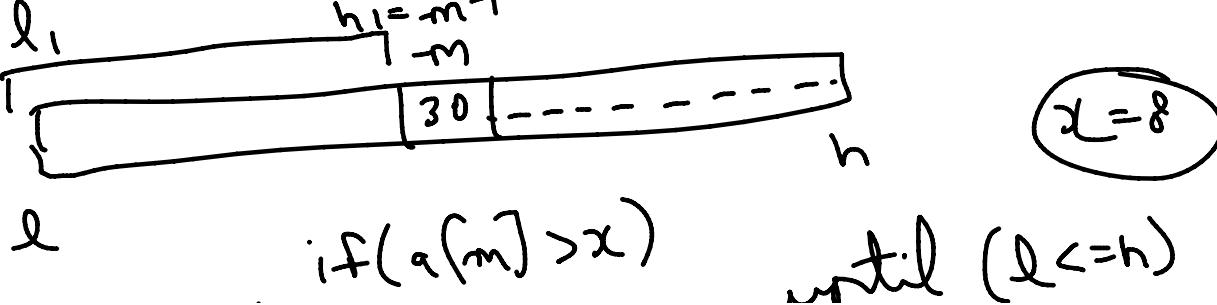
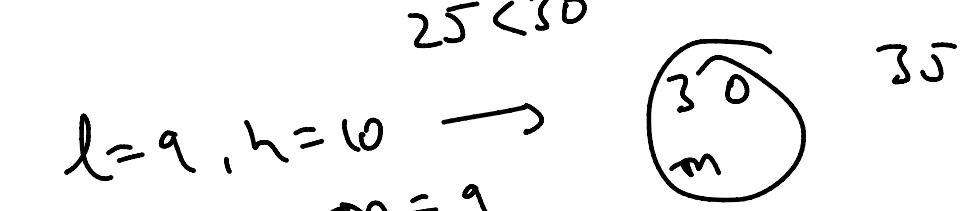
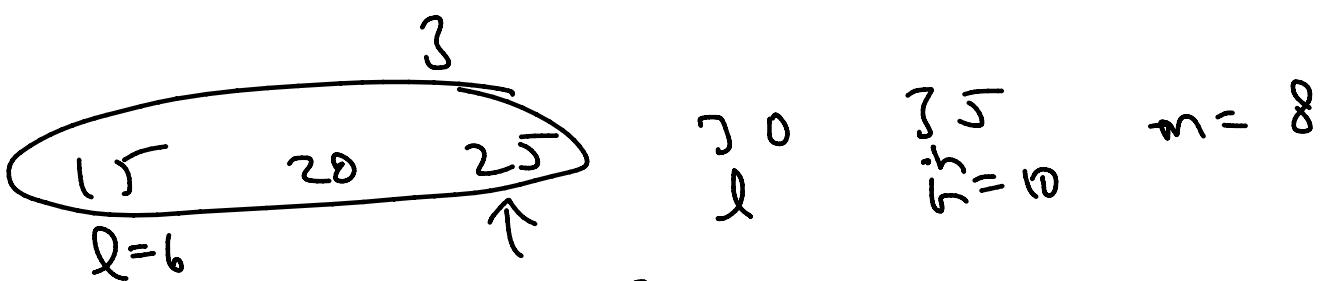
