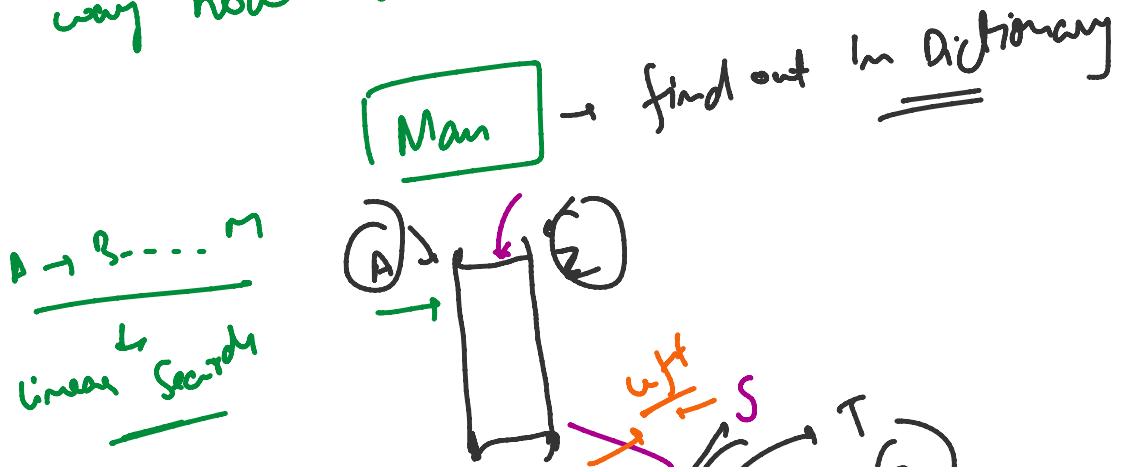
Searching Algorithms: whenever you have to find a particular data that either satisfies a certain condition or just normally find an element from the whole bulk data, we should think of searching algorithms.

Linear Search can be applied anywhere.  
It doesn't matter whether data follows  
"pattern" or not.

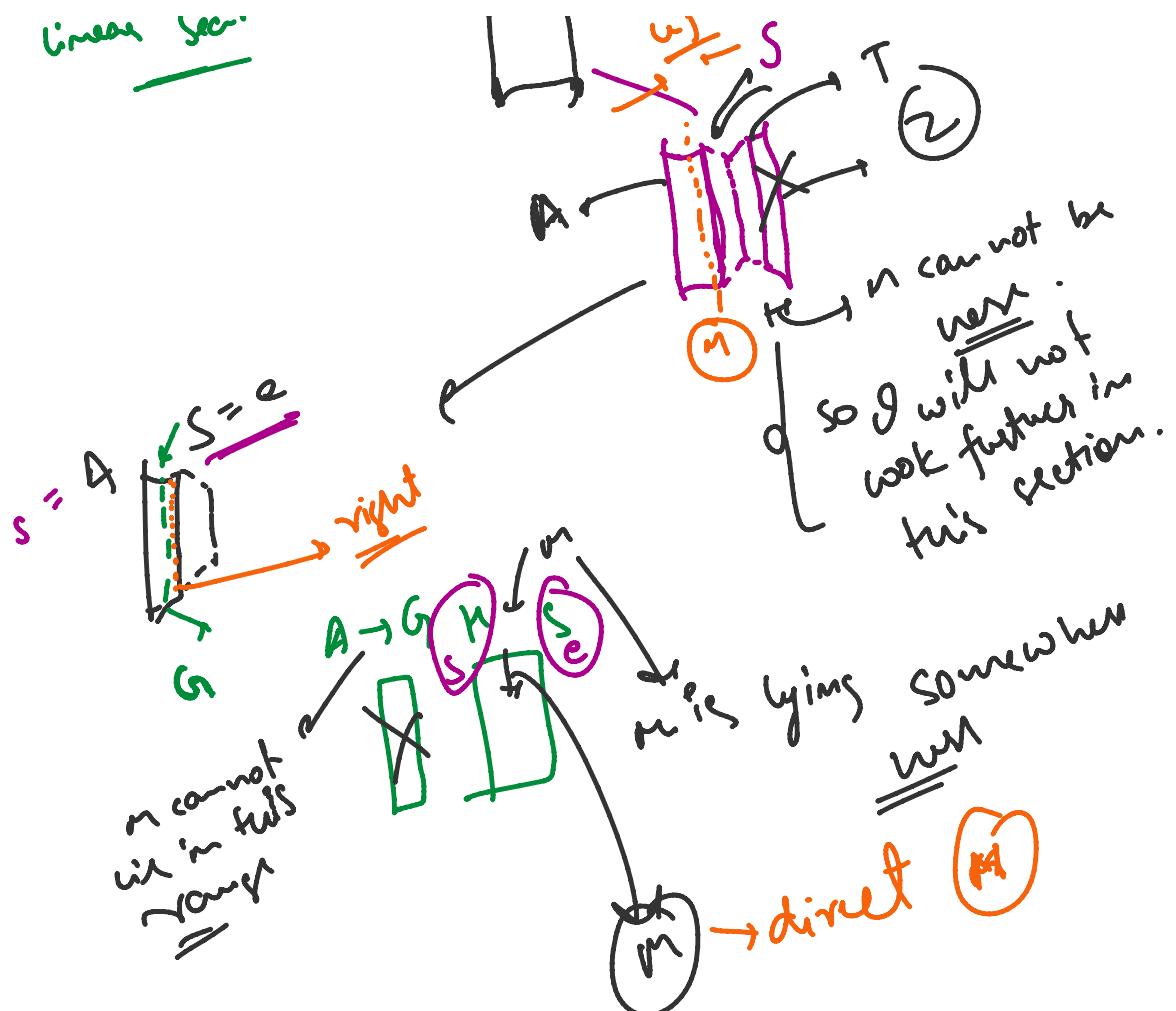
Binary Search: we use Binary Search when we want to search something in our data, and our data is following a certain pattern or order. That pattern is usually sorted data.



