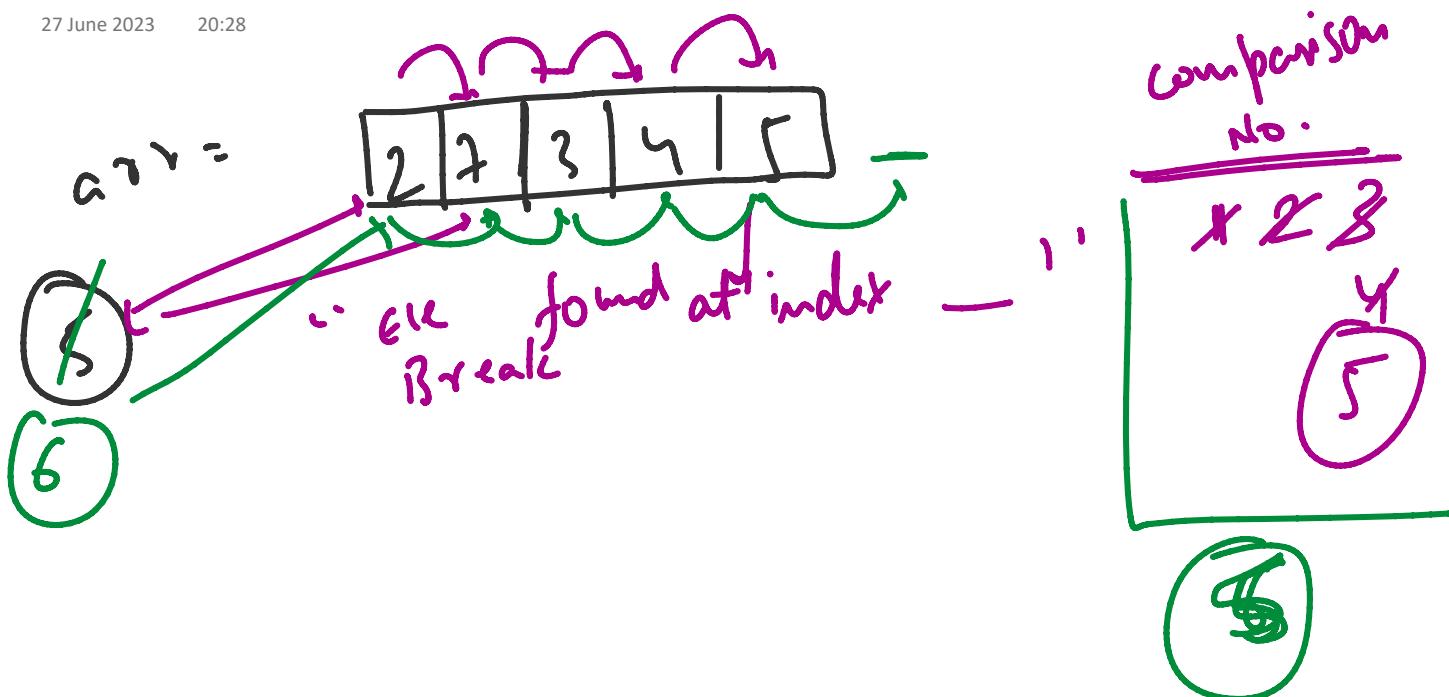


Binary Search

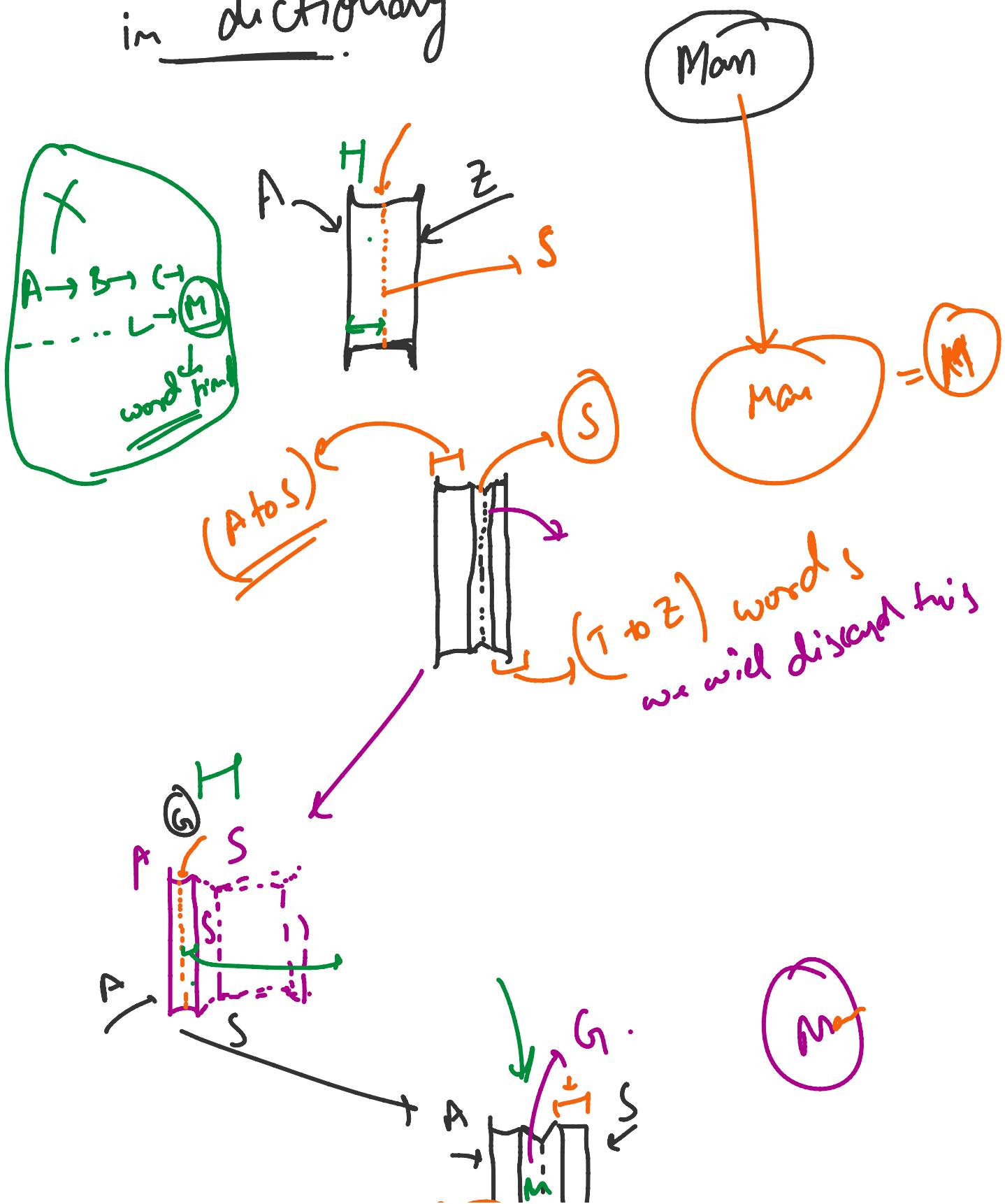
27 June 2023 20:28

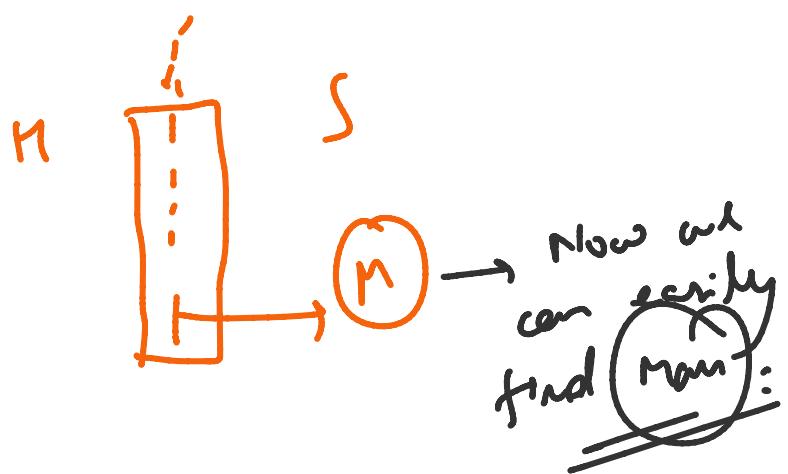
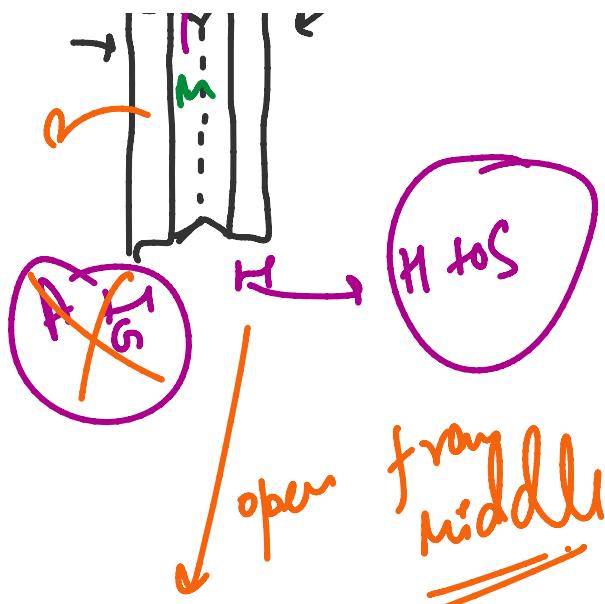


Searching Algorithms: whenever we are required to find a specific data (data that fulfills a certain condition) from the bulk data that is available to us we use searching algorithms.

- ① Linear Search \rightarrow can be applied anywhere
- ② Binary Search \rightarrow can be applied to search for data/value only when our data set / bulk data follows some order / sequence.
i.e. in 95% cases is that data is sorted.