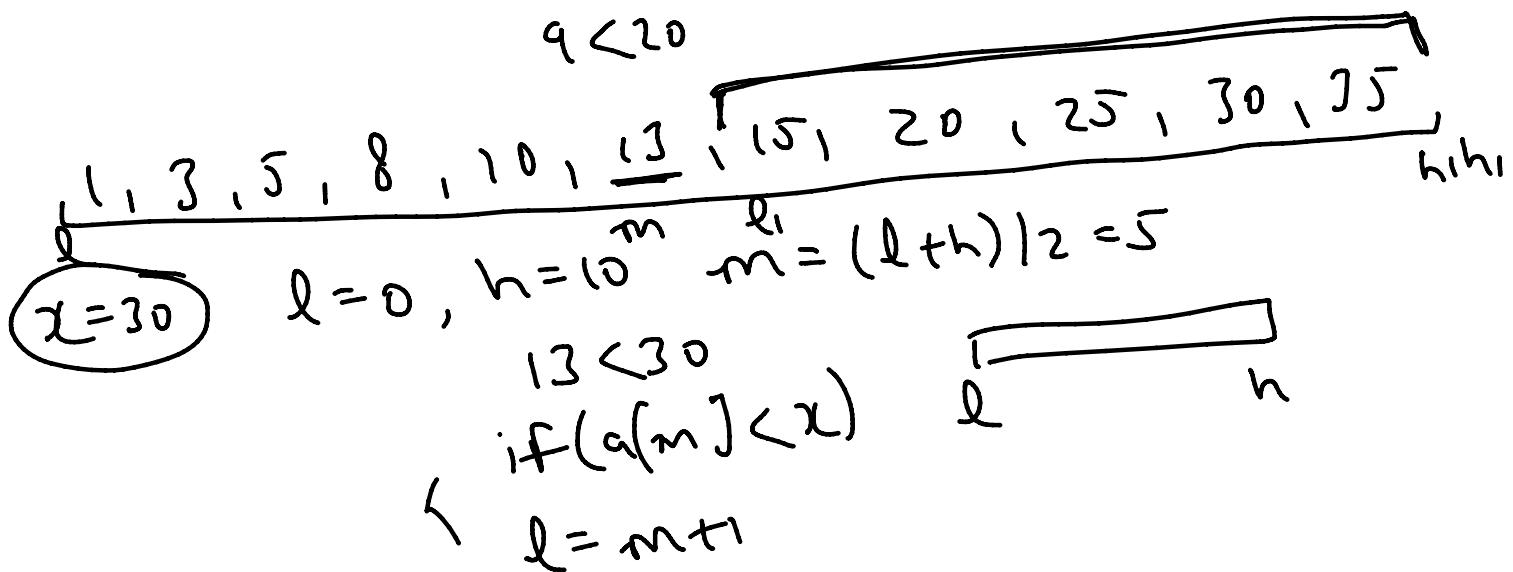
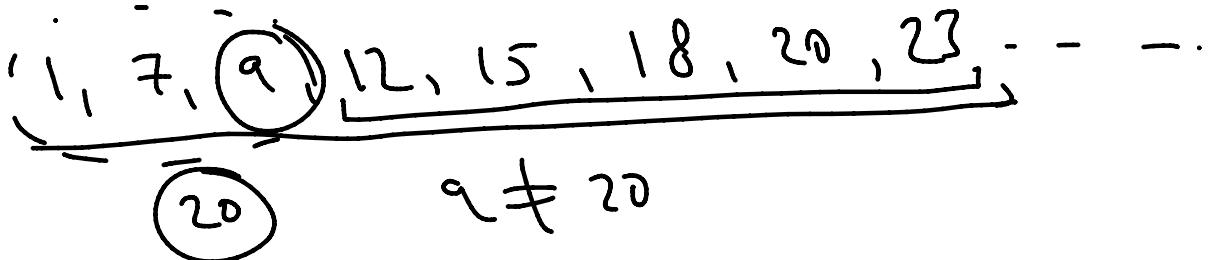
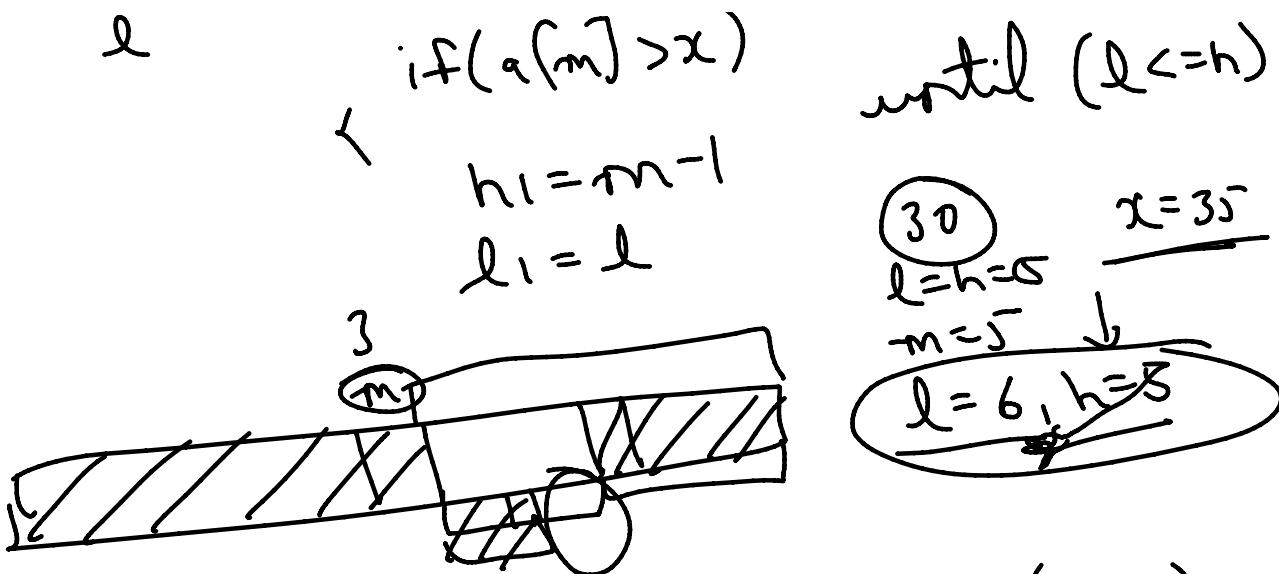