Binary Search behaves in some way now we search a word in Dictionary



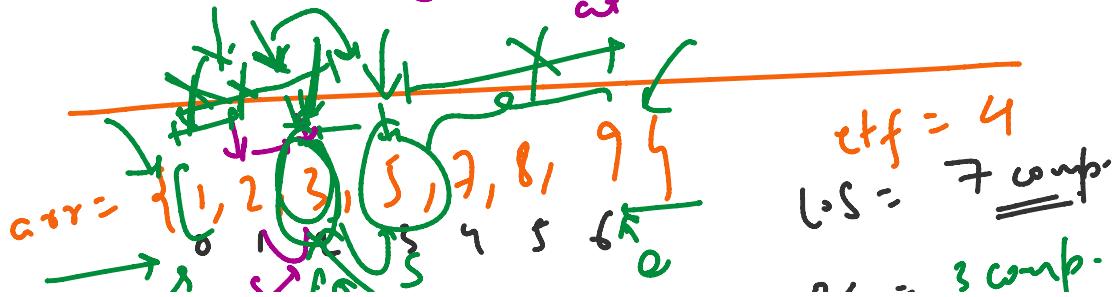
linear search



arr =  $\begin{matrix} \cdot & 1 & 2 & 3 & 4 & 5 & 6 \\ 1, 2, 3, 5, 7, 8, 9 \end{matrix}$   $\rightarrow e$

$$\text{int mid} = \left( \frac{s + e}{2} \right); \quad \frac{6 + 0}{2} = 3$$

① if ( $\text{arr}[mid] == \text{ctf}$ )  $\rightarrow 5$  cmp + 1  
cout "ele found at mid index"  
? ans is

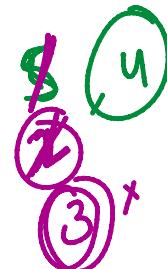


$\text{arr} = [1, 2, 3, 4, 5, 6, 7]$        $\text{lo} = 0$        $\text{hi} = 6$   
 $s = 0, e = 0$   
 $\text{if } \text{arr}[s] \leq \text{arr}[e]$   
 $\text{with } \text{mid} = (s+e)/2$        $\textcircled{2} \cdot \text{index} = 2$   
 $\text{int mid} = \underline{(s+e)/2}$

$\text{if } \text{arr}[\text{mid}] == \text{eff}$   
 $\{$

$\text{do } \{$   
 $\text{if } \text{arr}[\text{mid}] > \text{eff}$   
 $\text{e} = \text{mid} - 1$

$\text{else } \{$   
 $\text{s} = \text{mid} + 1$   
 $\}$



$\frac{0+2}{2} = 1$

~~$(s, e) = (2, 4)$~~

$\rightarrow s = 3$  /  $\text{index}$   
 $e = 2$  /  $\text{index}$

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$f$   
 $\{$   
 $\text{int } \underline{a=1}, \underline{b=1}$   
 $\text{return } a * b;$

$\}$

$\text{main}$   
 $f(x, y)$   
 $\text{int}$

$\rightarrow \text{now } f(1); \rightarrow \textcircled{1}$

$\text{both}$   
 $f(2, 3) \rightarrow 6;$   
 $\text{first}$   
 $f(5) \rightarrow 5;$

first  $f(5) \rightarrow \text{?},$   
~~first~~  $f(7-3) \rightarrow \text{?} \times$   
second  
/ next