

# Sorting Algorithms

1. Selection

2. Bubble

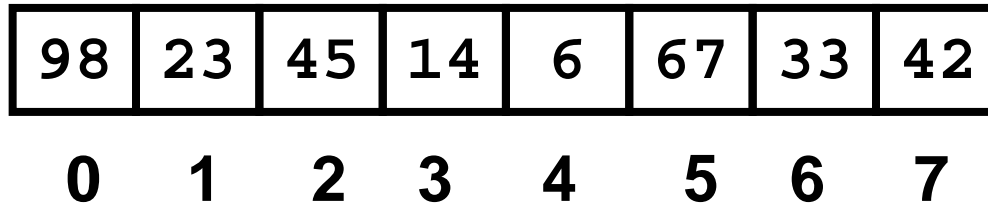
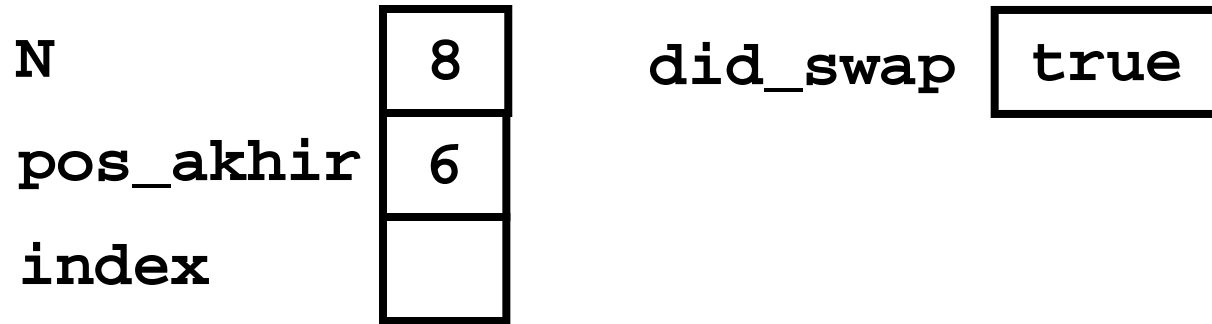
3. Insertion

4. Merge

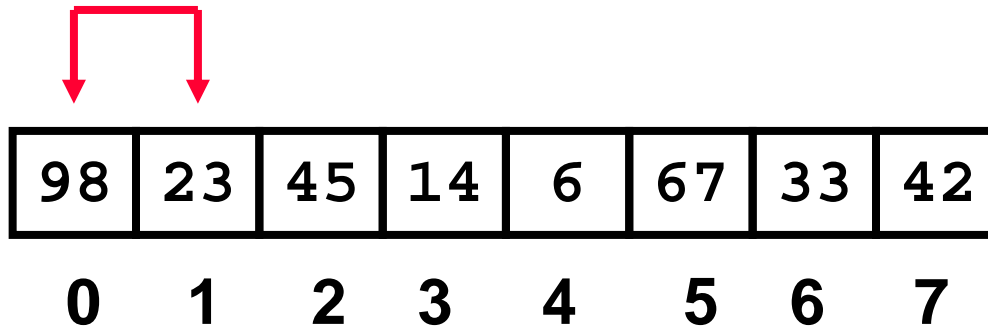
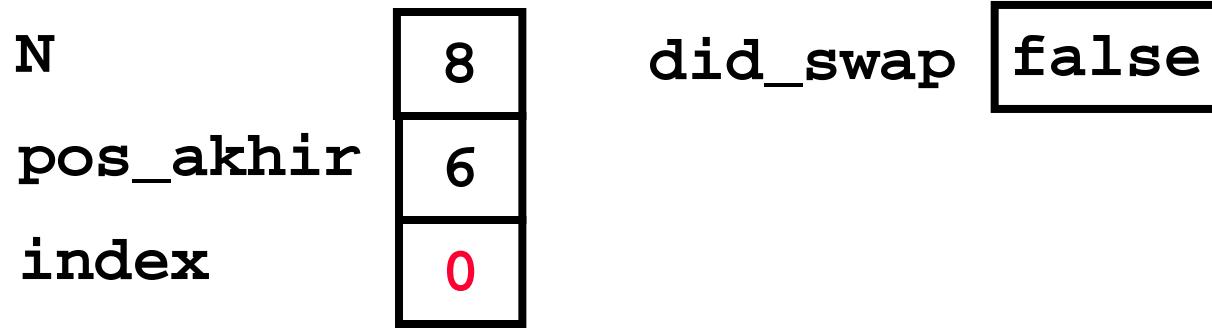
5. Quick

6. Shell

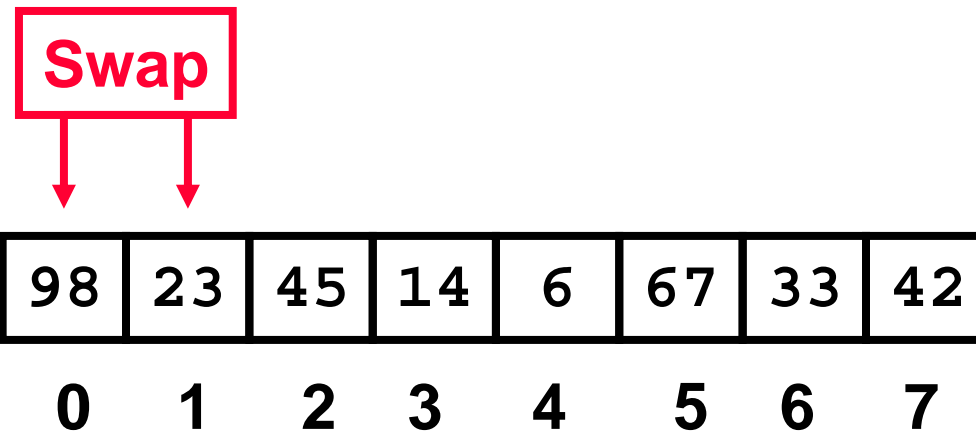
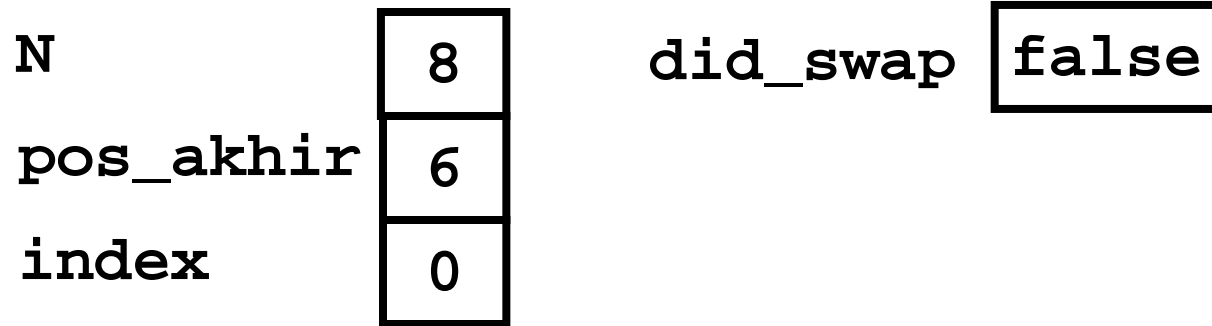
# An Animated Example



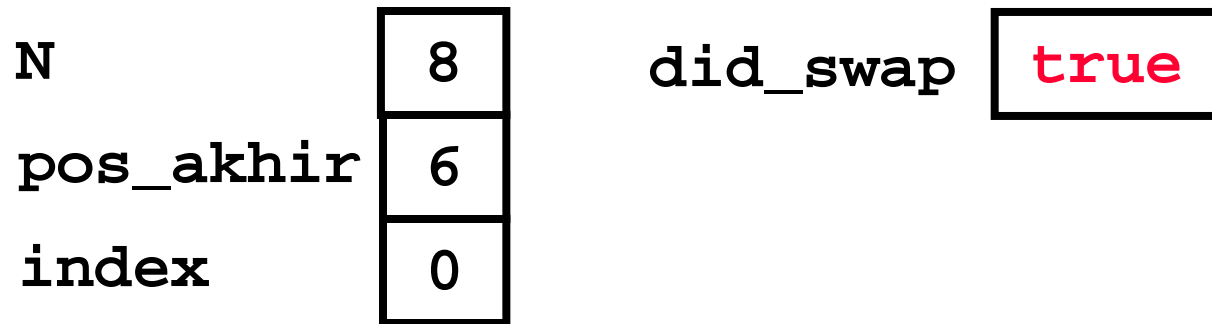
# An Animated Example



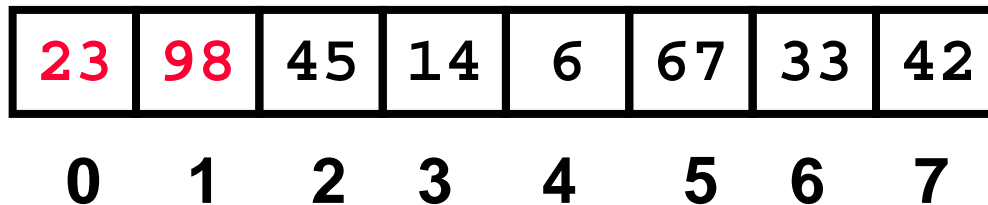
# An Animated Example



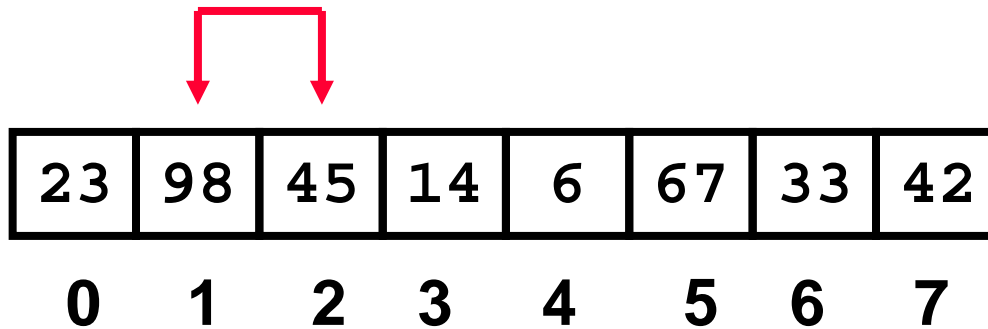
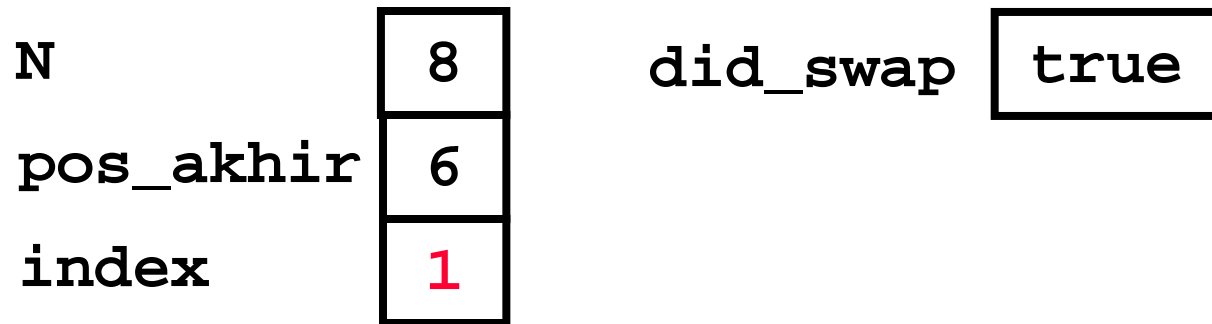
# An Animated Example



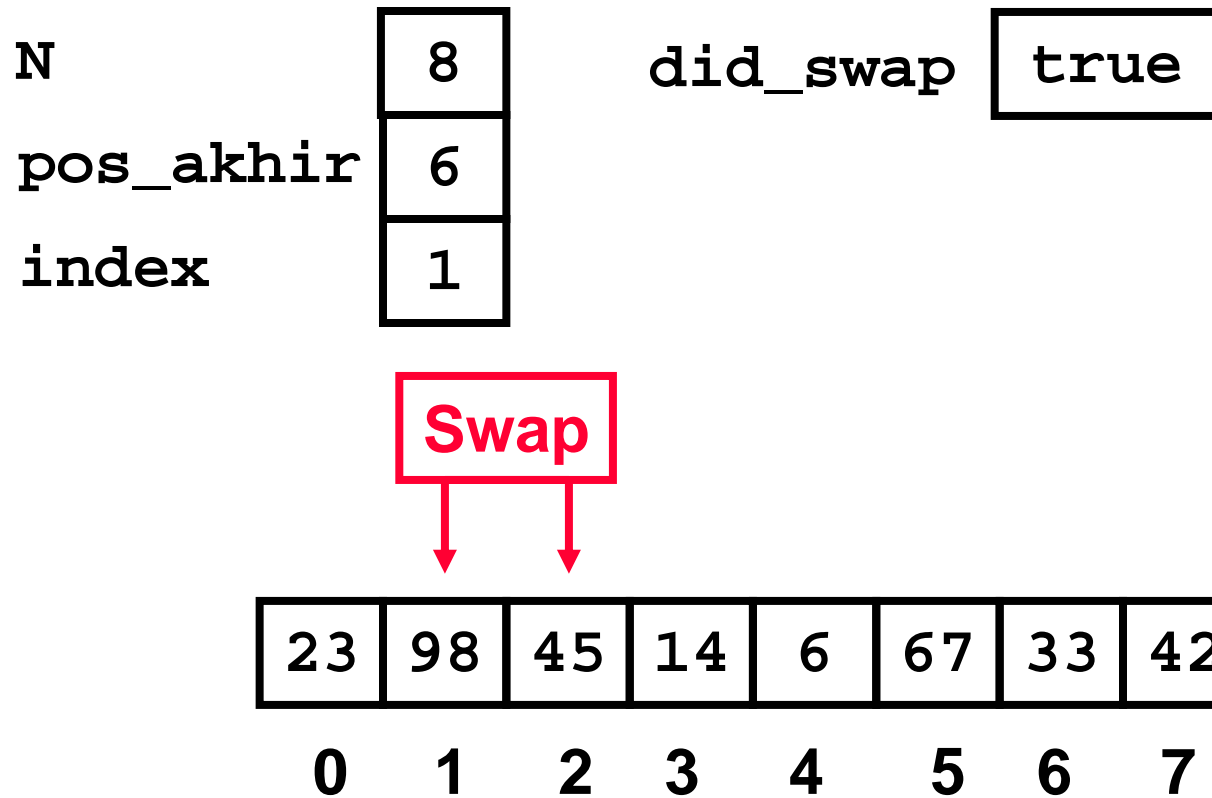
Swap



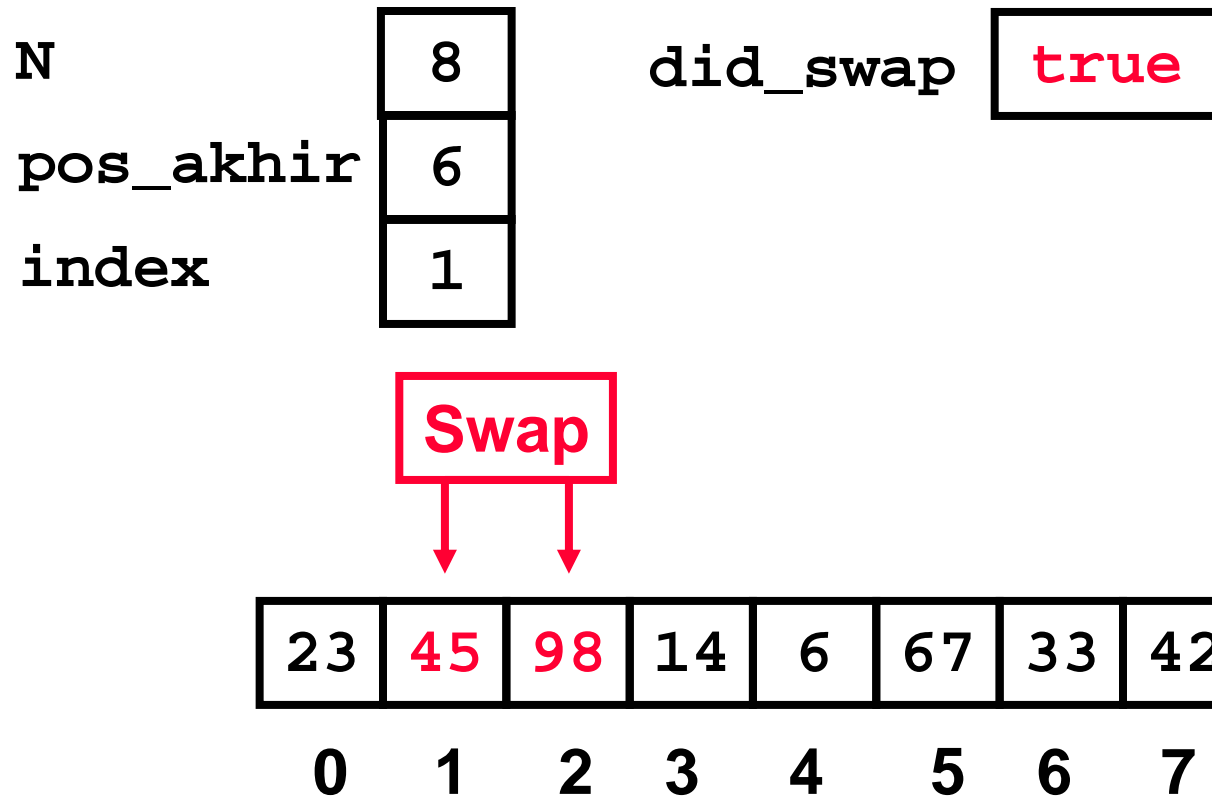
# An Animated Example



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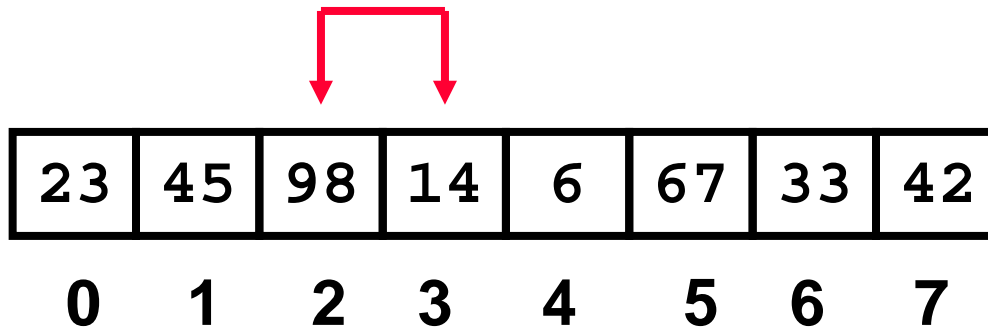
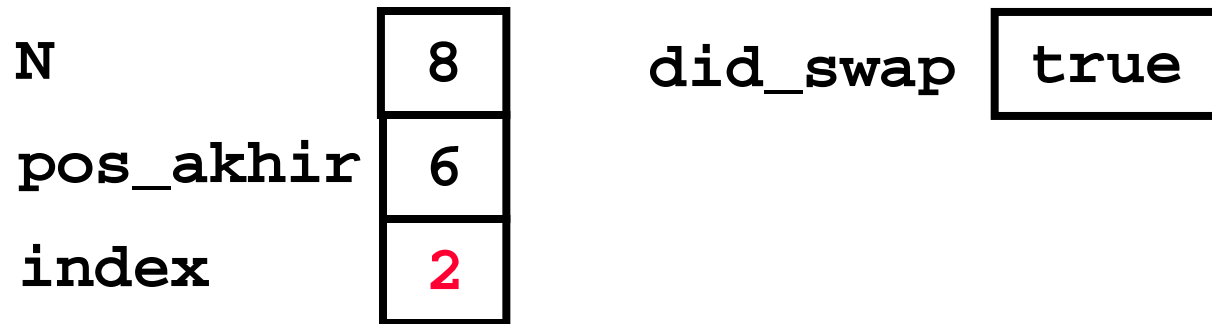