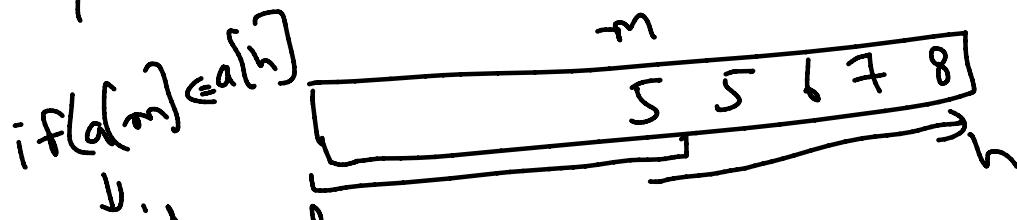
⇒ Binary Search



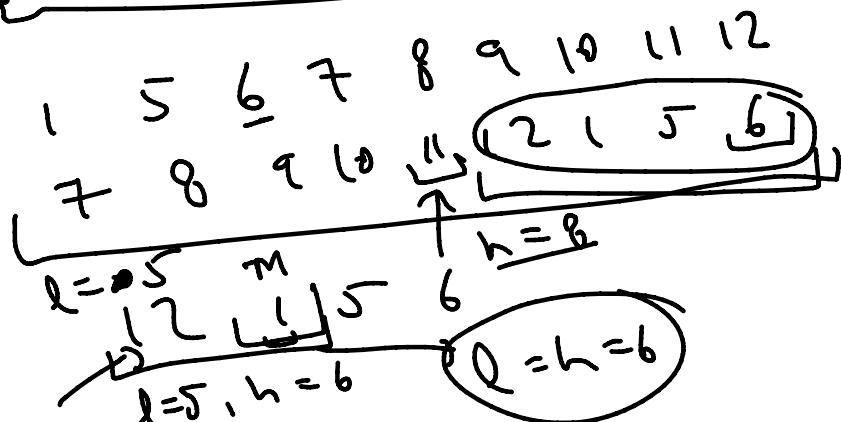
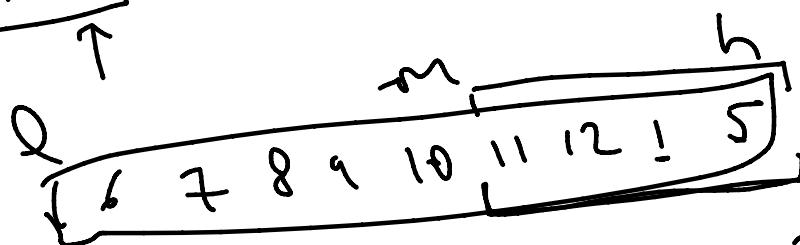


$$TC = T(n) = T(n/2) + C \rightarrow O(\log_2 n)$$

Q | Min in sorted rotated array.



$if(a[m] > a[h])$
 \downarrow
 min element
 \downarrow
 $[m+1, h]$

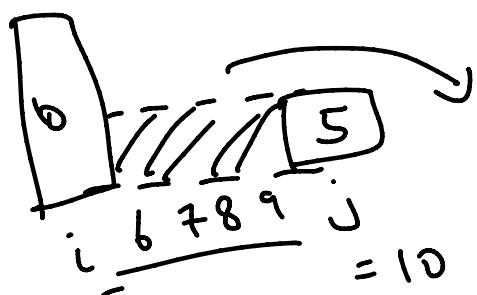


$10 \ 8 \ 7 \ 6 \ 5 \ 4 \ 3 \ 2 \ 1 \quad m=5$
 (5) 5 5 5 5

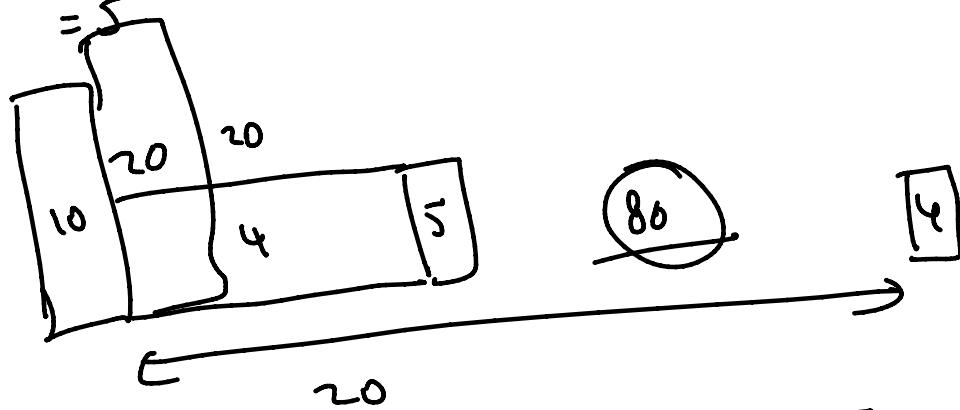
if ($a[m] <= a[h]$)
 if ($a[m] = a[h]$)

