

DS260222 A8B

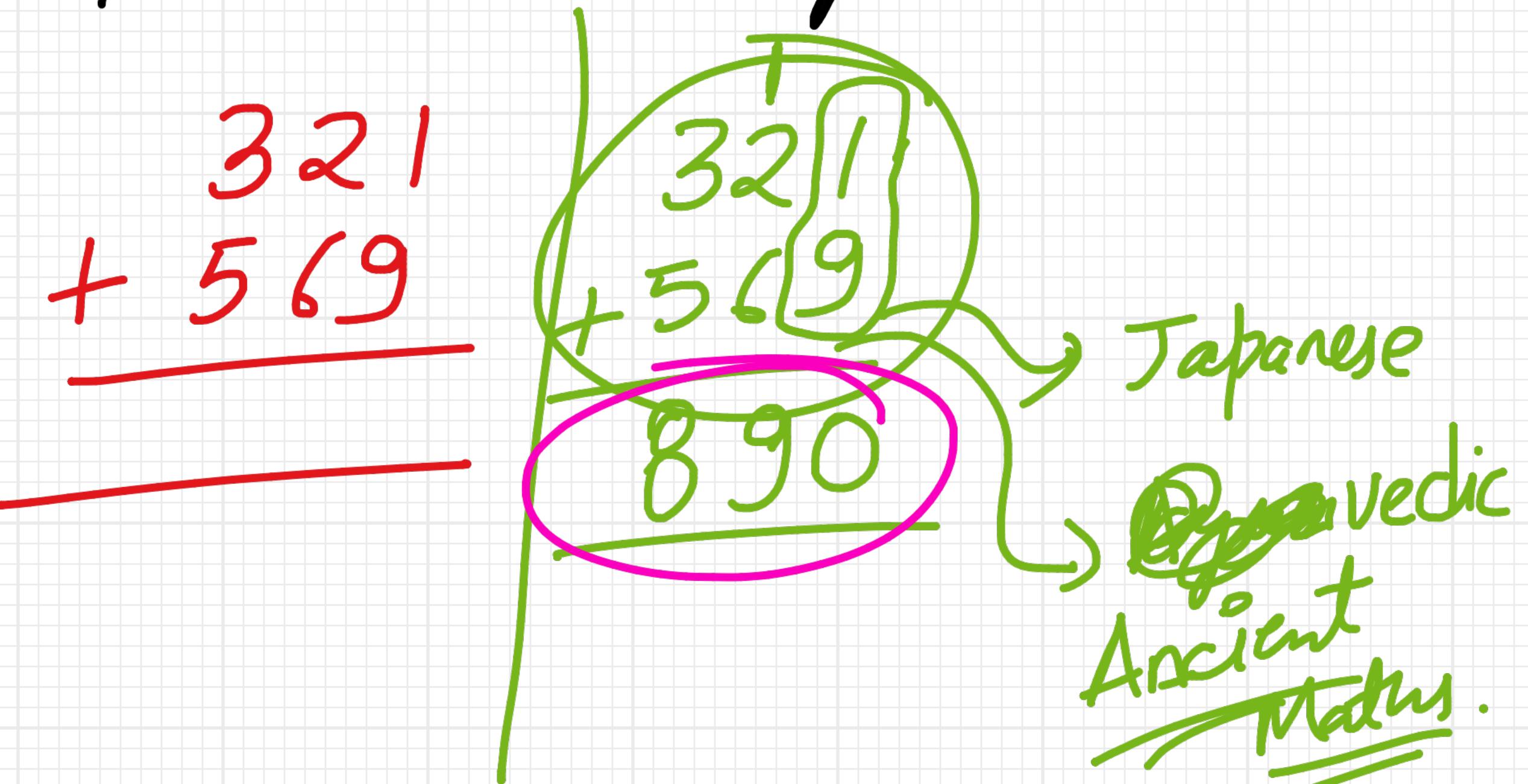
Algorithm?  $\Rightarrow$  Step by Step Instructions  
to solve a problem

Data Structure? Store where you keep  
data and retrieve from it.

\* Same problem can be solved  
by multiple methods/ways.

Problem

$$\begin{array}{r} 321 \\ + 569 \\ \hline \end{array}$$



Why do we study Algorithms?

- ① To find the faster solution
- ② To solve future problems which are similar to these algorithms or may be use these algo.