# An Animated Example

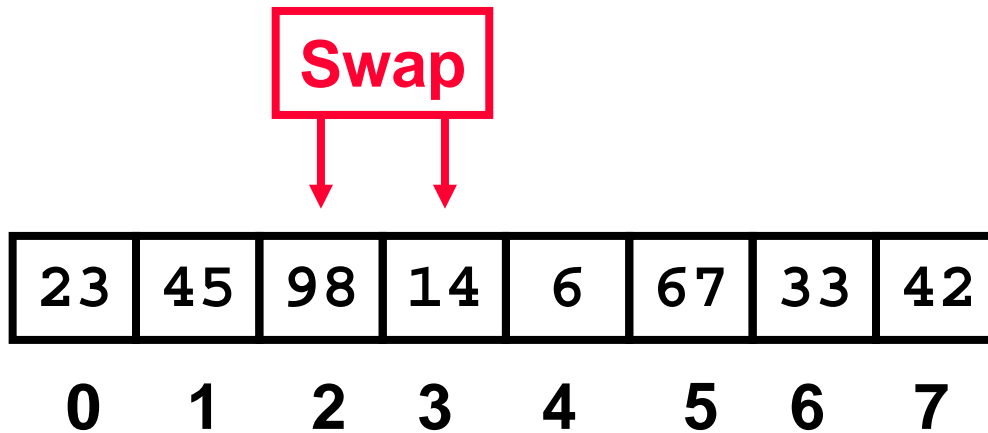
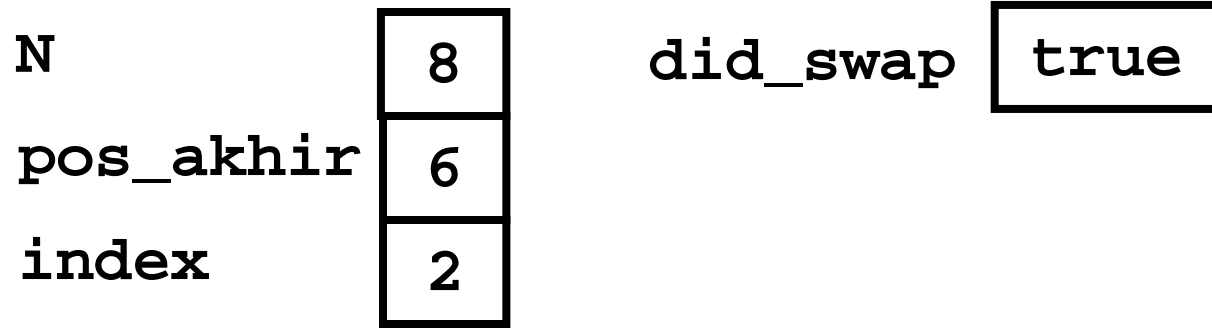




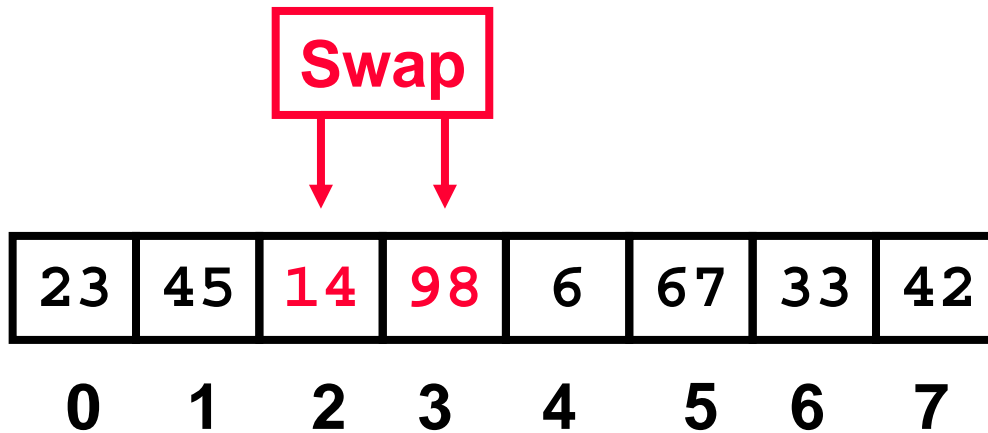
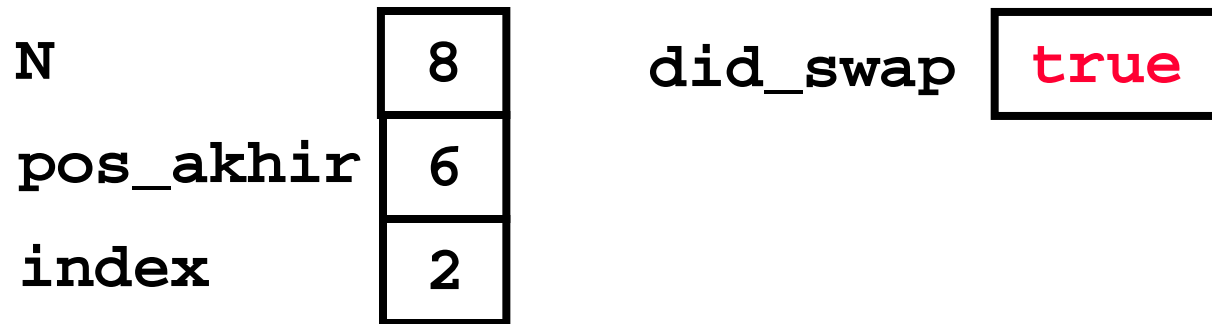
# An Animated Example



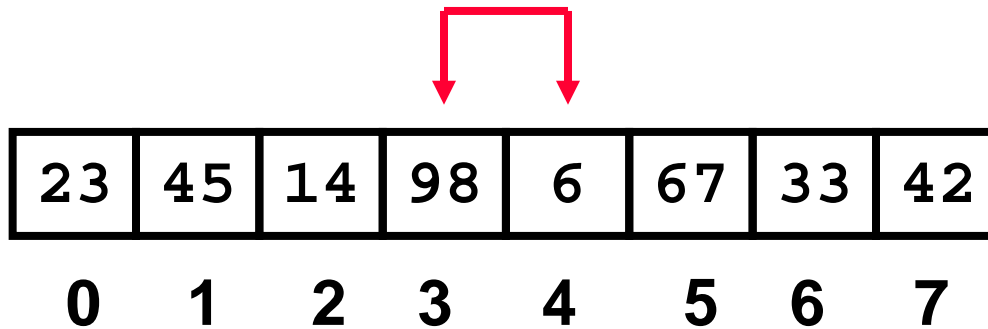
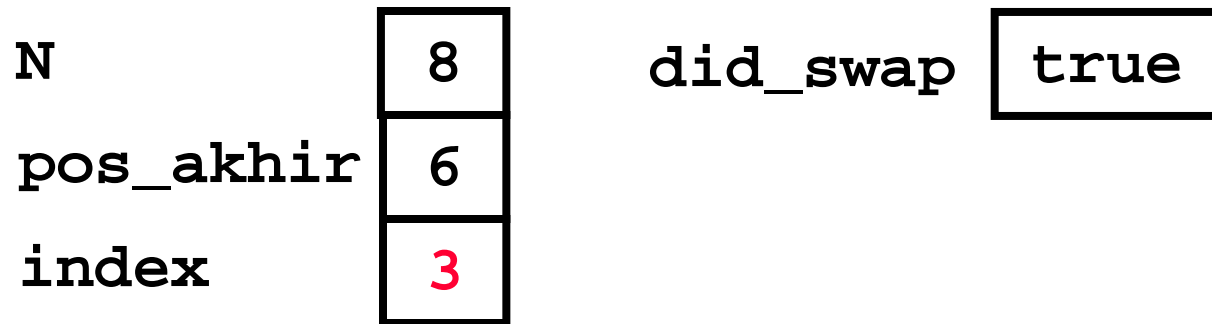
# An Animated Example



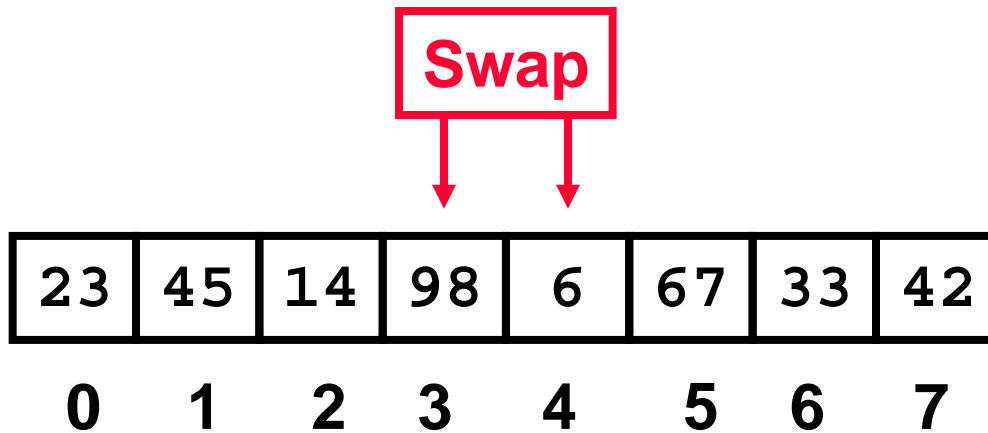
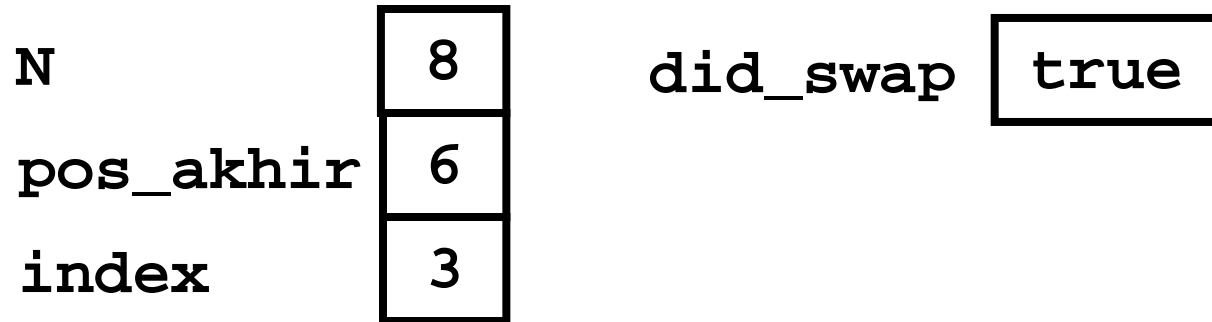
# An Animated Example



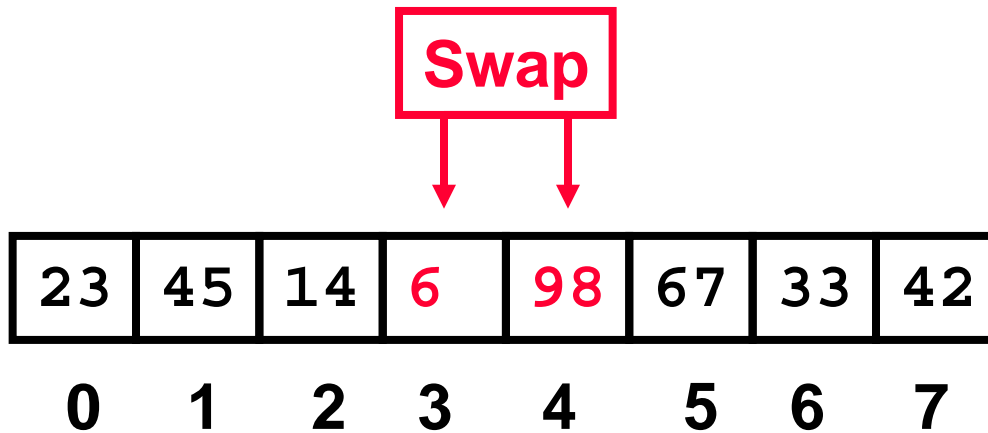
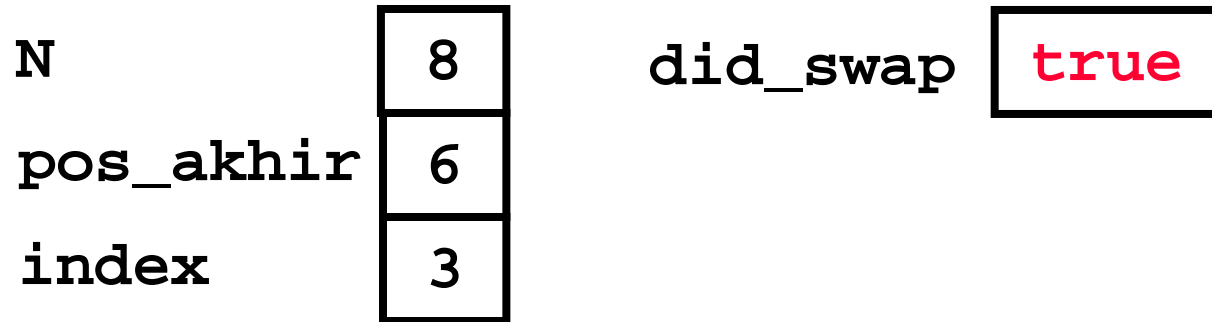
# An Animated Example



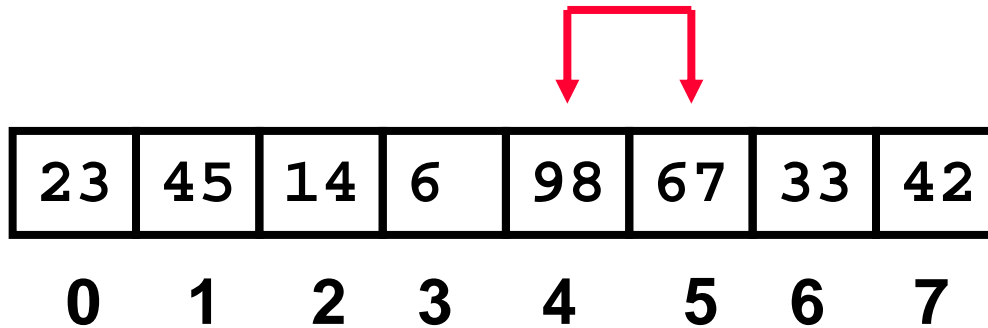
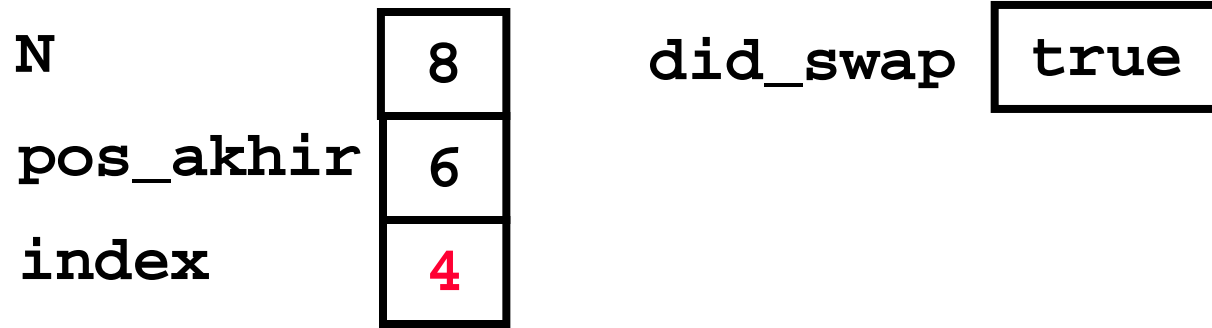
# An Animated Example



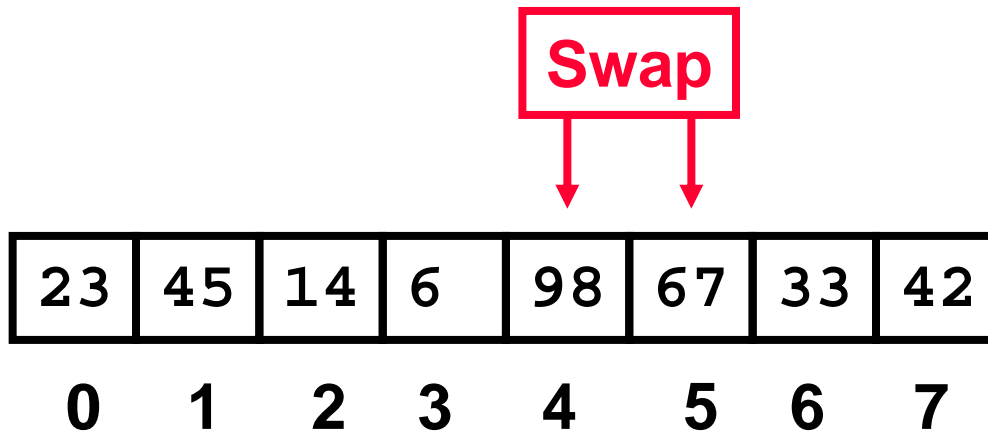
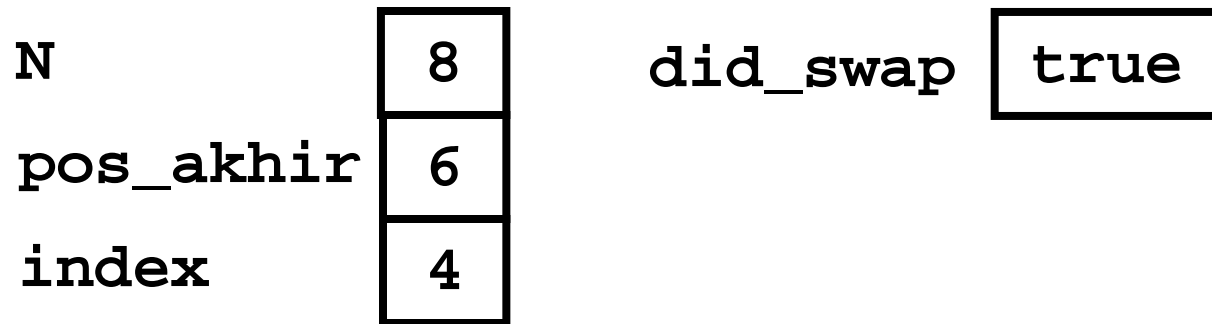
# An Animated Example