$12 \ 34 \quad (5) \ 6 \ 7 \ 8 \ 9$
 10 11 12

(5) $\frac{5 \ 5 \ 5 \ 5}{9 \ 8 \ 7 \ 6}$
 (10)



$$\min(h_1, h_2) \times (j - i + 1)$$

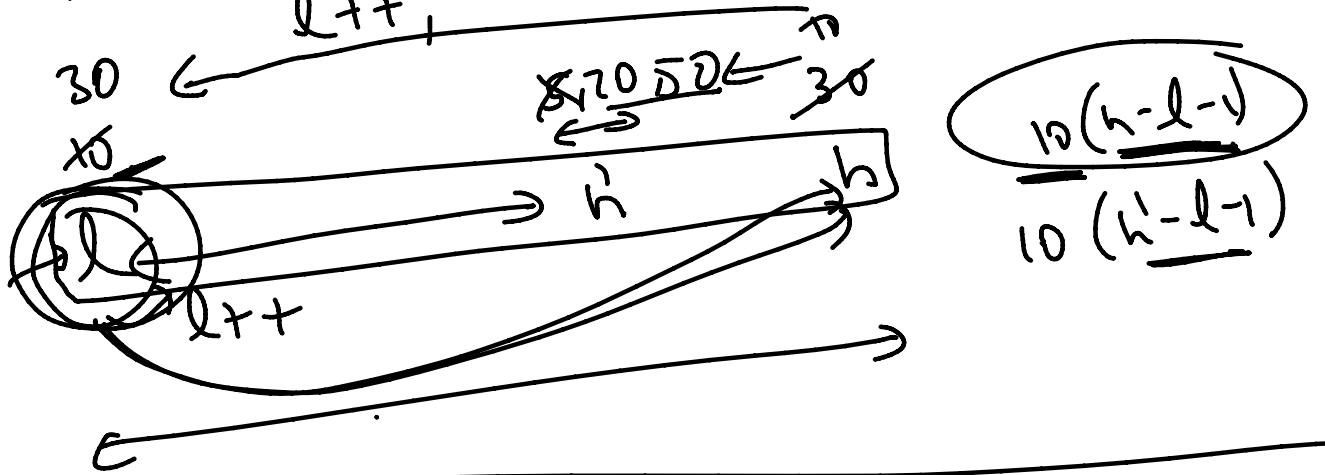


while($l < h$)
 if ($a[l] <= a[h]$)
 l ++

$$ans = \max(ans, (h - l - 1) \times \min(i(l), h(h)))$$

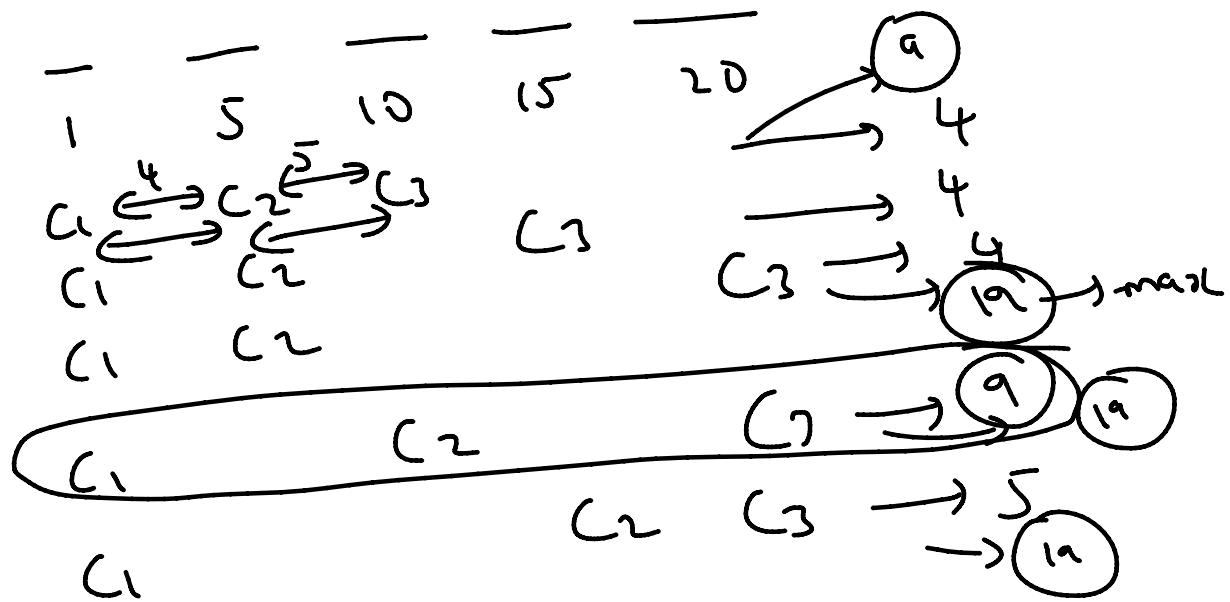
if ($a[l] > a[h]$)
 h --

$$f(a/l) \leq a^{n-1}$$