# Scanning

$l = [52, -3, 60, 100, 2]$

key = 60  $\times \times \checkmark$

Ans  $\Rightarrow$  2  
Linear Search

# # Binary Search

$l =$



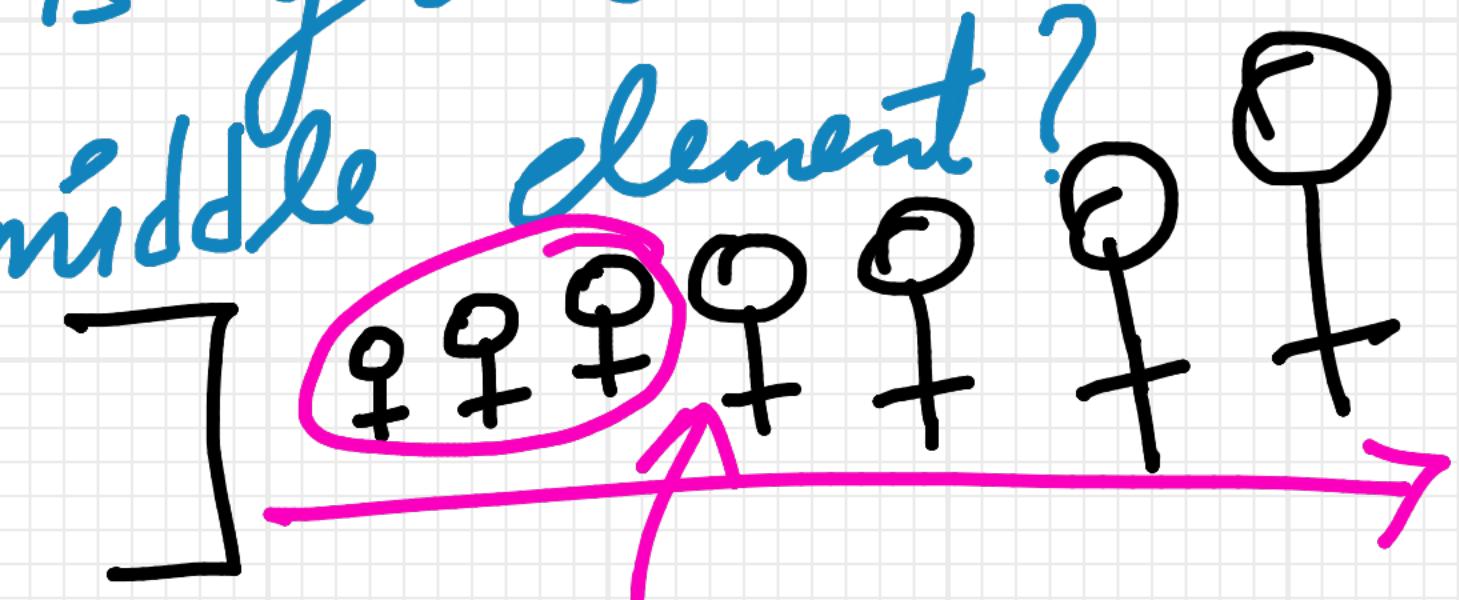
$$\text{key} = 3 \quad \text{odd} = \frac{n-1}{2}$$

$$7-1 = 3$$

Sorted  $l$

Key = 70

whether Key is greater than or less than middle element?