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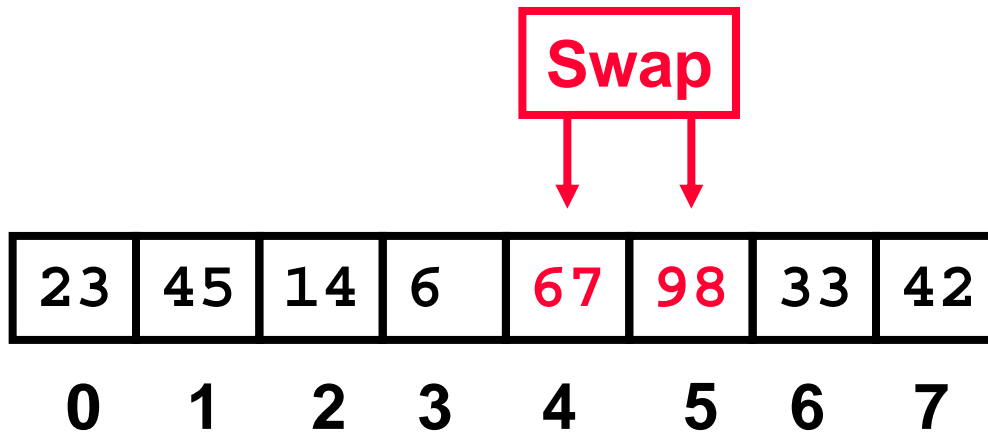
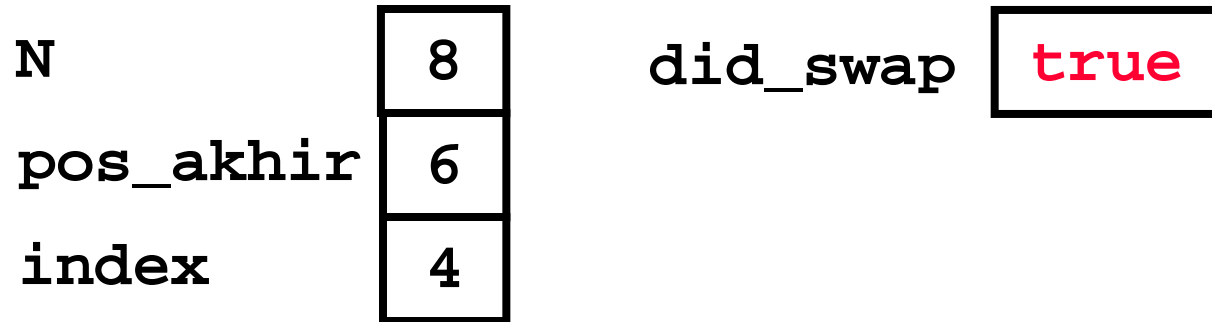


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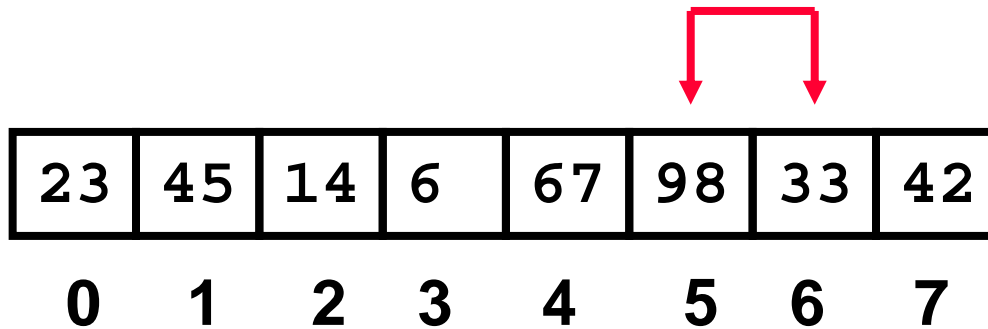
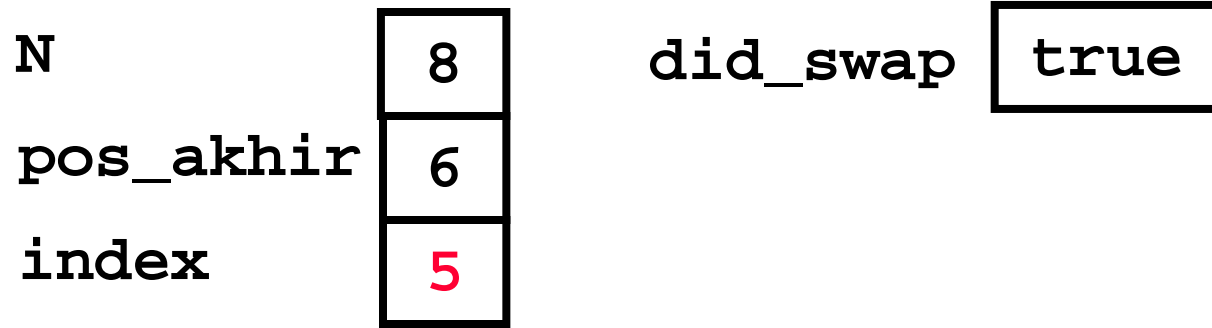




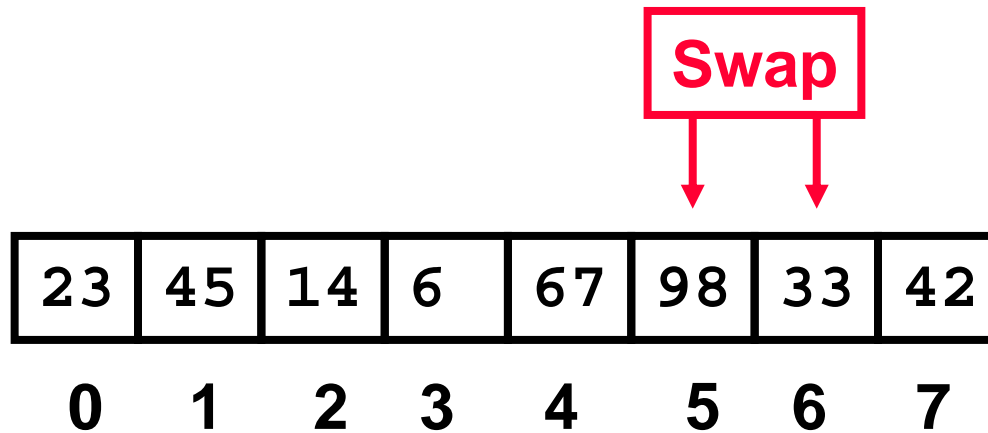
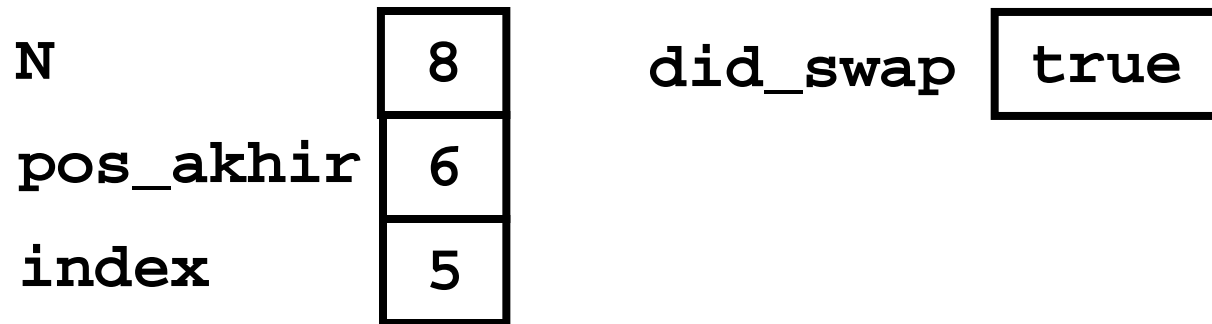
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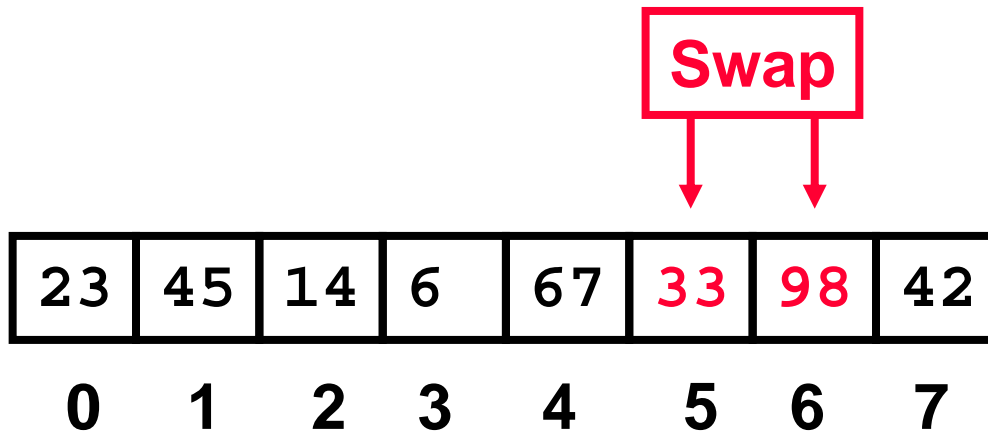
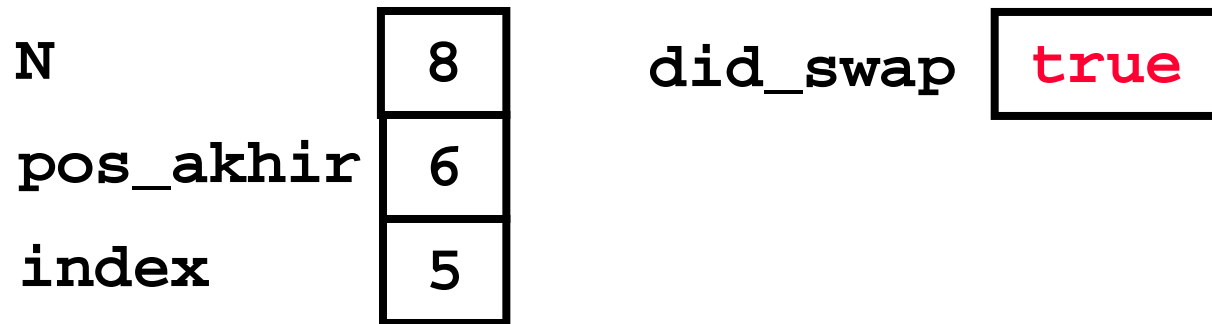
# An Animated Example



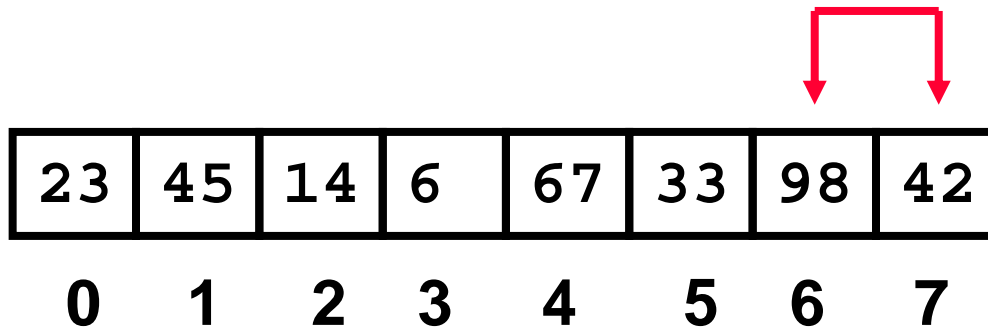
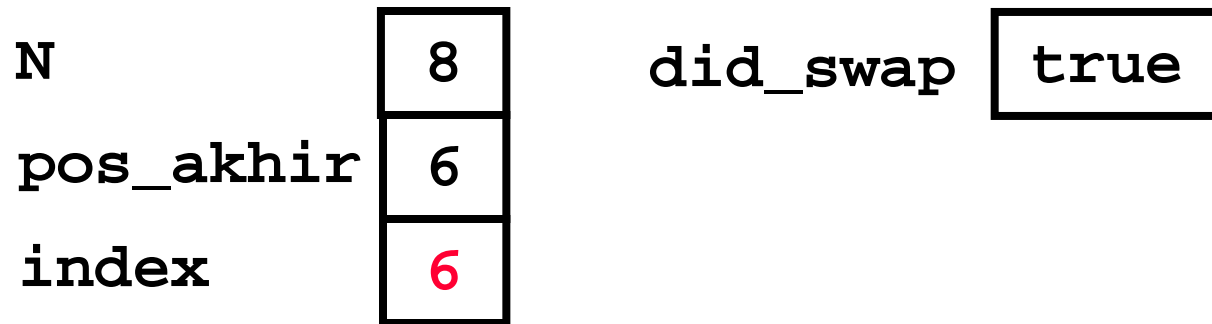
# An Animated Example



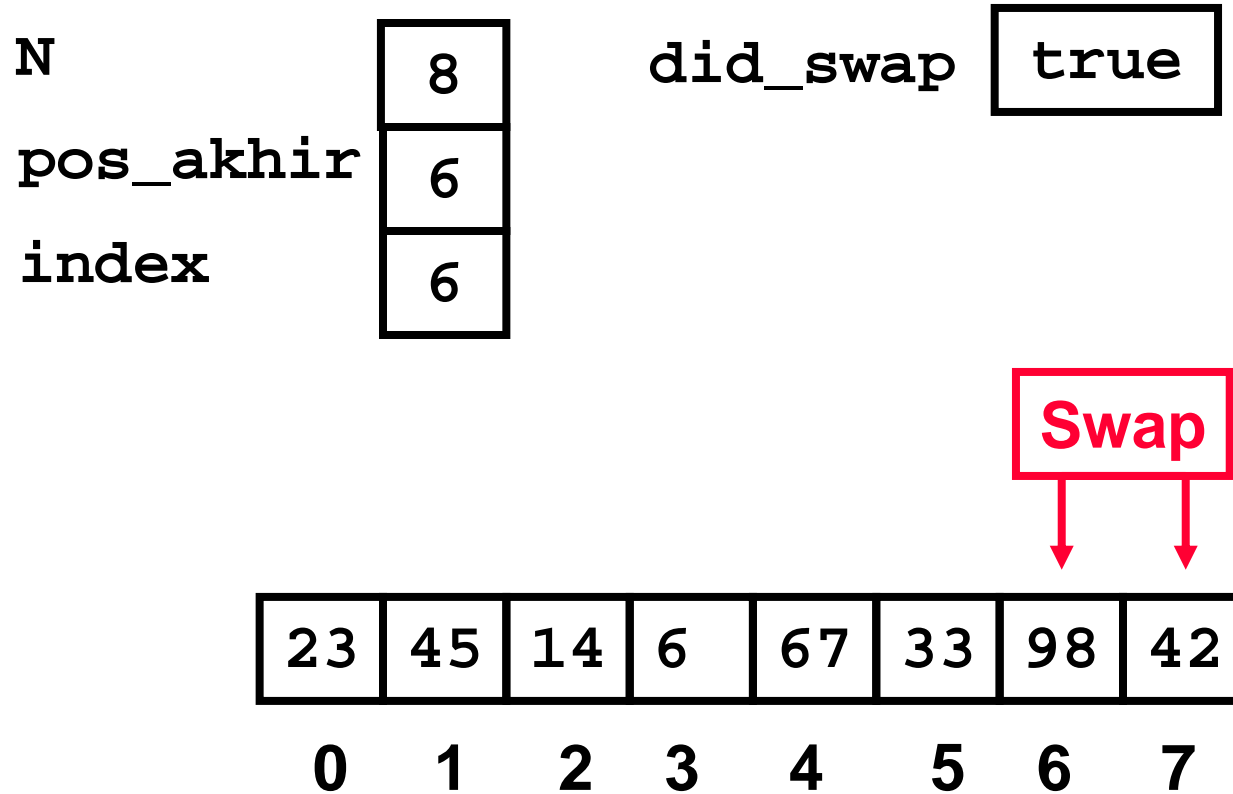
# An Animated Example



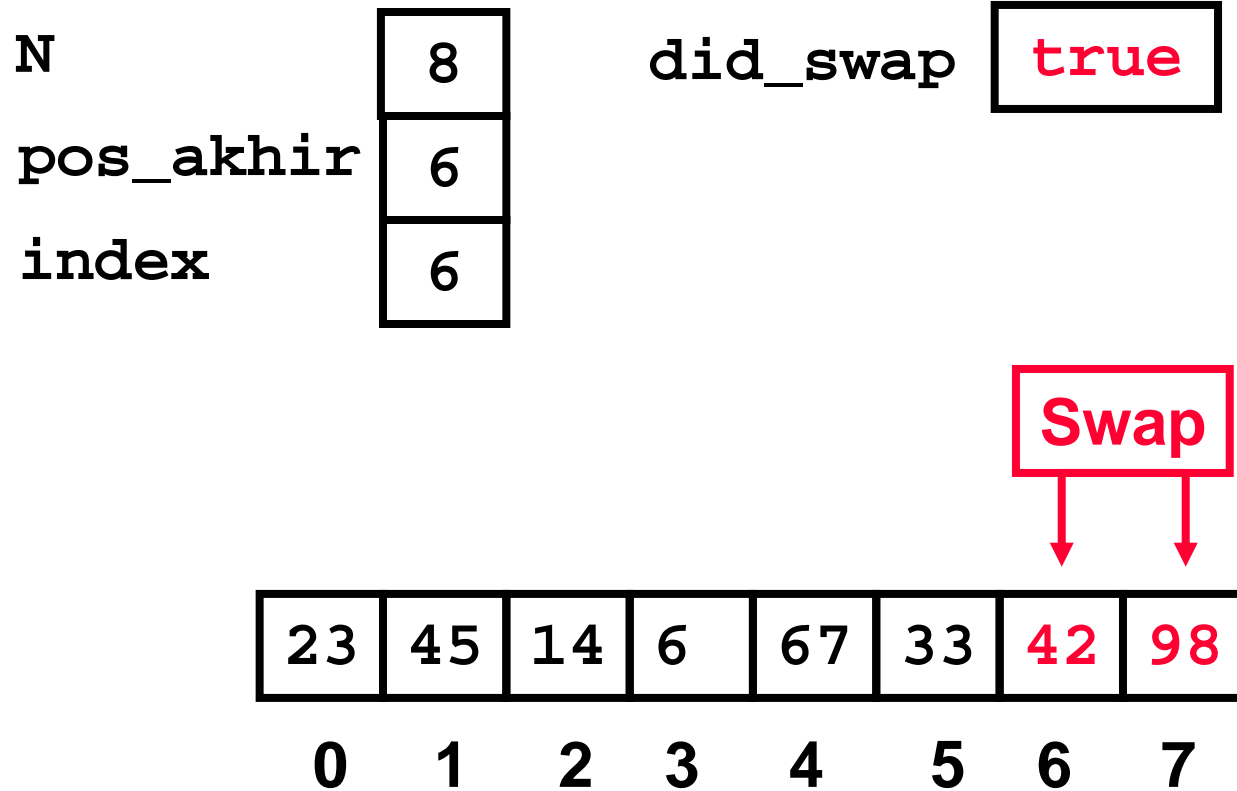
# An Animated Example



# An Animated Example



# An Animated Example



# After First Pass of Outer Loop

N 

8
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    did\_swap 

true
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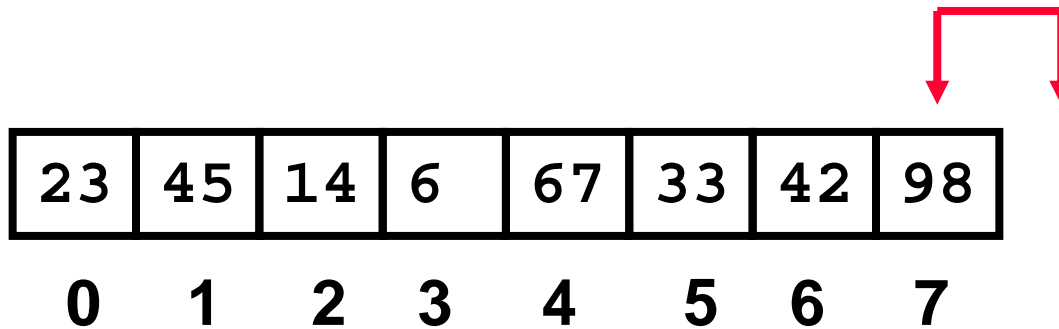
pos\_akhir 