Aggressive Comb

3 cows



$$\min = 2, \max = 20^0$$

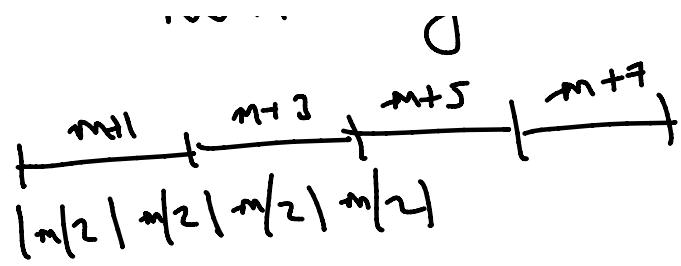
$$\min = 5^0, \max = 5^1 \checkmark$$

K cows \rightarrow m stalls

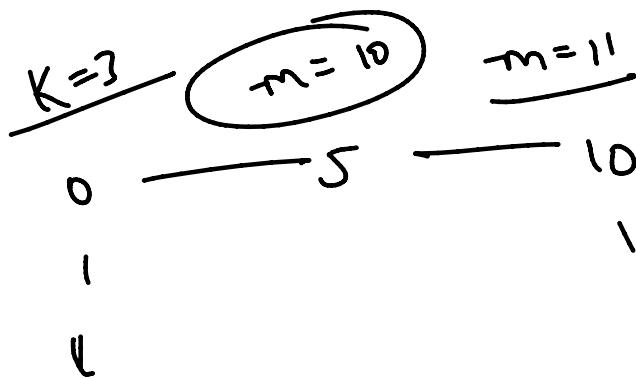
min any 2 cows \rightarrow m

$$\dots m+5, m+7, \dots$$

$$\boxed{m+1} \quad \dots$$

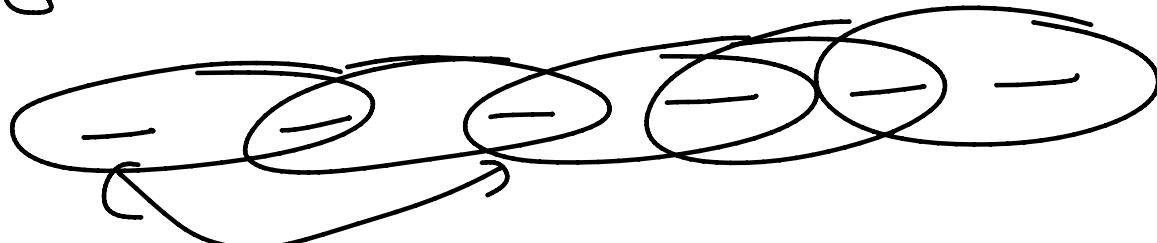
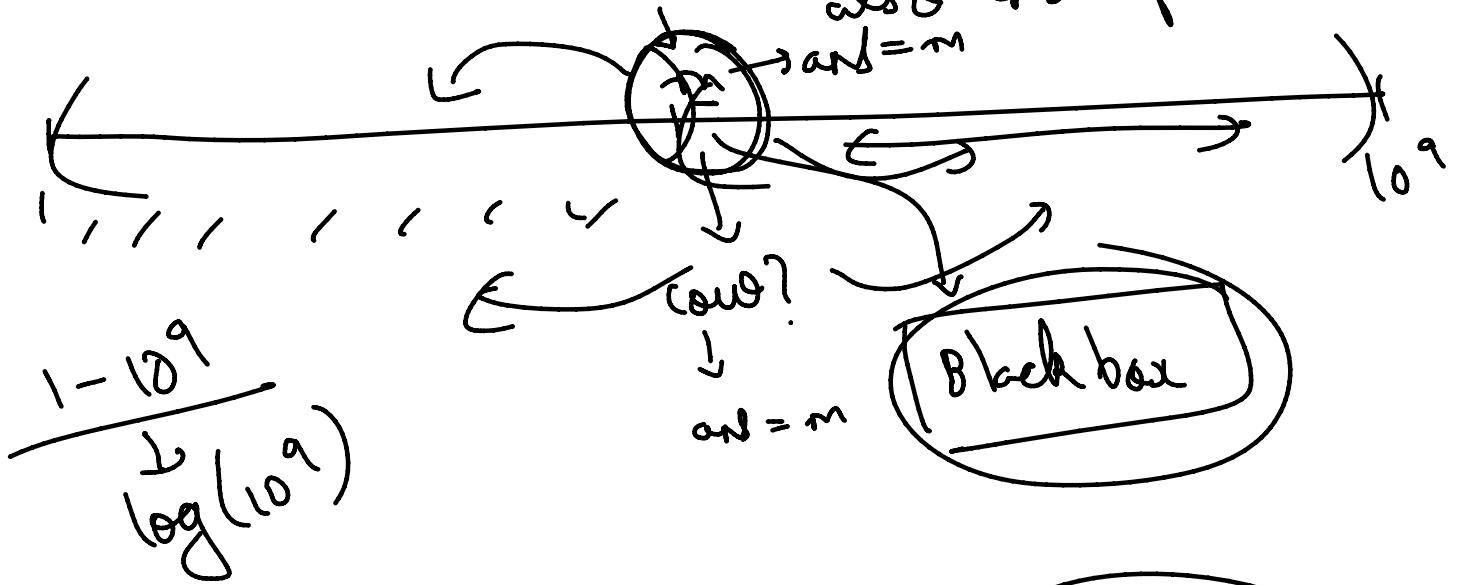