That order in 95% cases is that data is sorted.
 Bin. Search works similar to how we (humans) search for a word in dictionary.





In B.S. each time we try to reduce our search space.

$$a_{88} = \boxed{1 \ 2 \ 3 \ 5 \ 7 \ 9 \ 11 \ 13} \quad \begin{matrix} 0 & 1 & 2 & 3 & 4 & 5 & 6 & 7 \end{matrix}$$

$$\text{et } f = (5, 4)$$

$$\text{By } \text{L.S} \rightarrow 1+1+1+1 = 4, \text{ R.H.S. } 5$$

→ 1 + 1 + 1 + 1 = 4, the not found
→ 8. comparisons → 3
RS

By BS.

data is sorted

$a[0] = 1, a[1] = 2, a[2] = 3, a[3] = 5, a[4] = 7, a[5] = 9, a[6] = 11, a[7] = 13$

$x = 4$

$l = 0, r = 7$ index

$mid = (0+7)/2 = 3$

$a[3] = 5 > 4$

$l = 0, r = 2$ index

$mid = (0+2)/2 = 1$

$a[1] = 2 < 4$

$l = 2, r = 2$ index

$mid = (2+2)/2 = 2$

$a[2] = 4 = 4$

With 4 found

Not found 4 here

→ if $\text{arr}[\text{mid}] == \text{ef}$
with $\text{mid} <$

→ else if $\frac{arr[mid]}{mid} > ctf$:
 $l = mid + 1$ disc

и

$$a^{\gamma} = \frac{1 \cdot 1 \cdot 2 \cdot 3 \cdot \dots \cdot e^{-1} \dots}{s^{\gamma} \cdot \cancel{1} \cdot \cancel{2} \cdot \cancel{3} \cdot \dots \cdot \cancel{e^{-1}} \cdot \dots}$$

$$\text{arr}[\text{mid}] = 2$$

discarded

x

y

z

3

1

2

2

2

1

2

3

discarded

disconnected

$s = \text{mid} + \frac{e}{2}$

$\text{mid} = \frac{(s+e)}{2}$

$$\cos[\text{mid}] = 3$$

S' - mid + 1