6
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index 

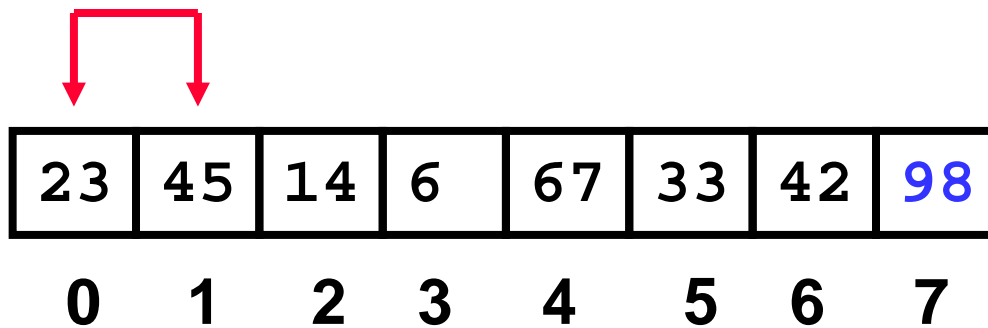
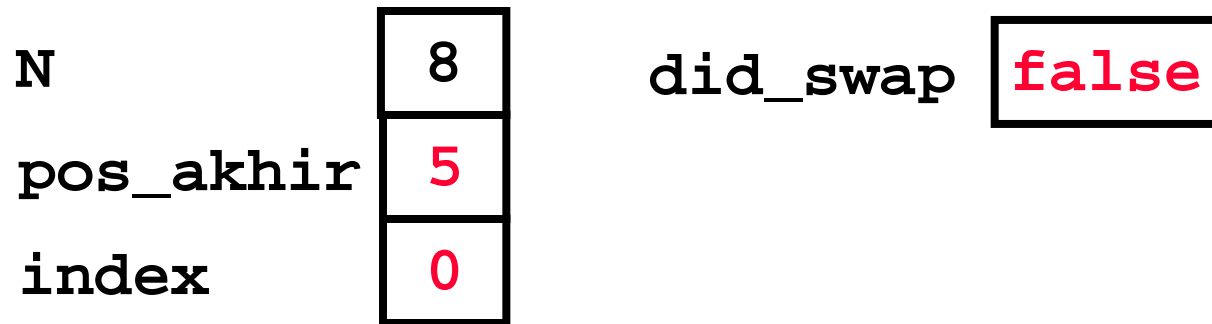
7
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    Finished first "Bubble Up"

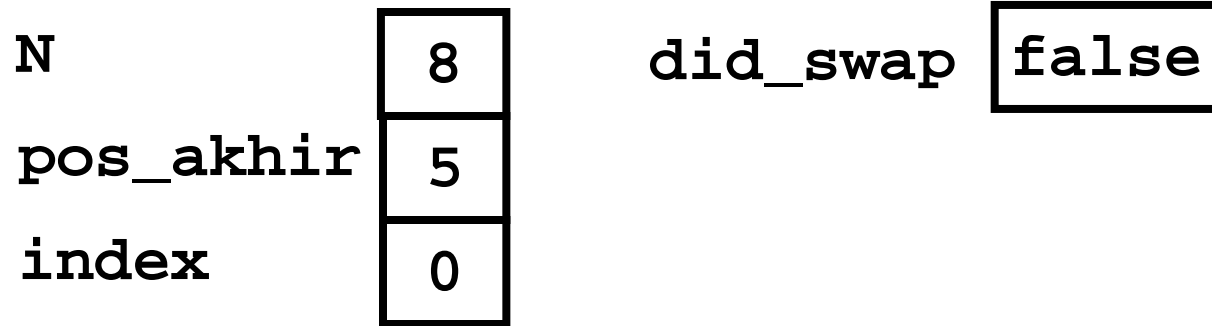




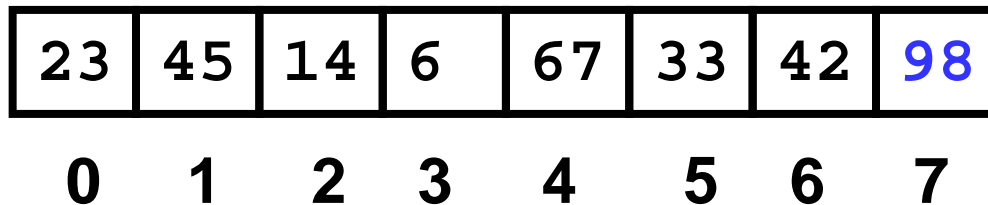
# The Second “Bubble Up”



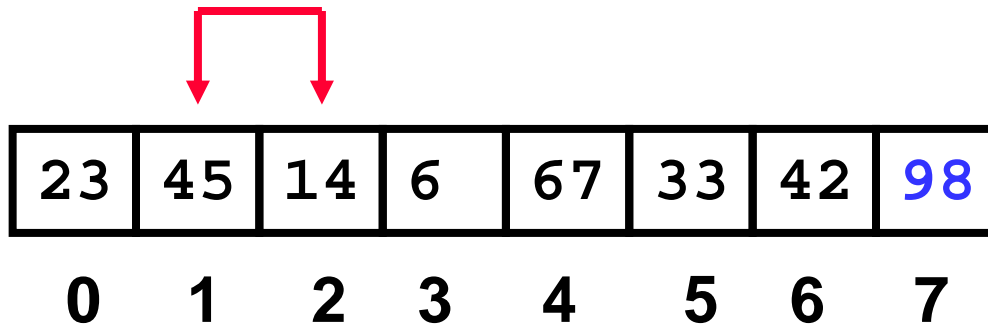
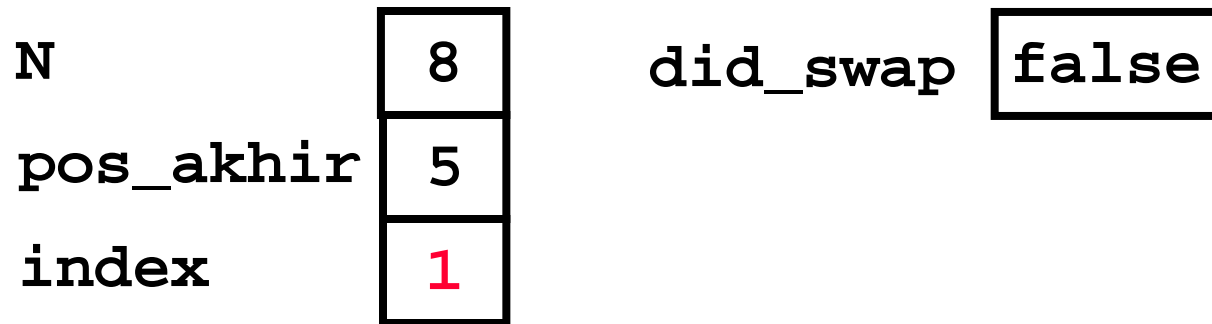
# The Second “Bubble Up”



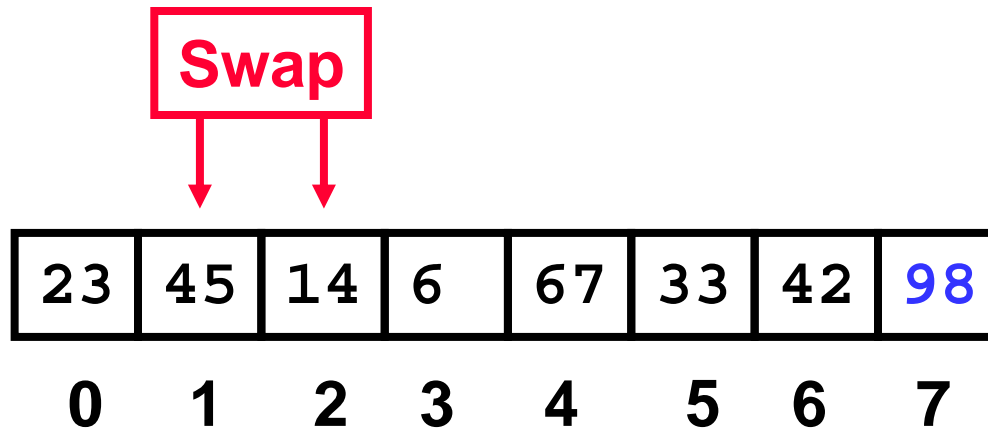
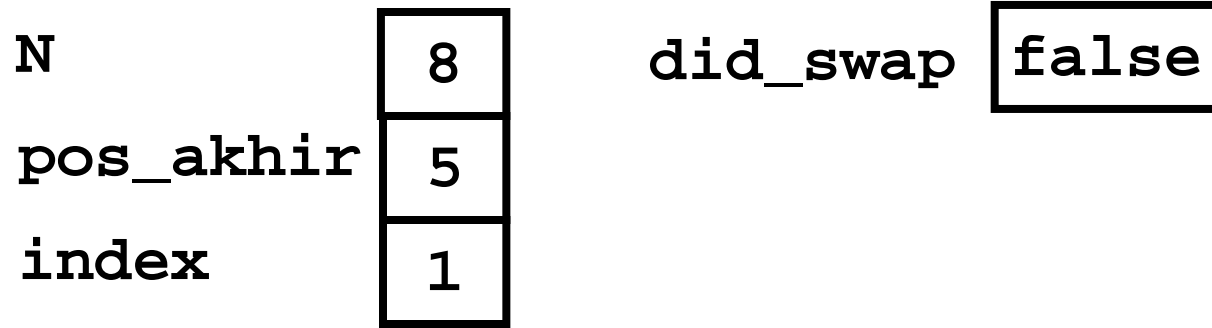
No Swap



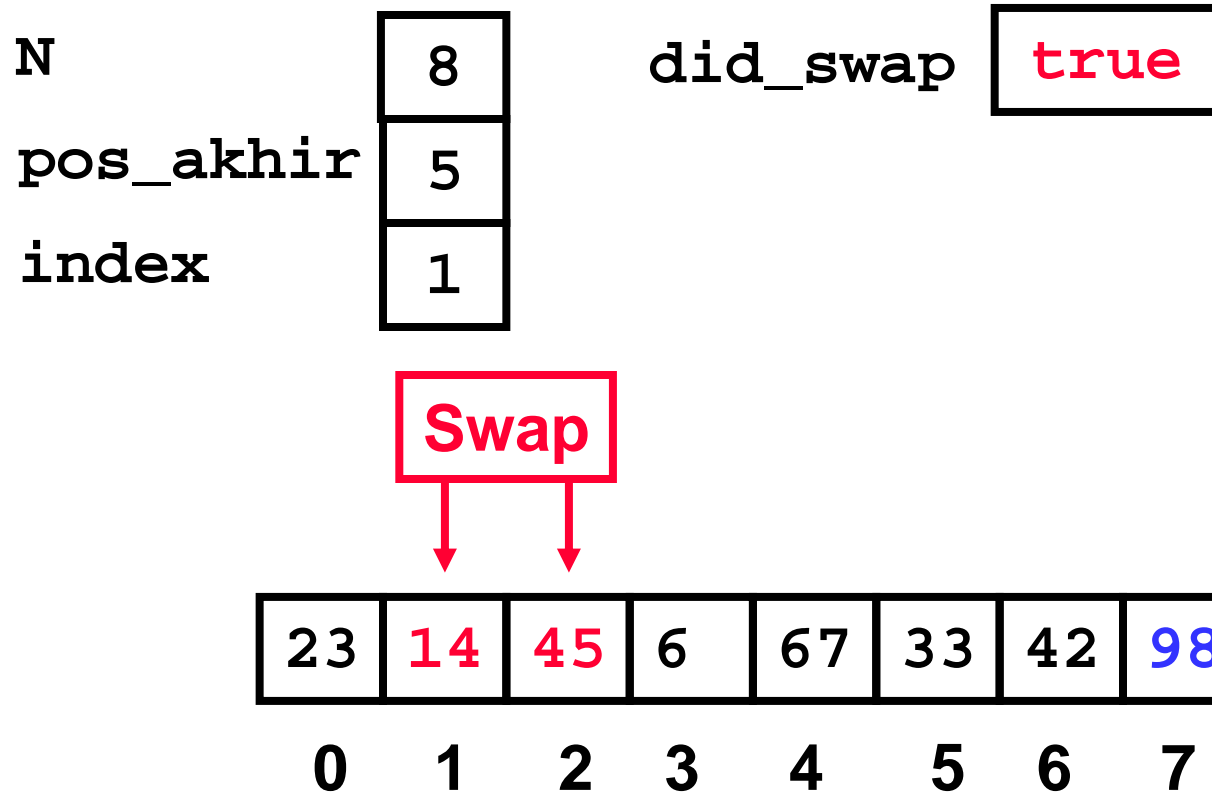
# The Second "Bubble Up"



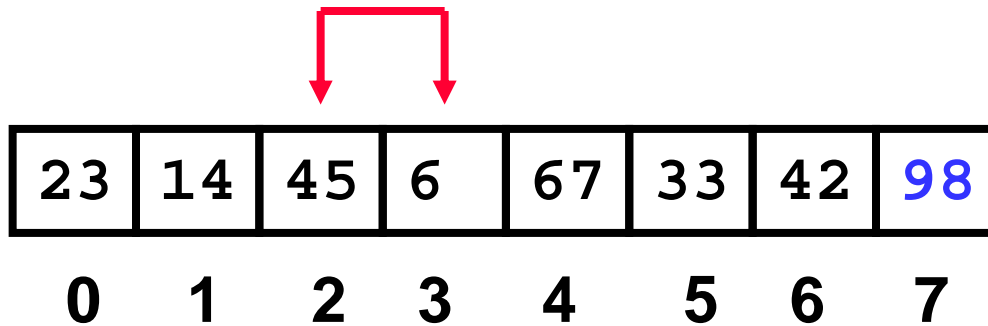
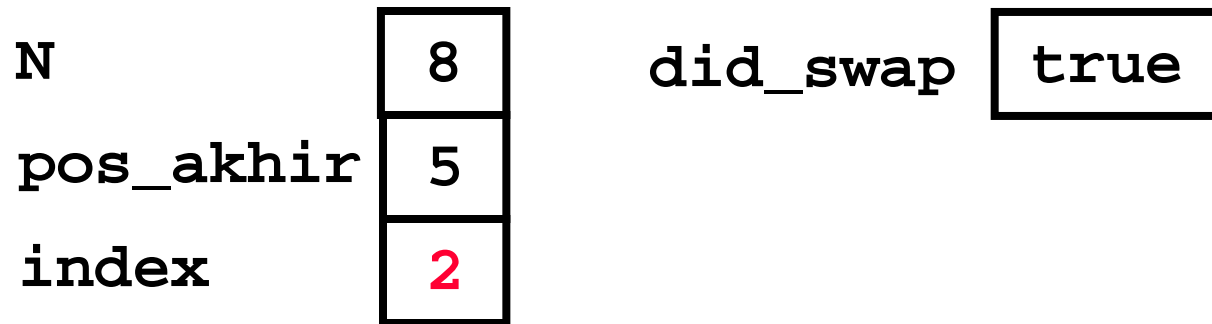
# The Second “Bubble Up”



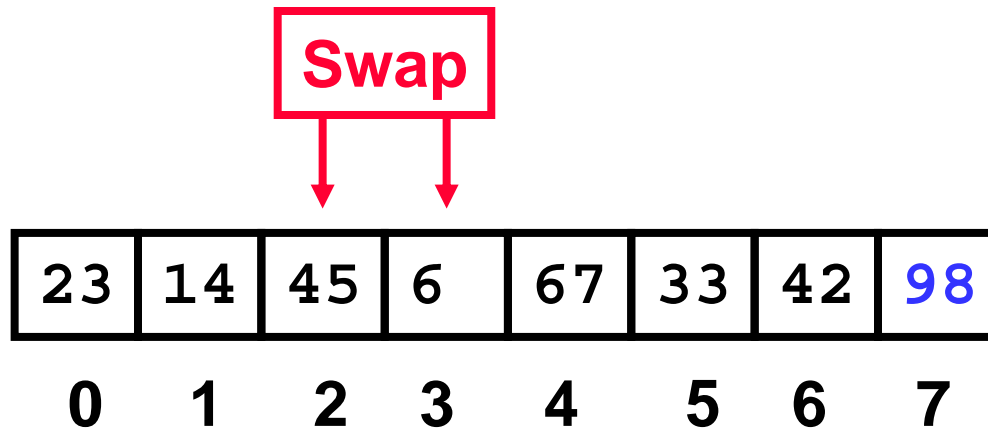
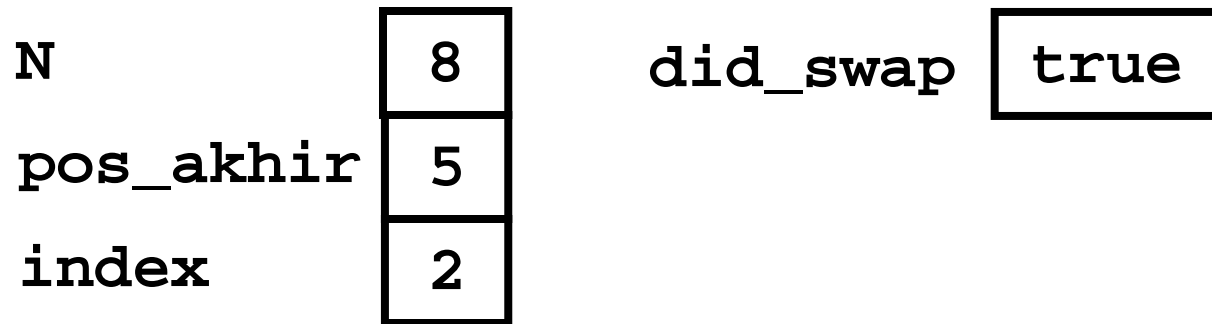
# The Second “Bubble Up”



