

0	1	2	3	4	5	6	7	8
8	7	6	5	4	3	2	1	9

start = 0    stop = 8    mid =  $\frac{0+8}{2} = 4$

$A[\text{start}] = 8$

$A[\text{stop}] = 9$

$A[\text{mid}] = 4$

8 7 6 5 4 3 2 1 9

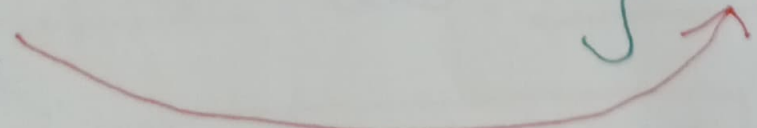
Swap pivot and last item

9 7 6 5 4 3 2 1 8  
*i* *j* pivot

Both *i* and *j* stays.

Swap and increment *i*, dec *j*

1 7 6 5 4 3 2 9 8  
*i* *j* *i* pivot



Cross over happened

Swap pivot and value at i

0	1	2	3	4	5	6			
1	7	6	5	4	3	2		8	9
								E	G

L

There is one recursive call  $(L, 0, 6)$

$$\text{mid} = \frac{0+6}{2} = 3$$

median of  $\{1, 5, 2\} = 2$ .

2 is the pivot.

Swap pivot with last item. (No change)

1	7	6	5	4	3	2
						pivot

*(Diagram showing a red arrow from index 6 to index 2, and a red arrow from index 2 to index 2, indicating a swap of the pivot with the last element.)*

cross over happened

Swap pivot and value at i

1	2	6	5	4	3	7
L	E					G

There is one recursive call

2	3	4	5	6
6	5	4	3	7

start = 2 stop = 6

pivot = {6, 4, 7} = 6

Swap pivot with last item

7	5	4	3	6
---	---	---	---	---

i j pivot

No change. Swap and inc i,  
dec j

3	5	4	7	6
---	---	---	---	---

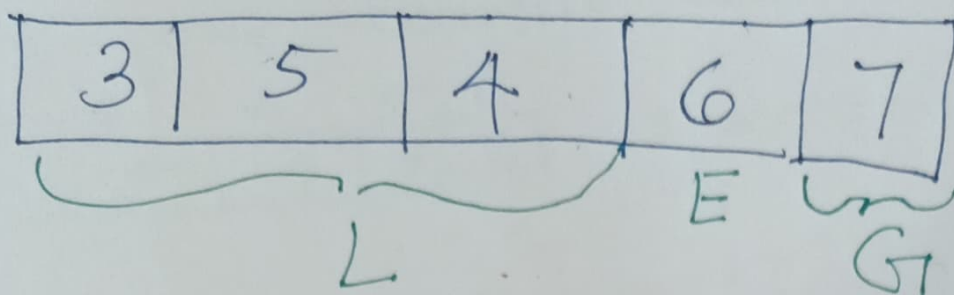
i j pivot

no change

Cross over happened.

Swap pivot and value at i

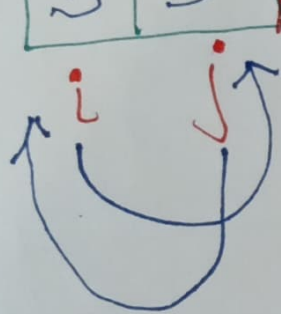
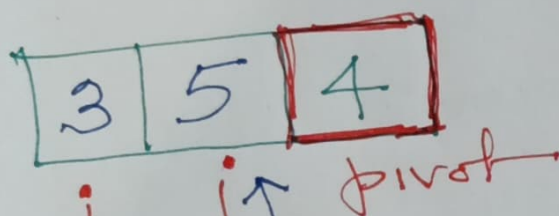




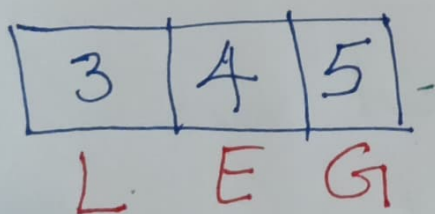
Recursive call  $\left( \begin{array}{ccc} 2 & 3 & 4 \\ \hline 3 & 5 & 4 \end{array} \right)$

median of  $\{3, 5, 4\} = 4$

pivot is 4.



cross over happened  
 swap. ~~put~~ pivot  
 with value at i



Algorithm ends