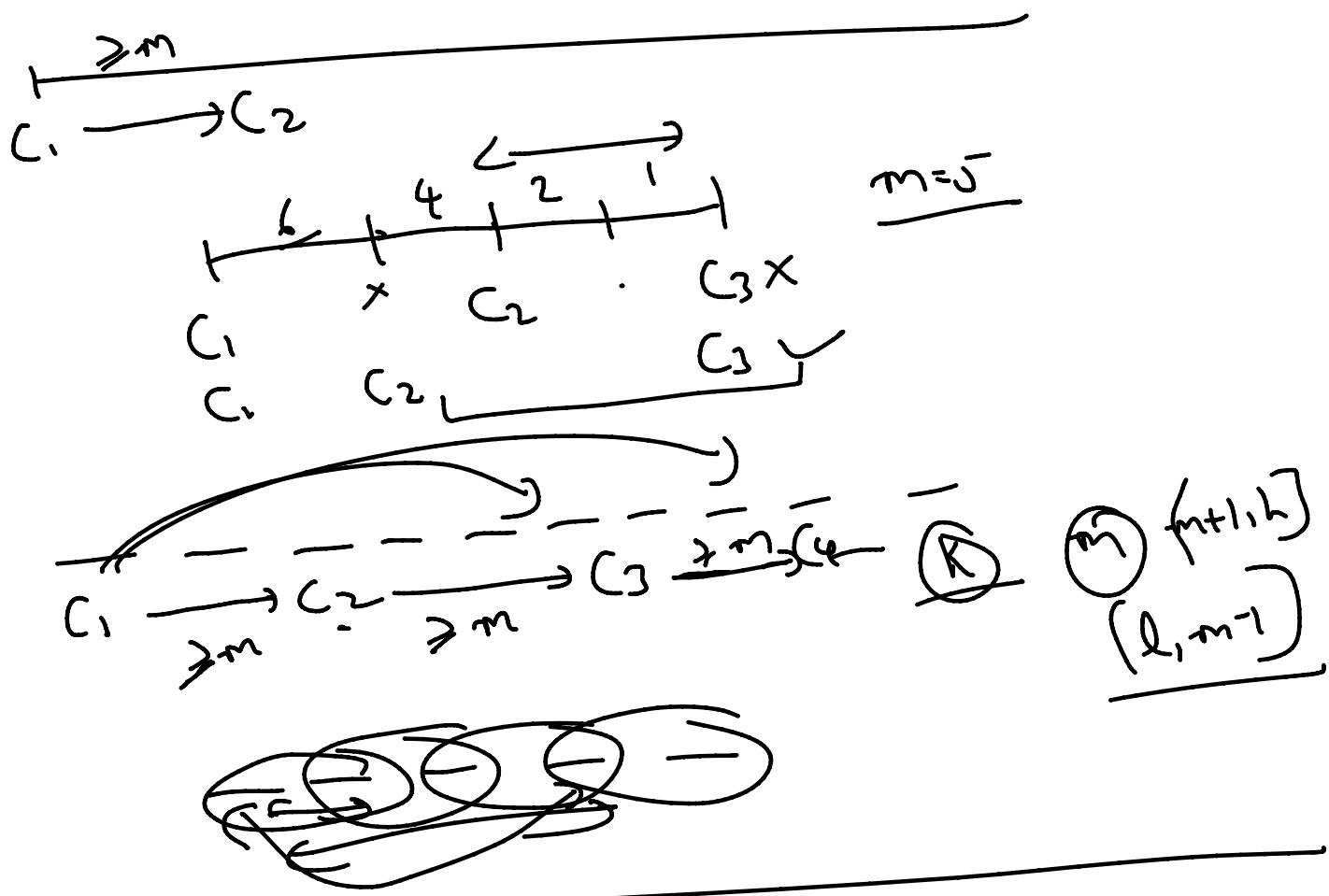
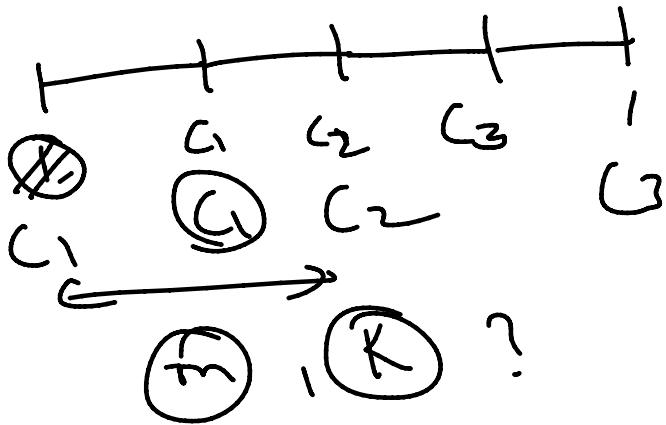
$m+1$
 if \rightarrow min dist b/w any 2 cows is poss
 for value of m ,
 then all values $< m$
 are possible.