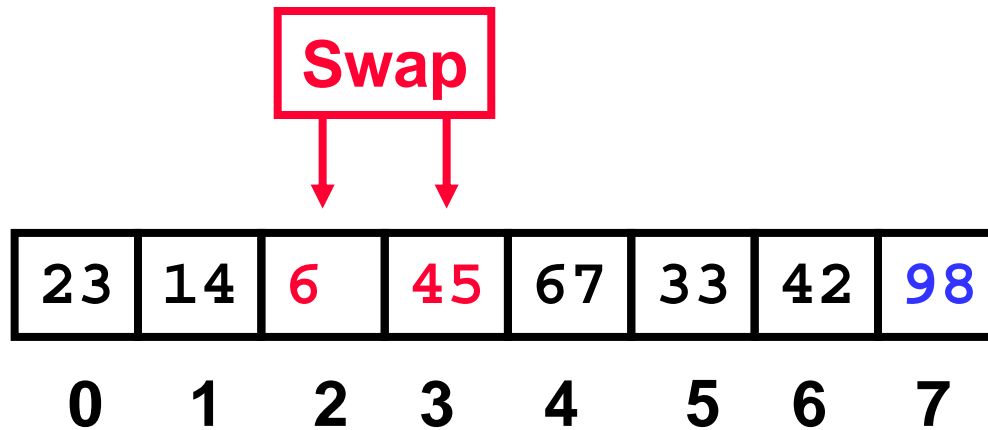
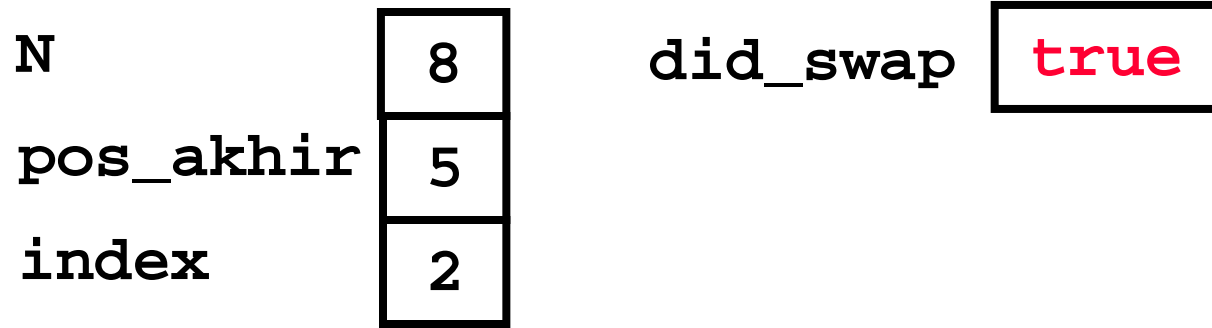
# The Second "Bubble Up"



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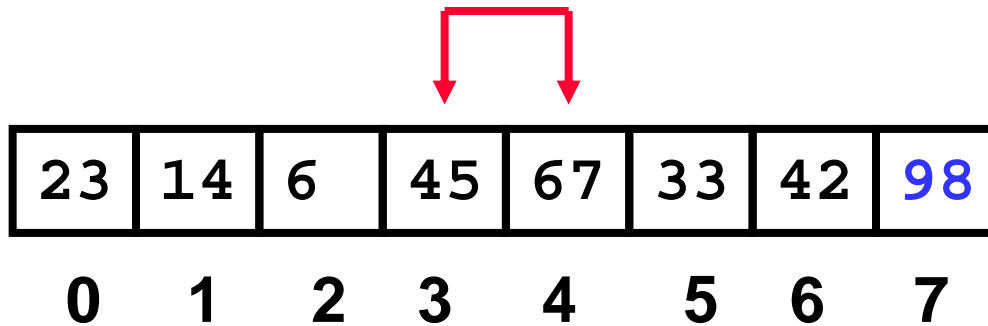
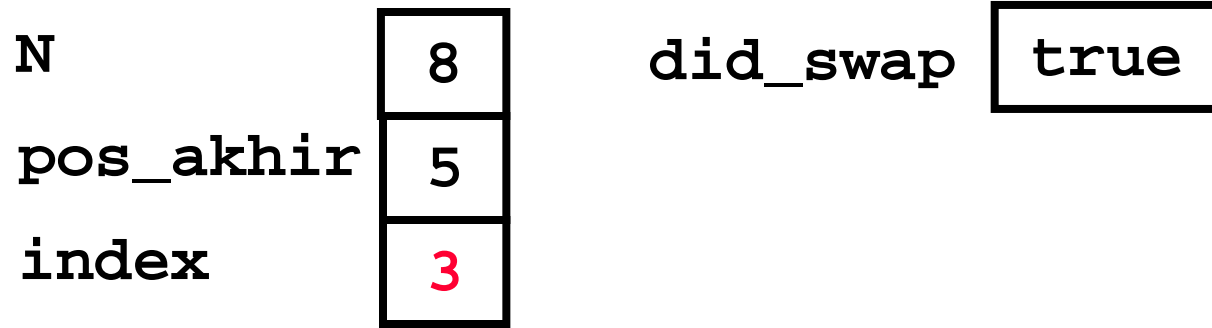


# The Second “Bubble Up”

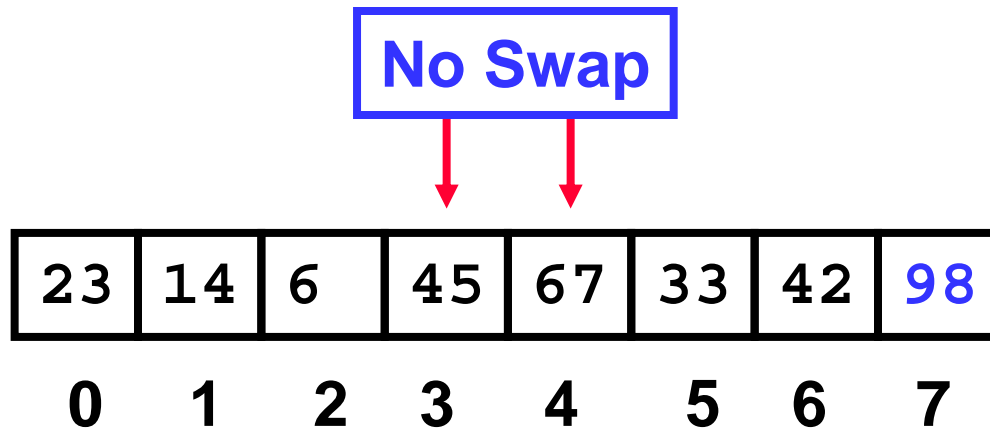
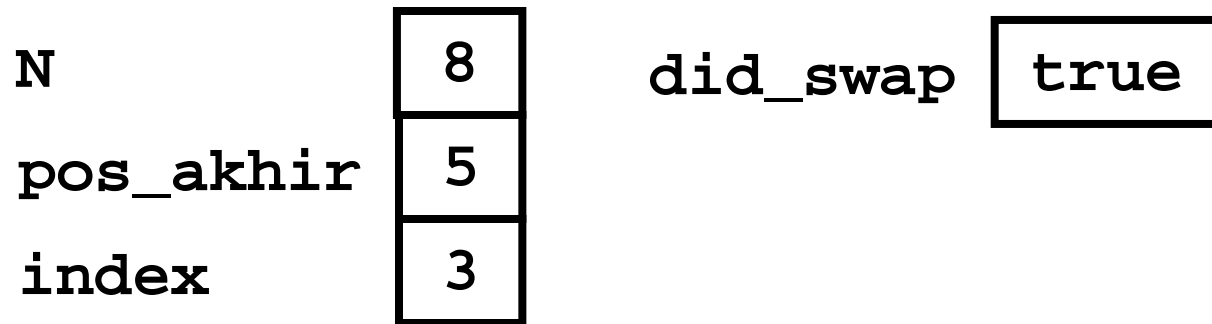




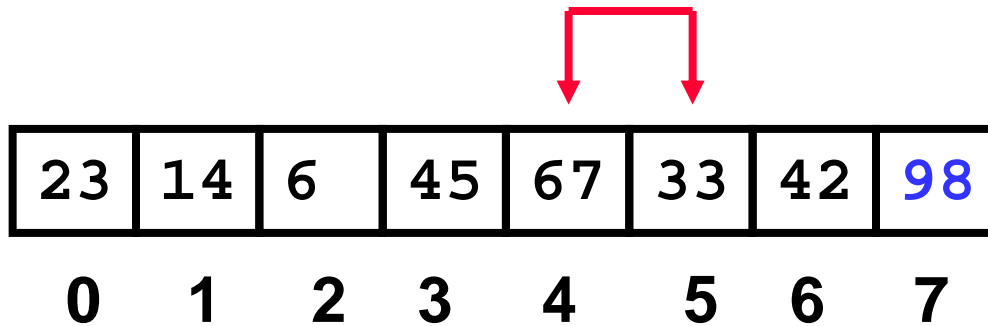
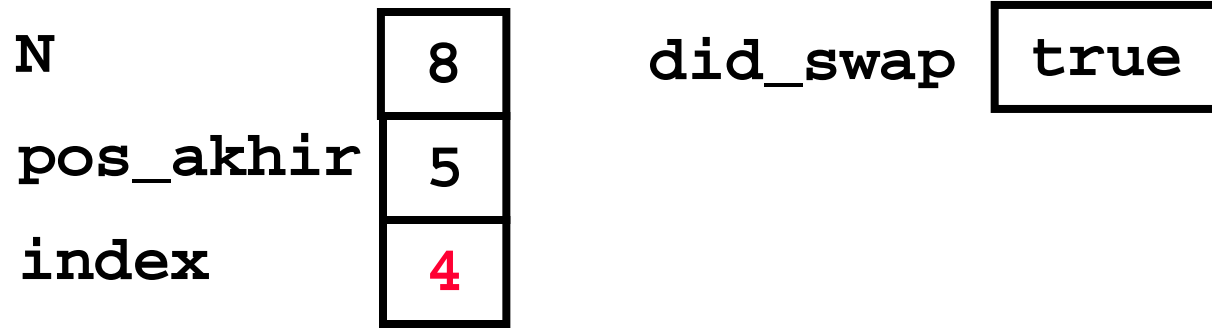
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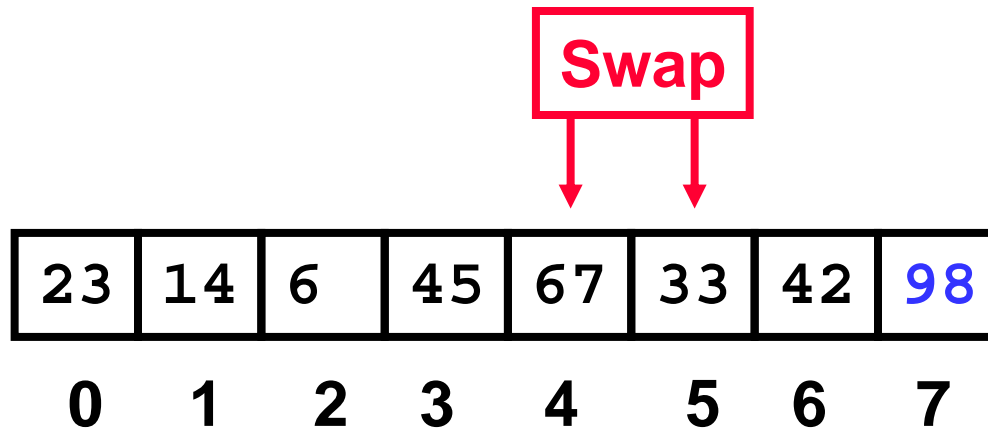
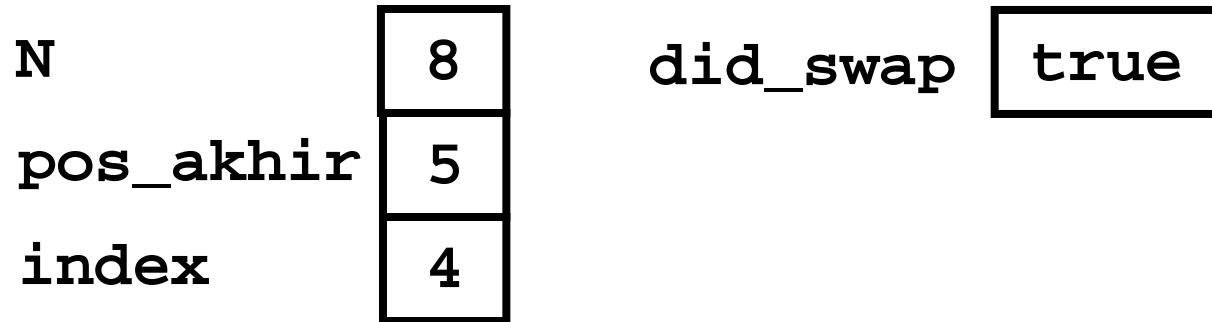
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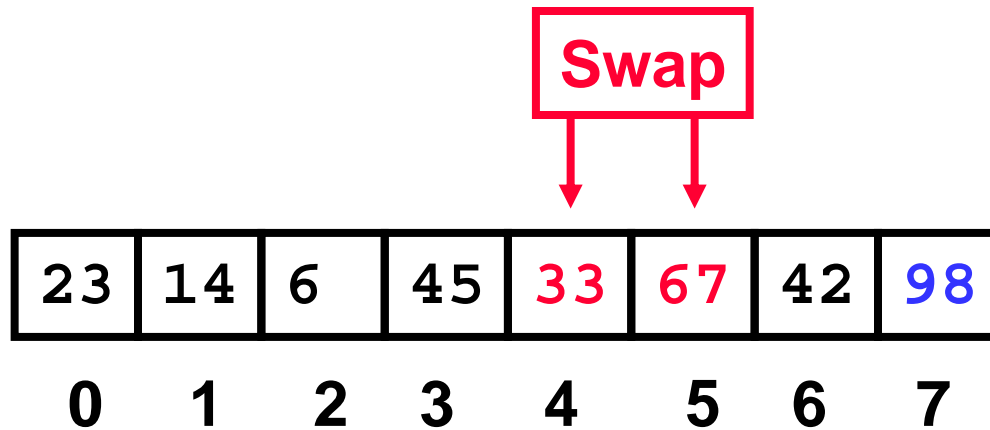
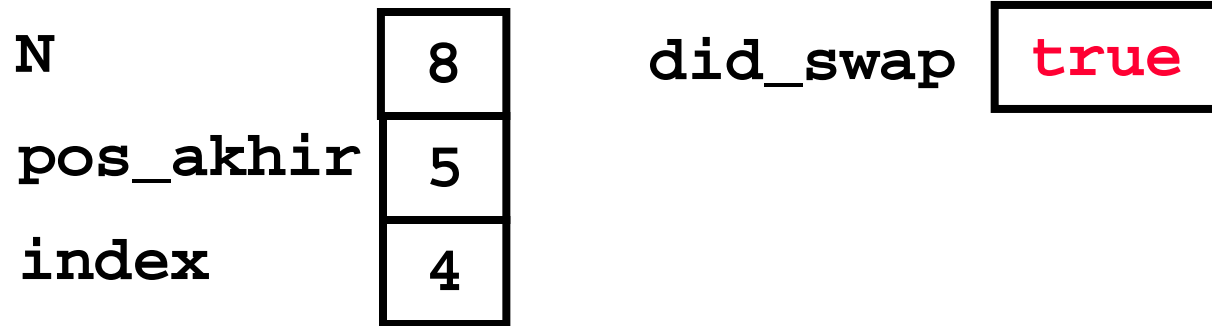
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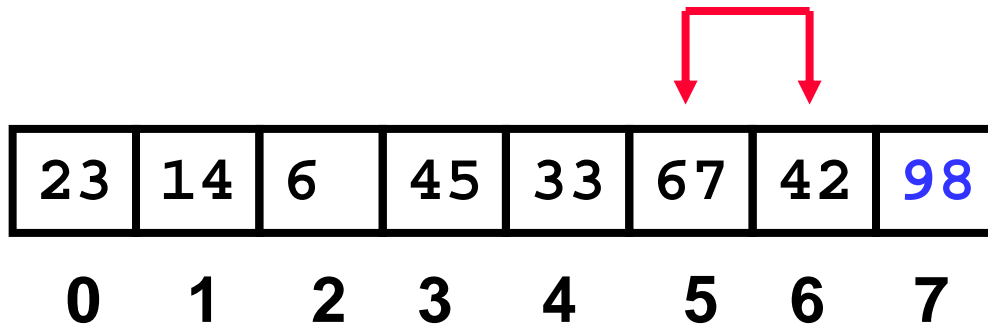
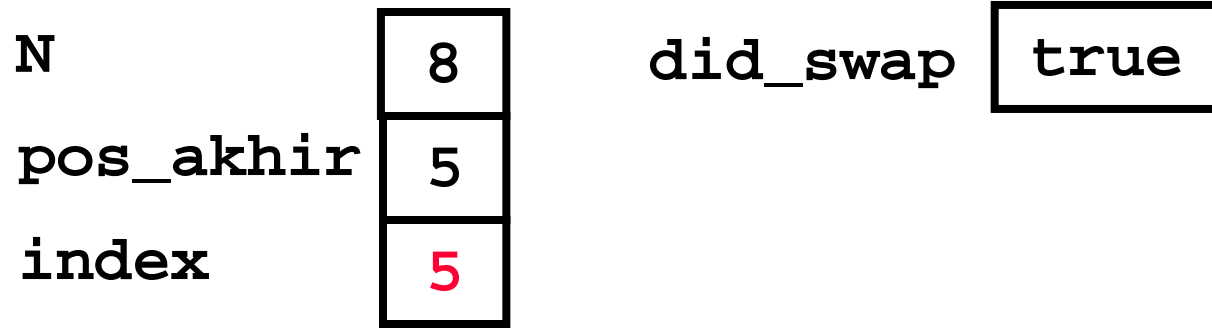
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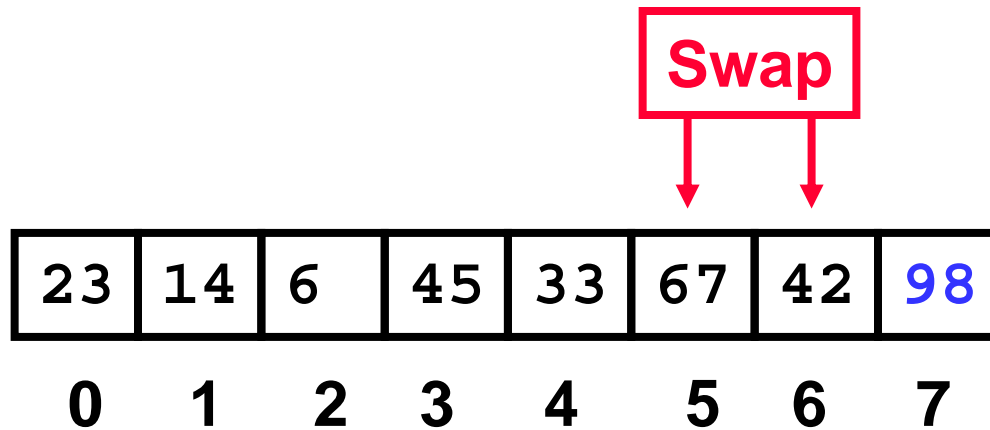
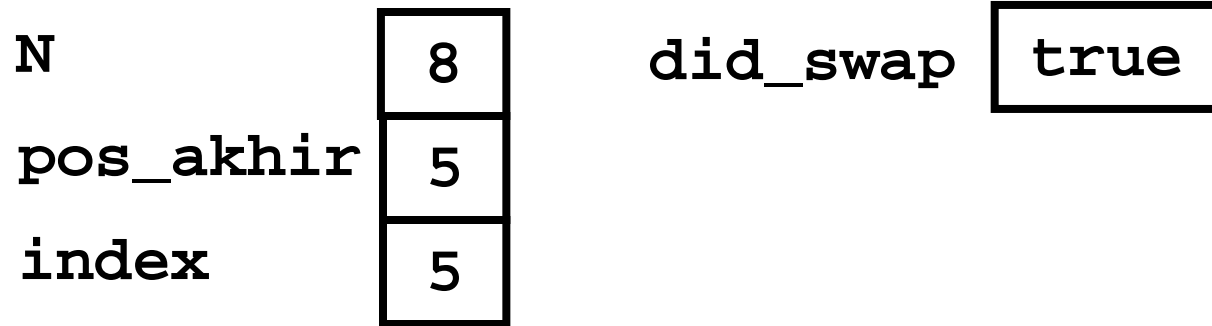
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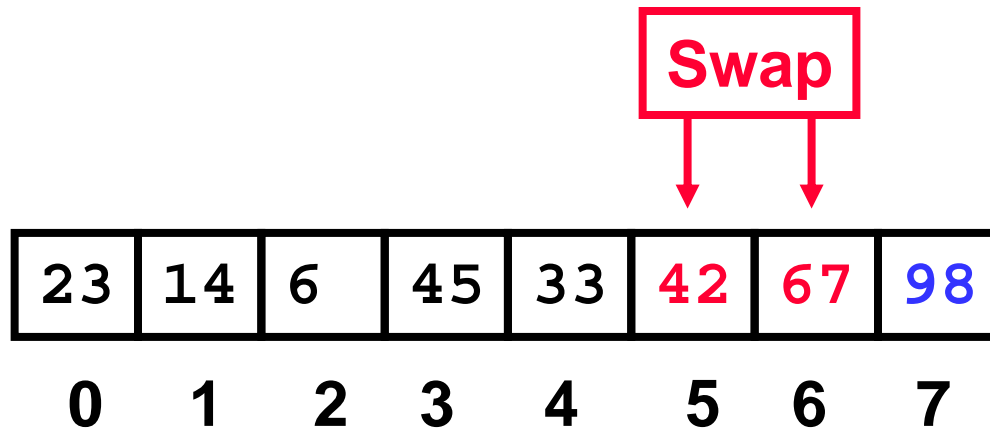
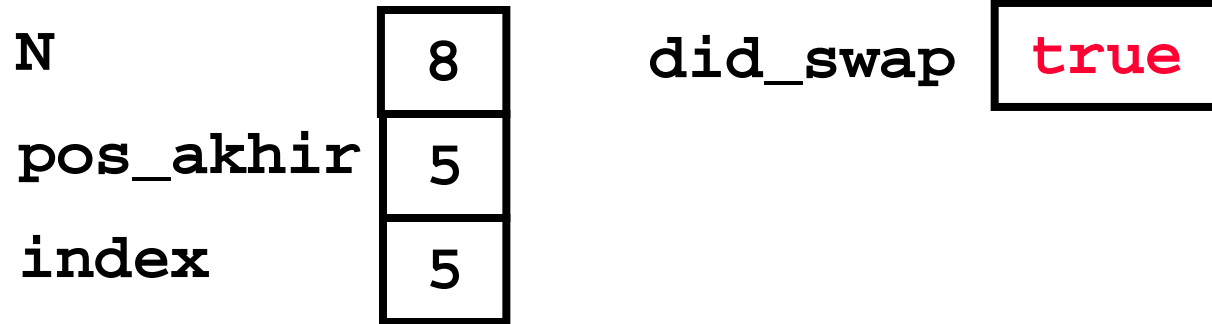
# The Second “Bubble Up”