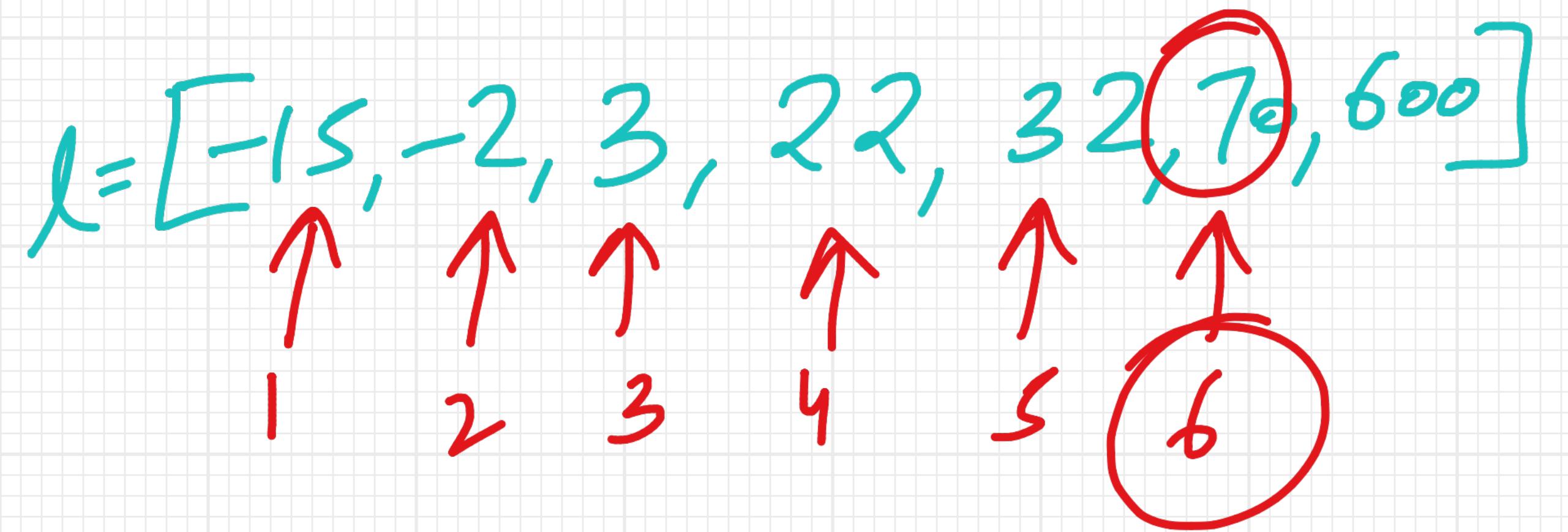
Key = 70

[32, 70, 600]

Middle element

whether it is greater, smaller or equal to key

2 Steps



Binary Search is  
faster compared  
to Linear Search.

$$\left[ \begin{matrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 2 & 3 & 4 \end{matrix} \right] \quad \left[ \begin{matrix} 4 & 5 \end{matrix} \right]$$

$5 // 2 = 2$

Diagram showing a 3x3 matrix with the last two columns circled in green. A green oval encloses the last two columns. A pink bracket groups the last two columns of the matrix.

$$\left[ \begin{matrix} 0 & 1 & 2 & 3 & 4 \\ 1 & 2 & 3 & 4 & 5 \\ 2 & 3 & 4 & 5 & 0 \end{matrix} \right] \quad \left[ \begin{matrix} 6 & 7 & 8 & 9 \\ 7 & 8 & 9 & 10 \end{matrix} \right]$$

Diagram showing a 3x4 matrix with the last four columns circled in blue. A blue oval encloses the last four columns. A pink bracket groups the last four columns of the matrix.

$4 \text{ each}$

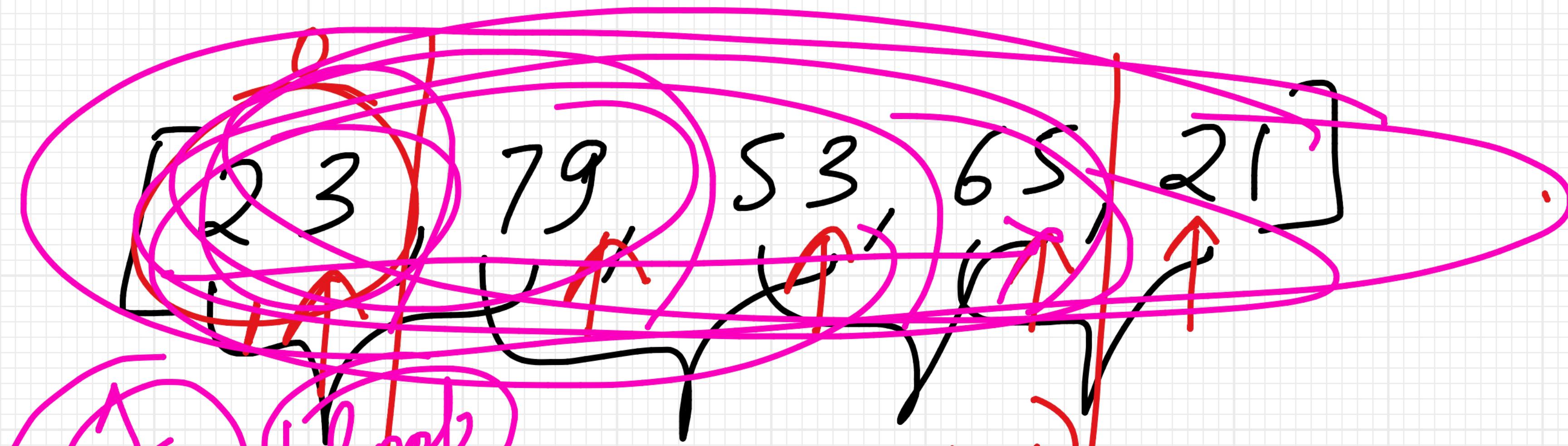
$4 \text{ each}$

$10 // 2 = 2$

Diagram showing a 3x5 matrix with the last five columns circled in blue. A blue oval encloses the last five columns. A pink bracket groups the last five columns of the matrix.

$4 / 2 = 2$

Kind of middle



time  
while ( $\text{right\_ptr} > 0$ )

2 loops

$\text{right\_ptr} = 1$