26

\rightarrow If min dist b/w any 2 cows of m is not possible, then $>m$ is also not possible.





Sorting :- → list of data → sort

e.g.: - $a[3, 1, 5, 2, 4]$ → sort → $(1, 2, 3, 4, 5)$

→ $(5, 4, 3, 2, 1)$

merge sort quick sort

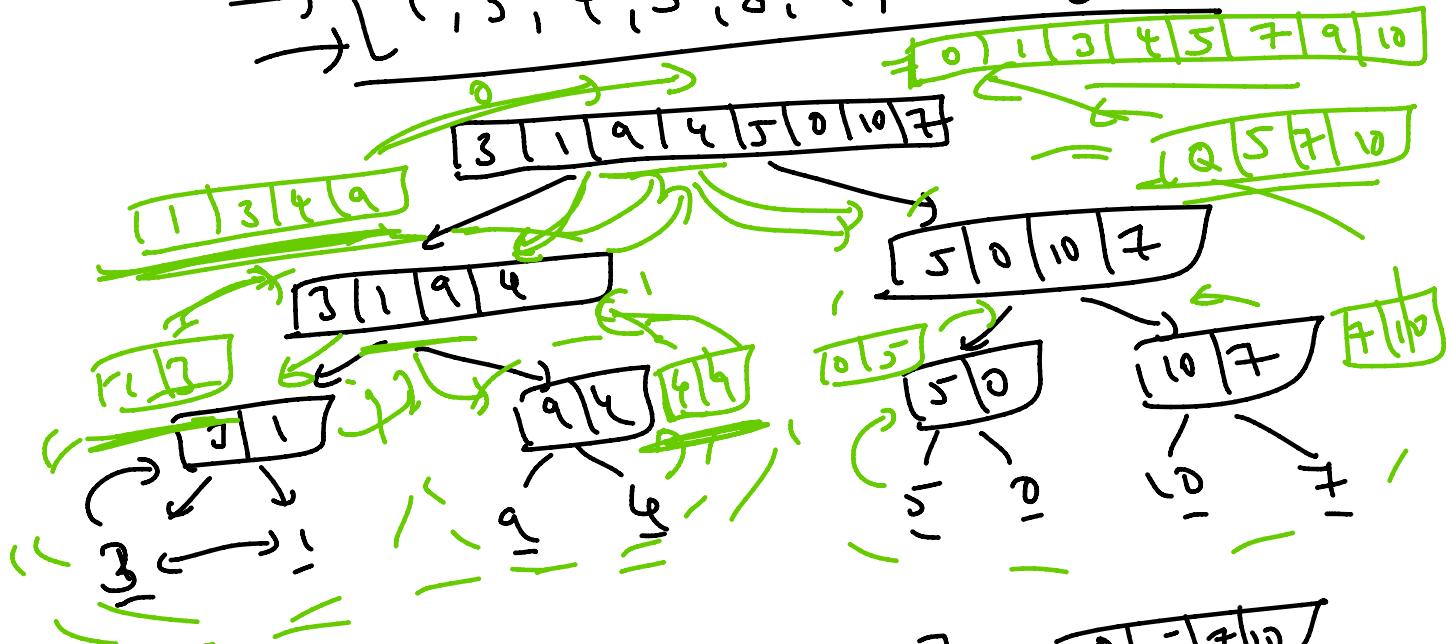
{ selection, bubble, insertion }

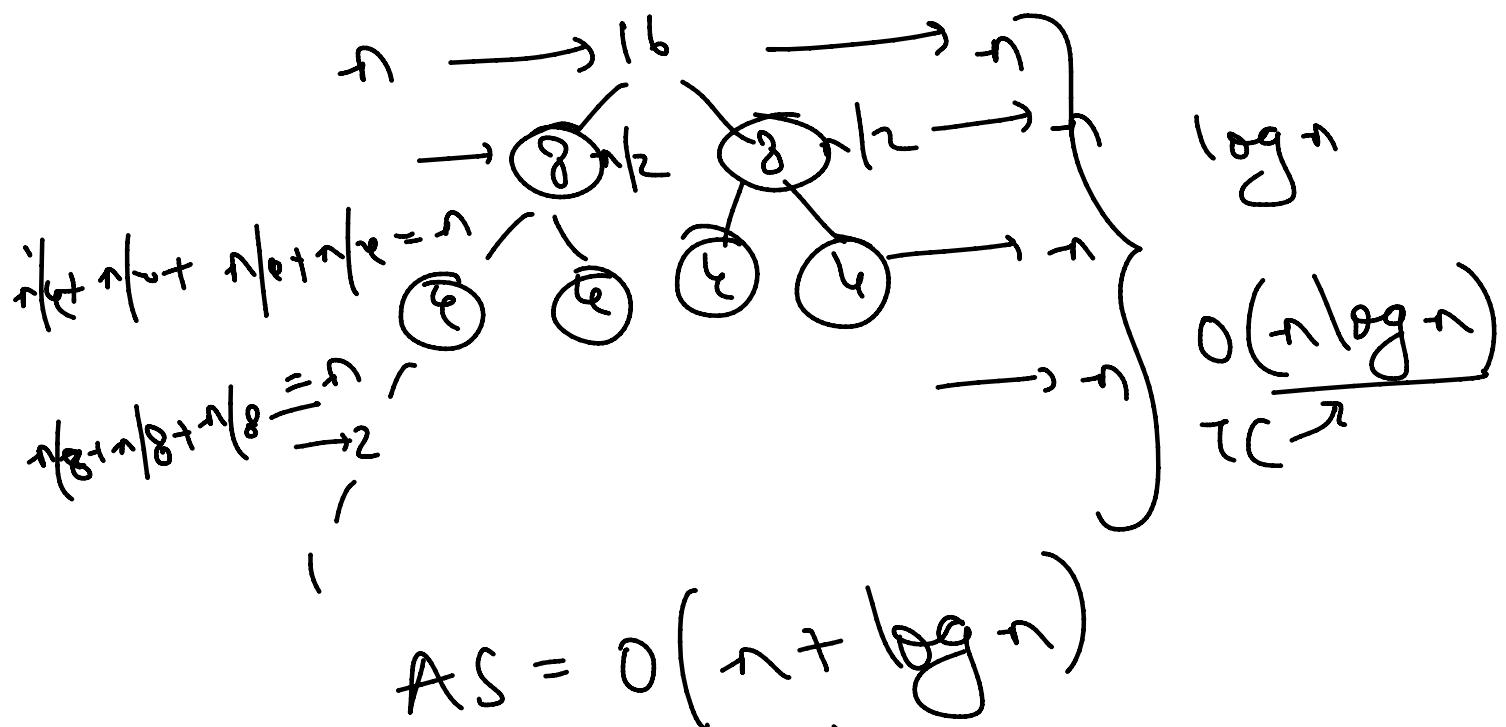
(merge sort) v sort see
bubble, insertion

=> Merge Sort :- → divide & conquer.

$$\rightarrow [3, 5, 9, 12] \xrightarrow{\text{m}} [1, 4, 8, 13]$$