# The Second “Bubble Up”



# The Second “Bubble Up”





# After Second Pass of Outer Loop

N 

8
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    did\_swap 

true
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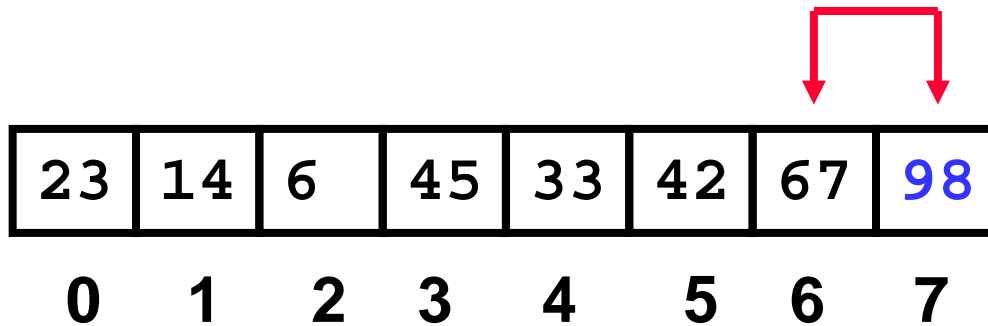
  
pos\_akhir 

5
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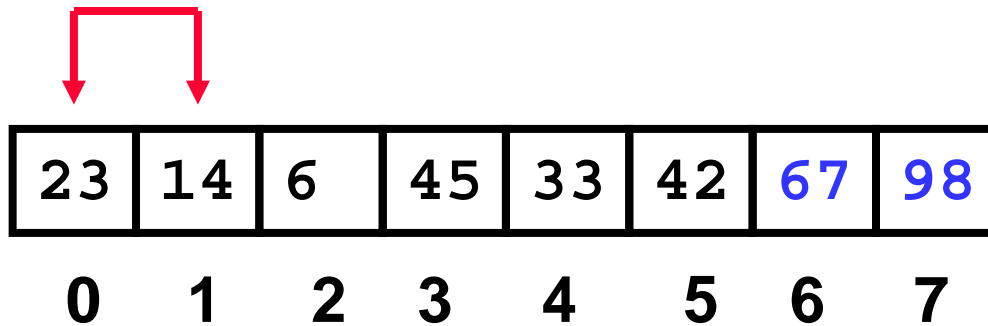
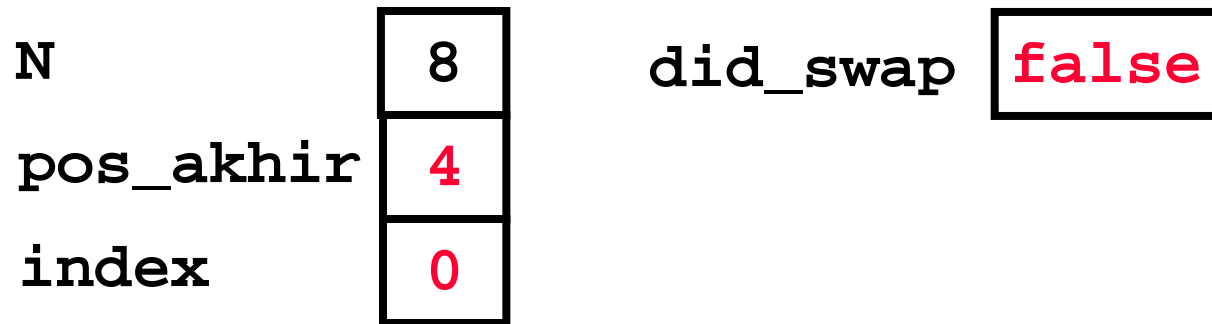
  
index 

6
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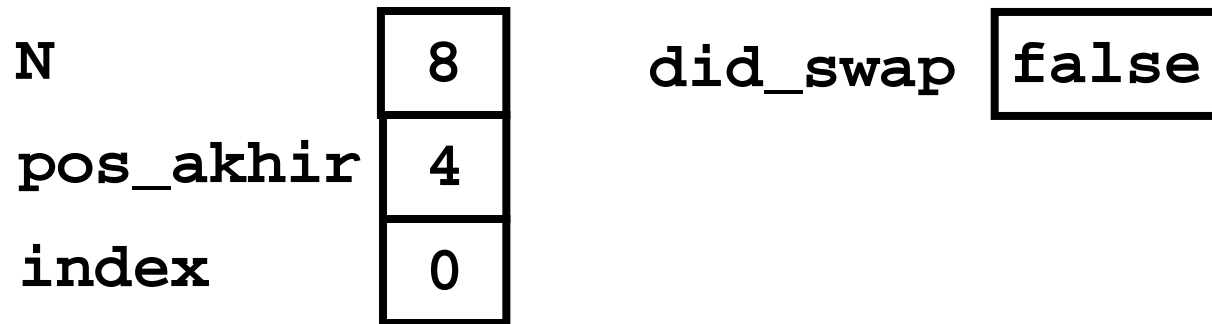
**Finished second "Bubble Up"**



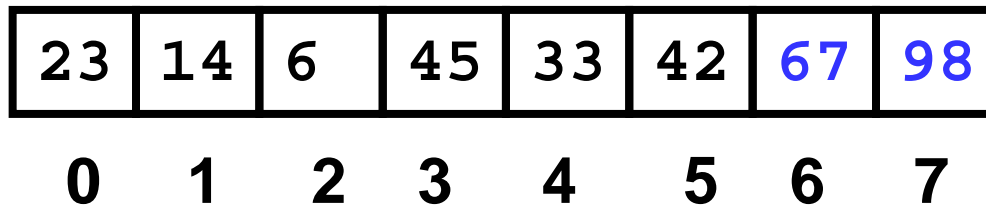
# The Third "Bubble Up"



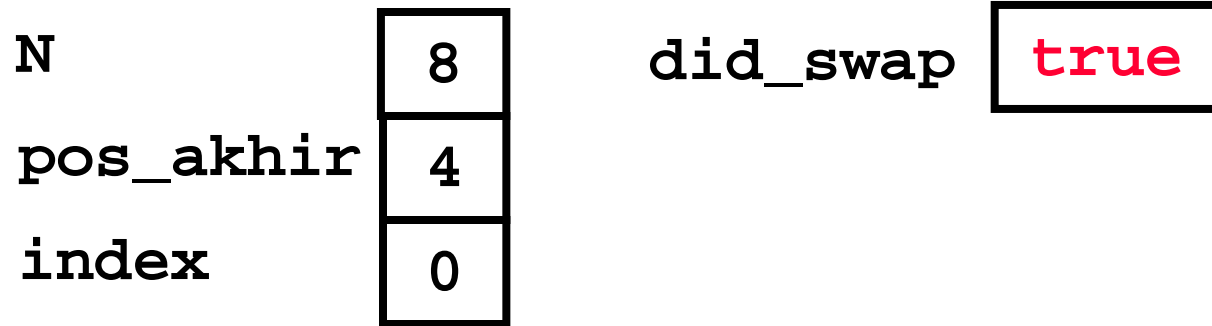
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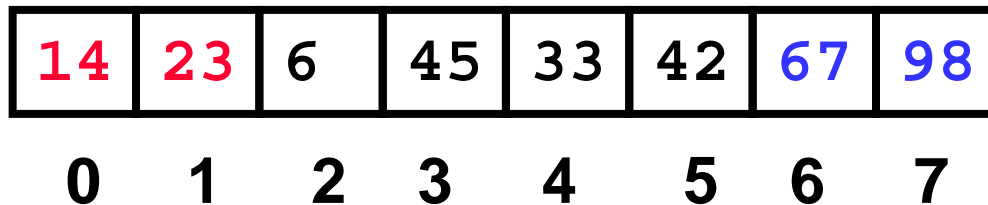
Swap



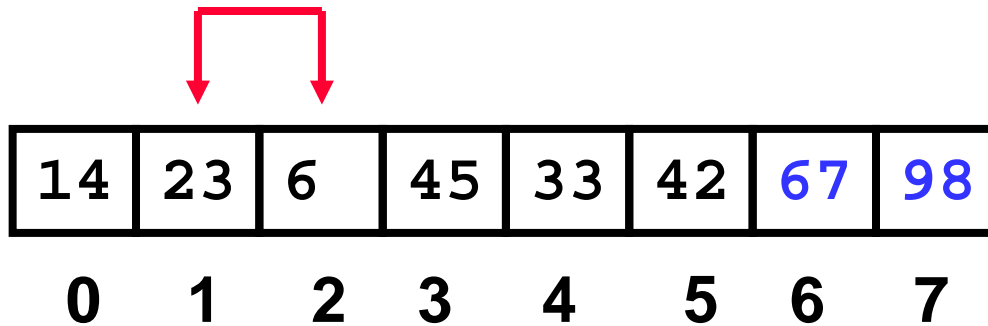
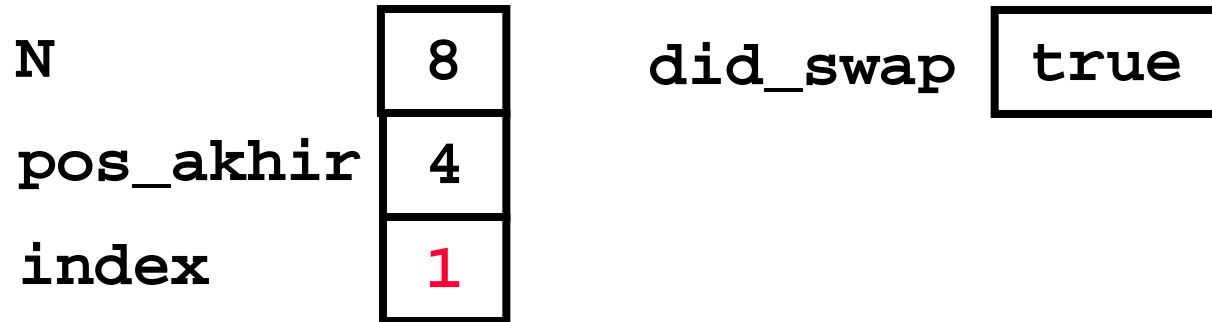
# The Third "Bubble Up"



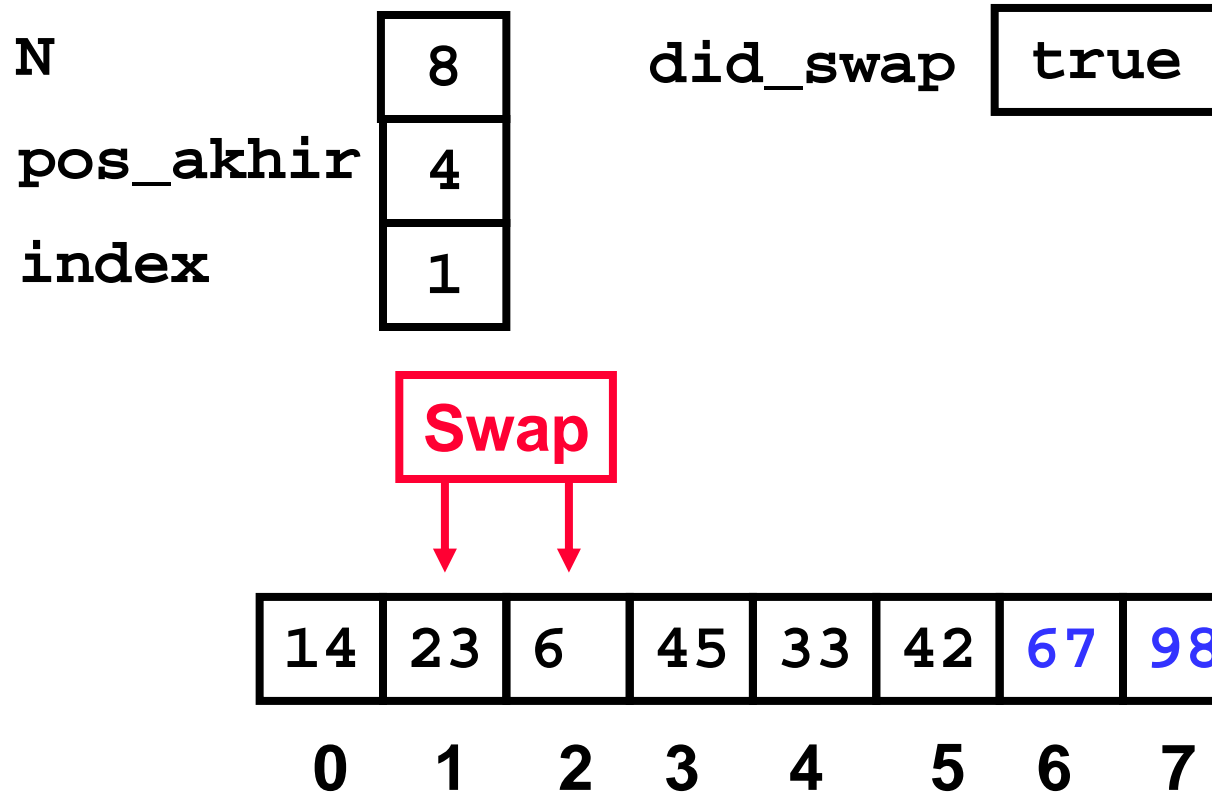
Swap



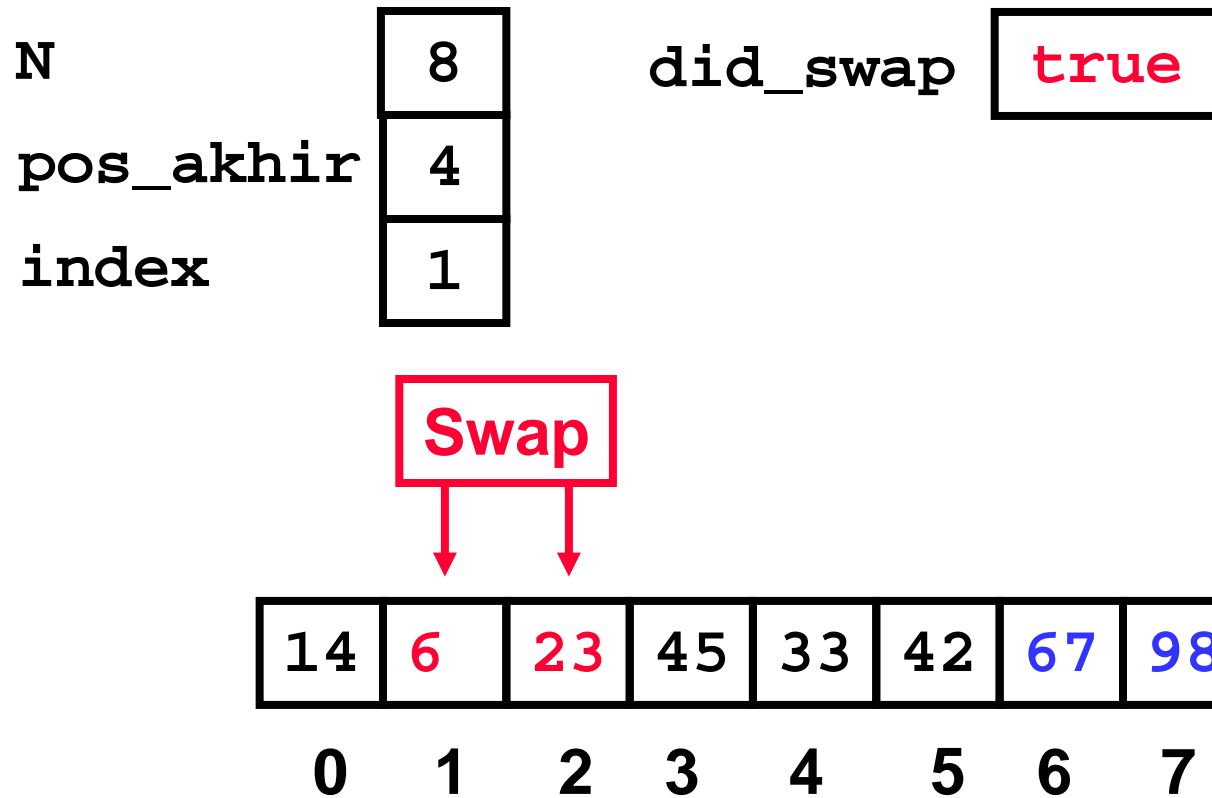
# The Third "Bubble Up"



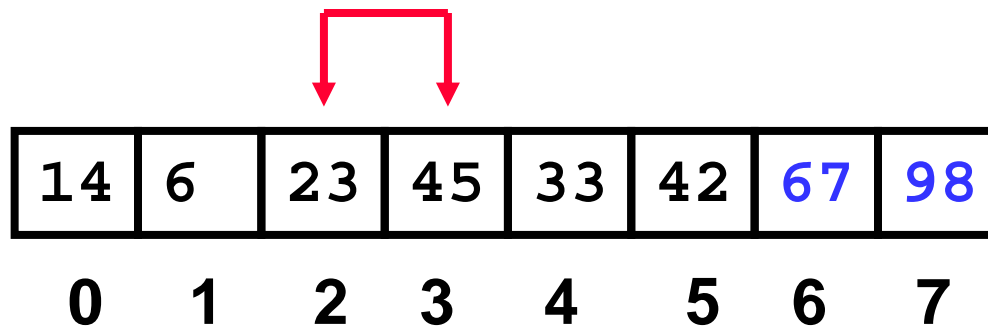
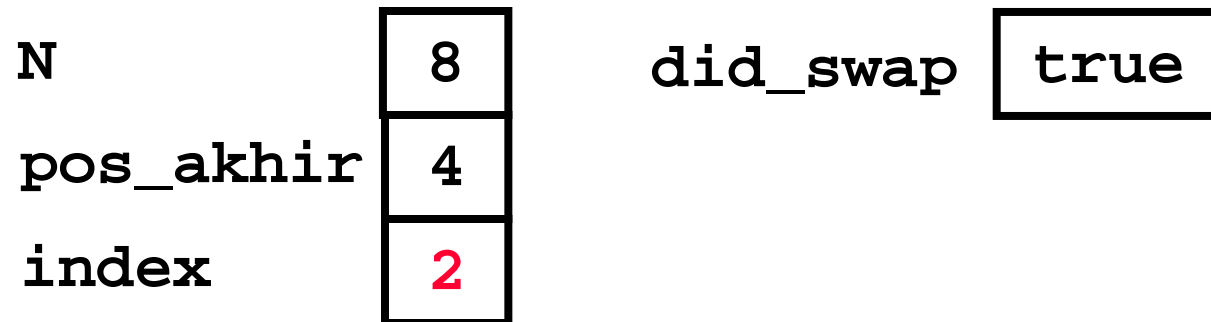
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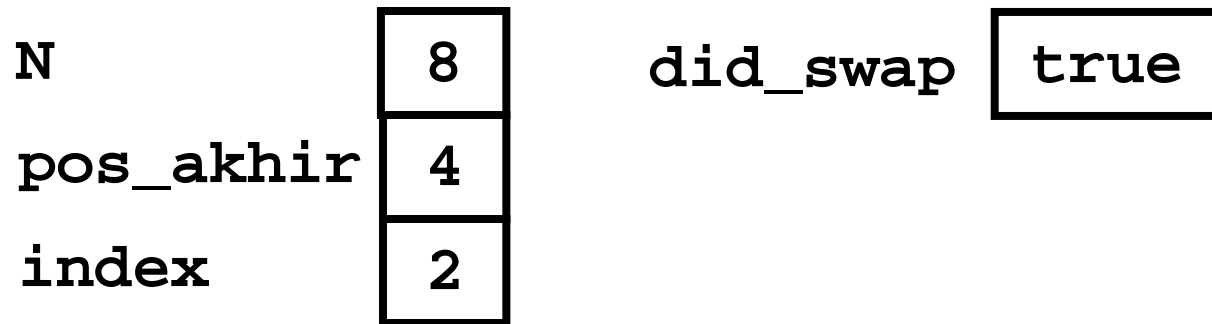


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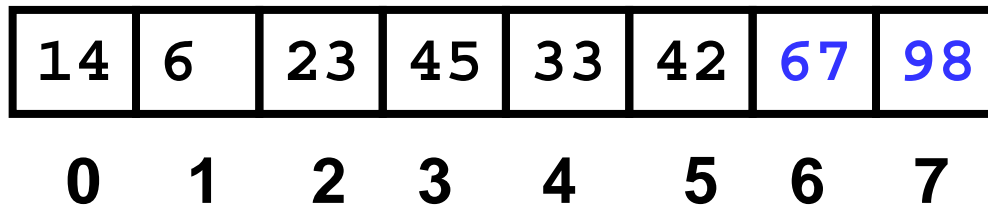




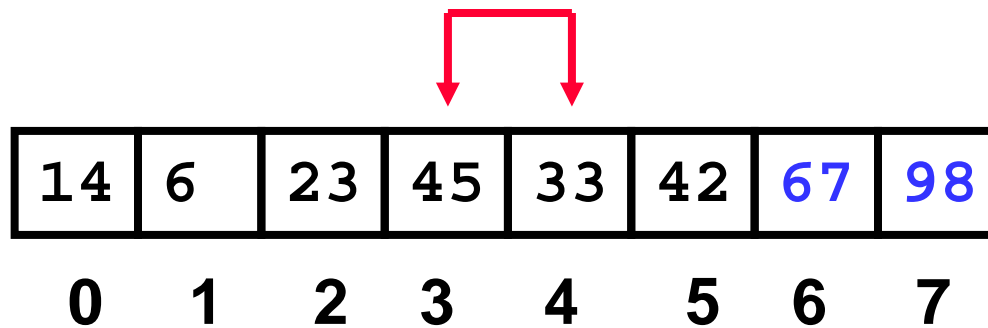
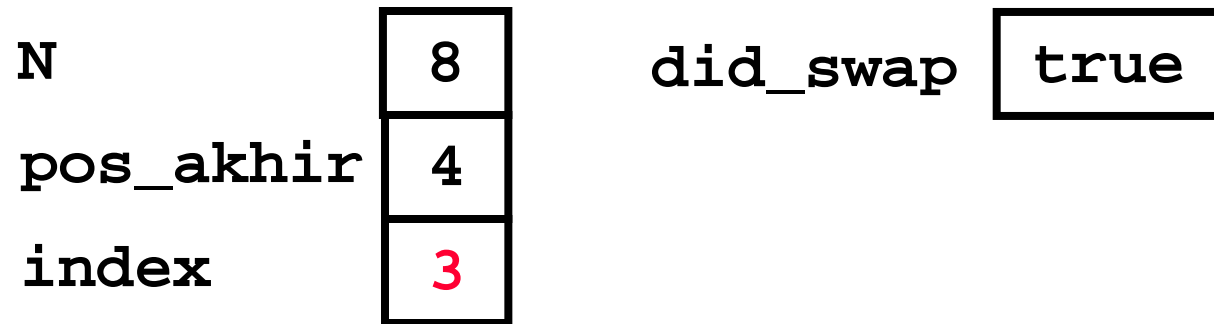
# The Third "Bubble Up"



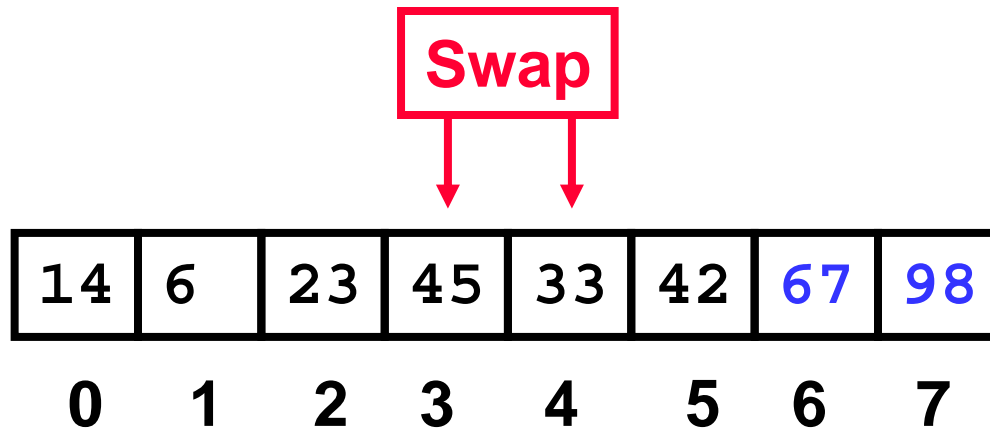
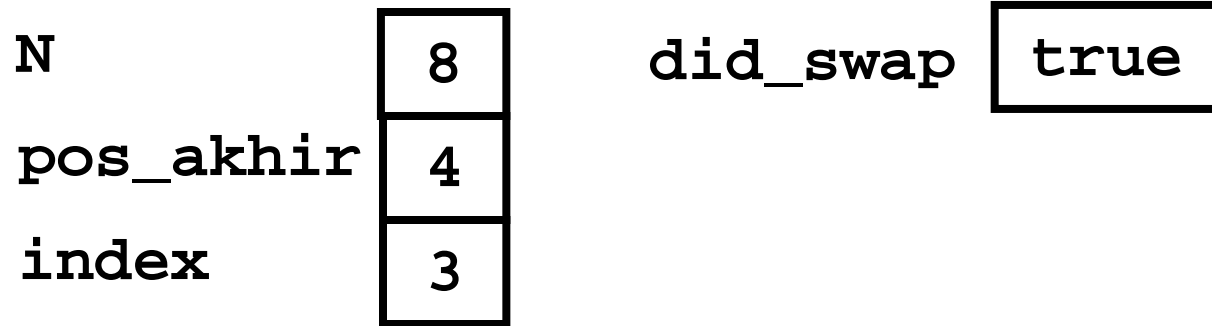
No Swap



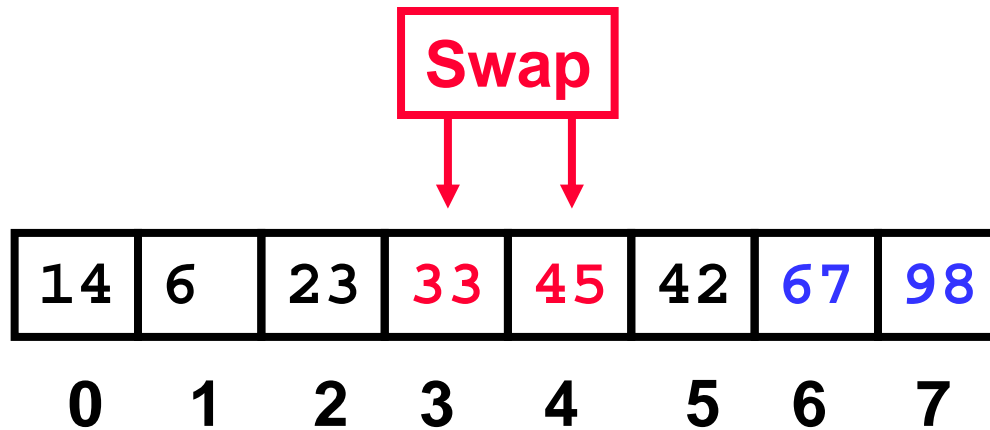
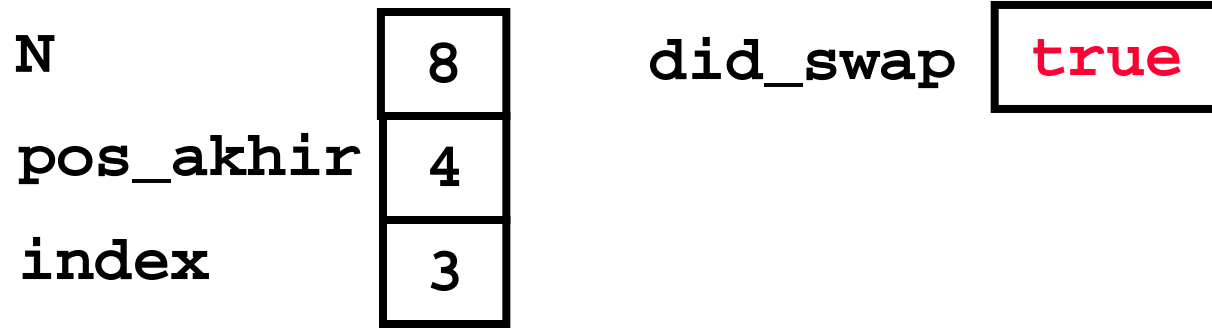
# The Third "Bubble Up"



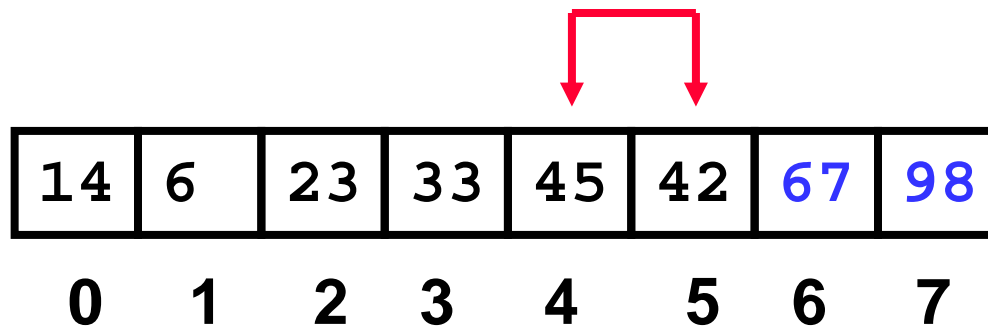
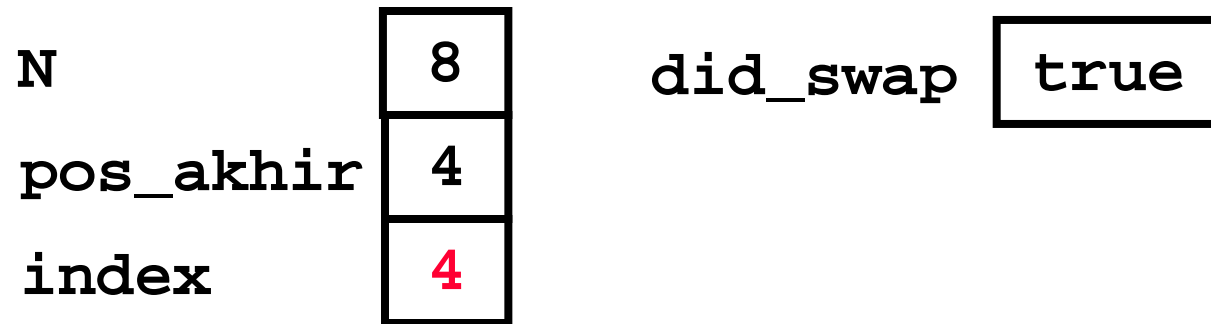
# The Third “Bubble Up”



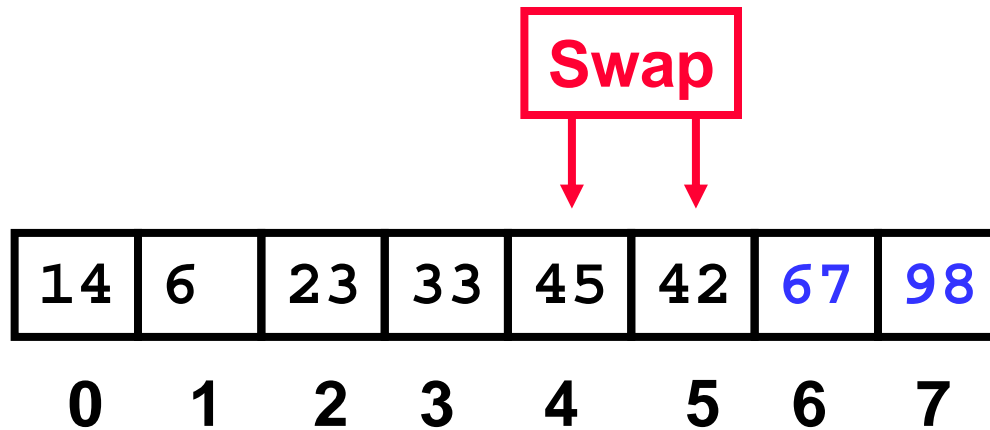
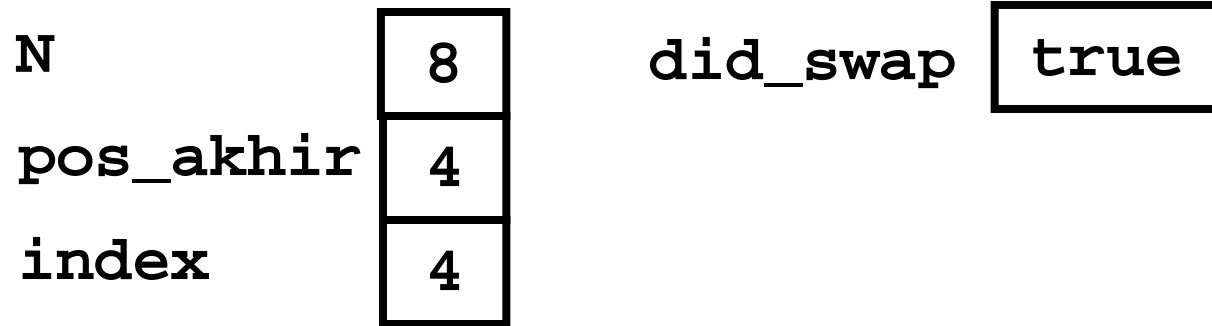
# The Third "Bubble Up"



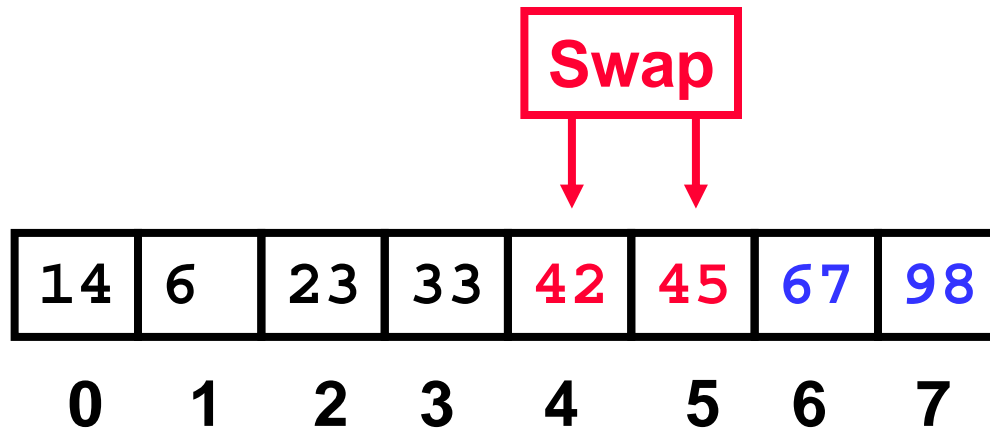
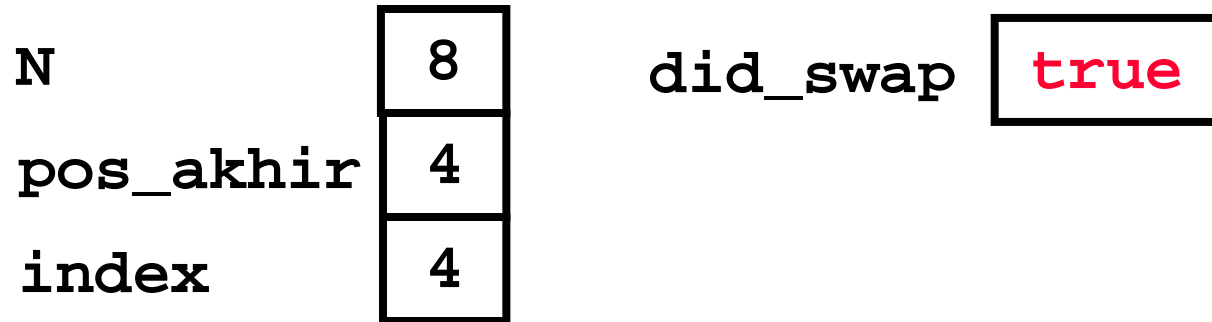
# The Third "Bubble Up"