$$\rightarrow [1, 3, 4, 5, 8, 9, 12, 13]$$





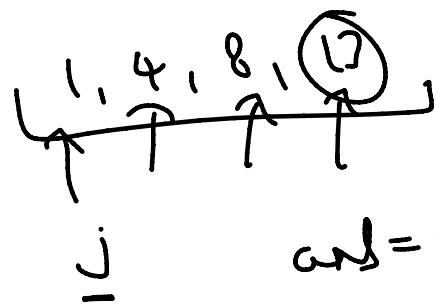
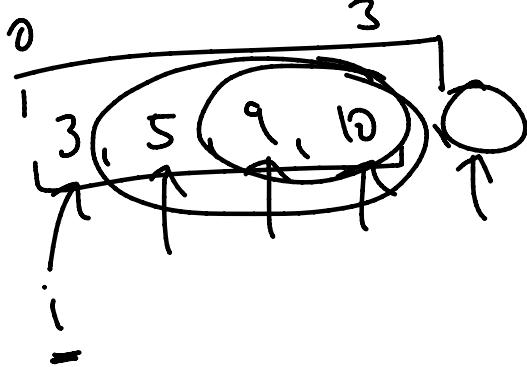
$$AS = O(n + \log n)$$

$$= O(n)$$

$\rightarrow \underline{\text{stable}} = ? \rightarrow \checkmark \underline{\text{stable}}$

$\rightarrow \underline{\text{inplace}} = ? \quad \text{Not inplace}$

$$\tau(n) = 2\tau(n/2) + \underline{\sigma}$$



$$ans = ans + \frac{m - i + 1}{4}$$

$$\begin{array}{r} +3 \\ +2 \\ \hline = 9 \end{array}$$