# The Third "Bubble Up"



# The Third “Bubble Up”



# After Third Pass of Outer Loop

N 

8
---

    did\_swap 

true
------

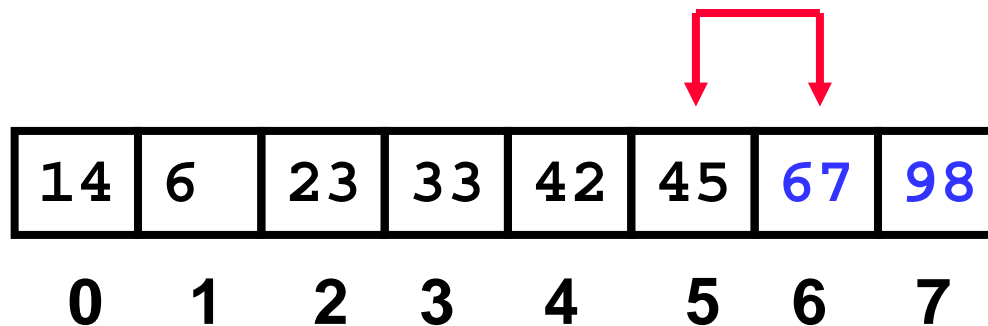
  
pos\_akhir 

4
---

  
index 

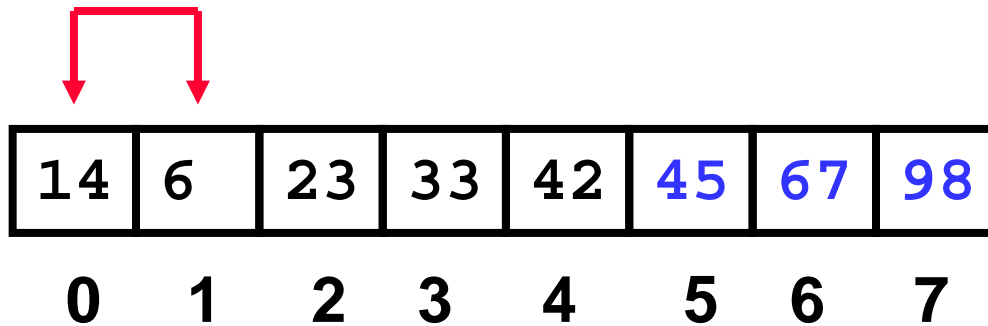
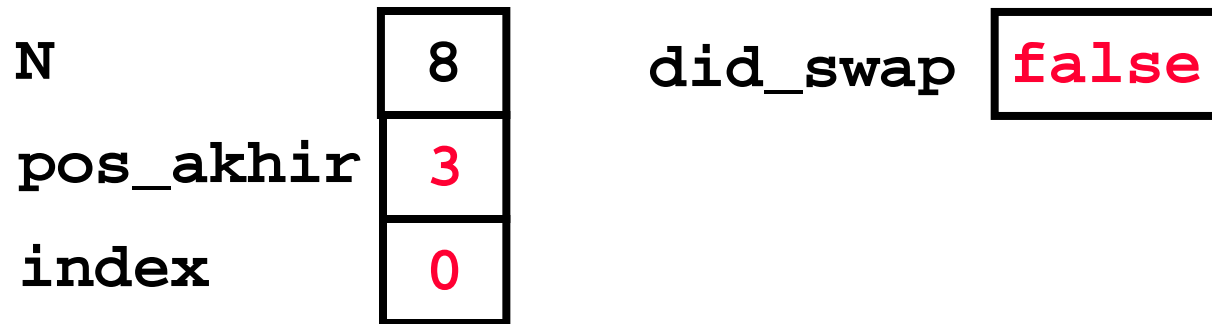
5
---

**Finished third "Bubble Up"**

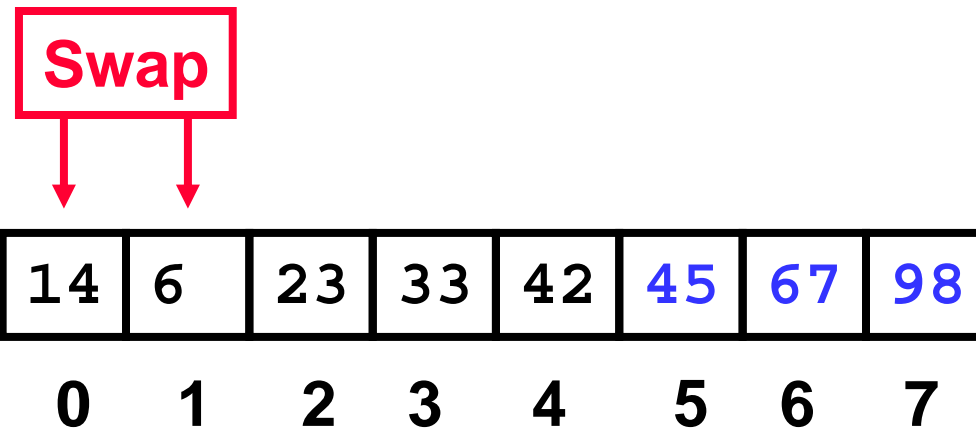
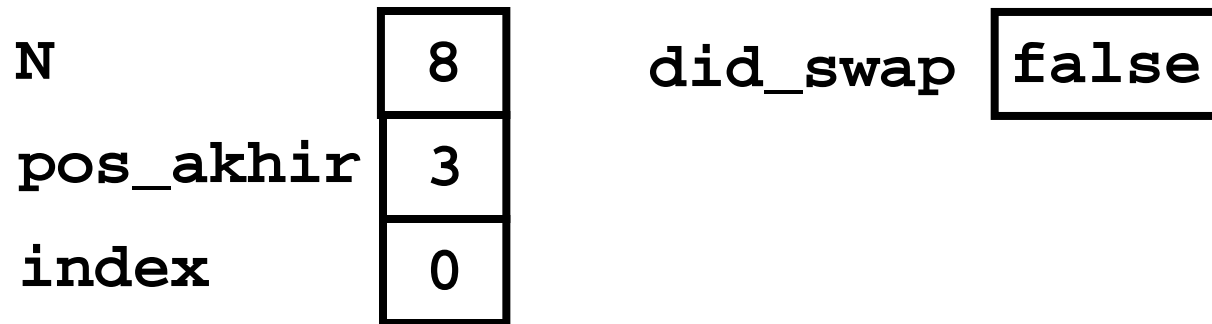




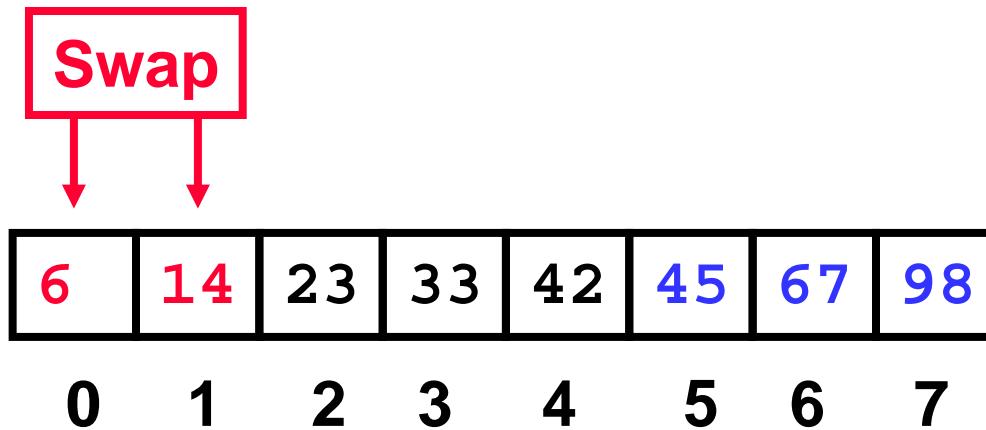
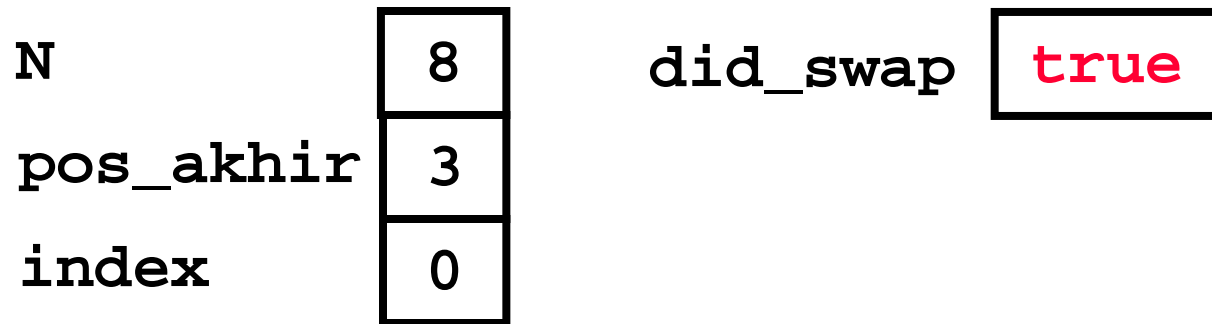
# The Fourth "Bubble Up"



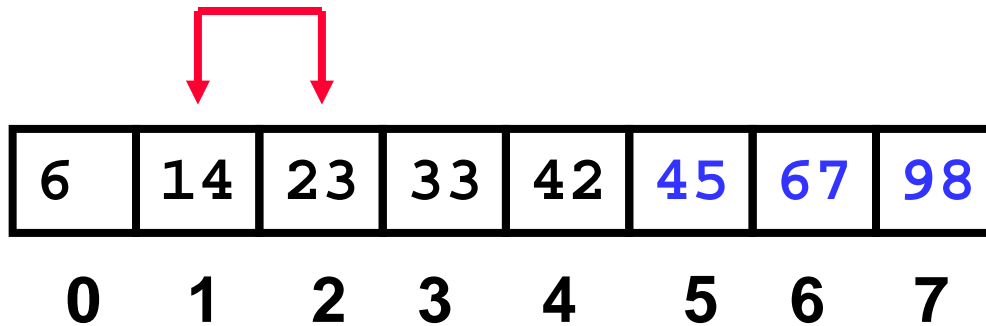
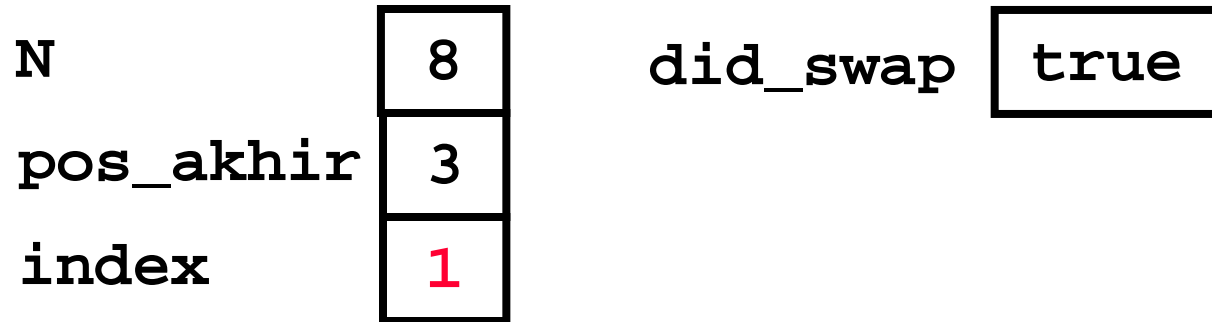
# The Fourth "Bubble Up"



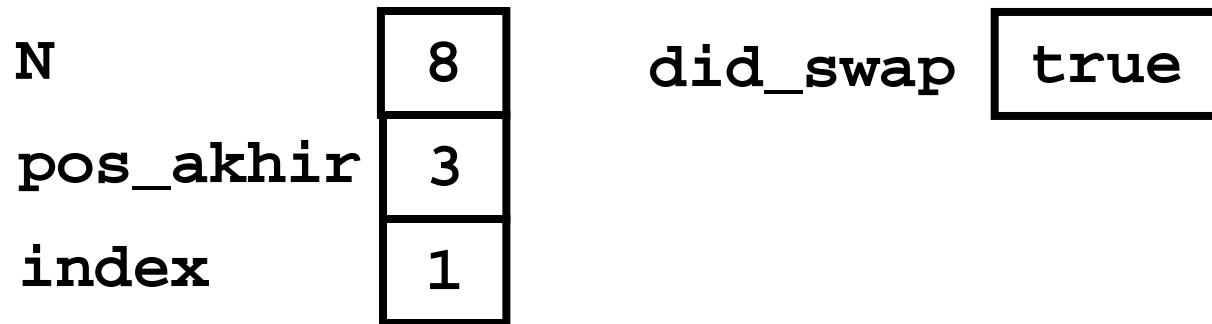
# The Fourth "Bubble Up"



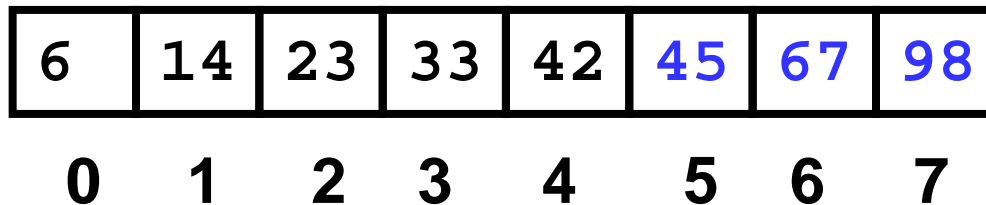
# The Fourth "Bubble Up"



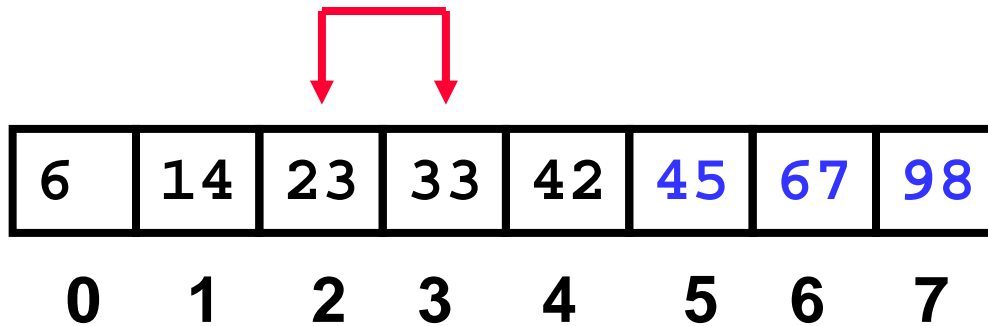
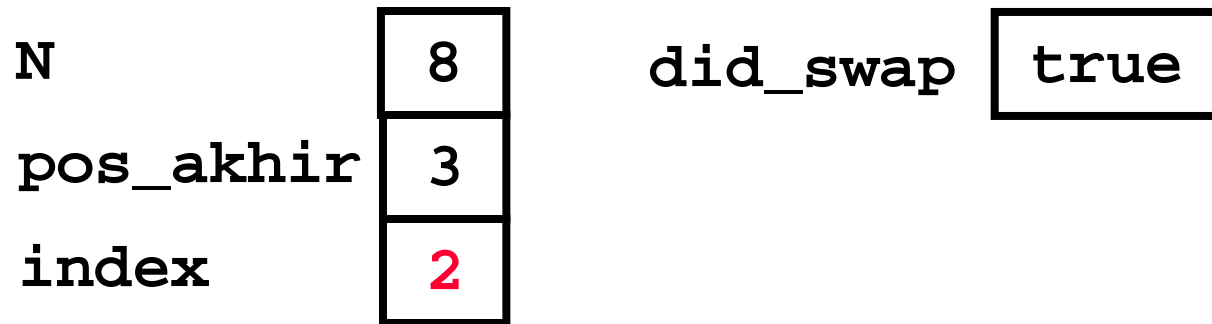
# The Fourth "Bubble Up"



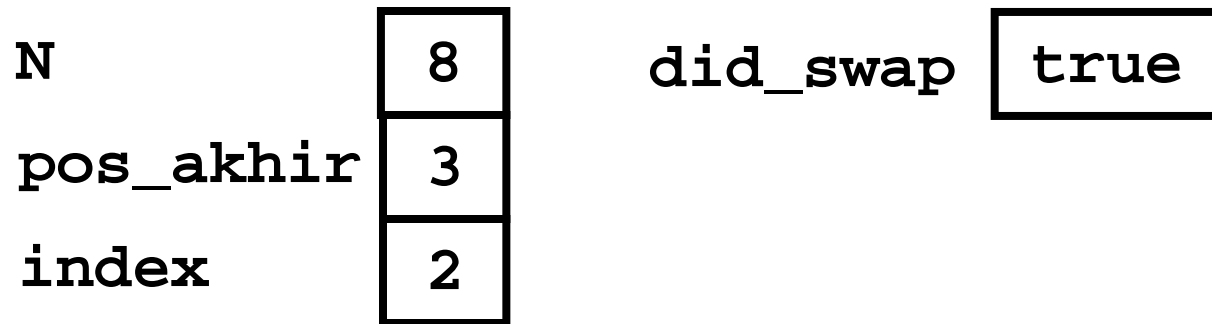
No Swap



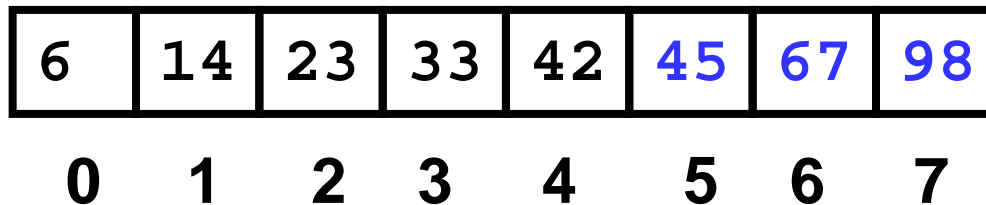
# The Fourth "Bubble Up"



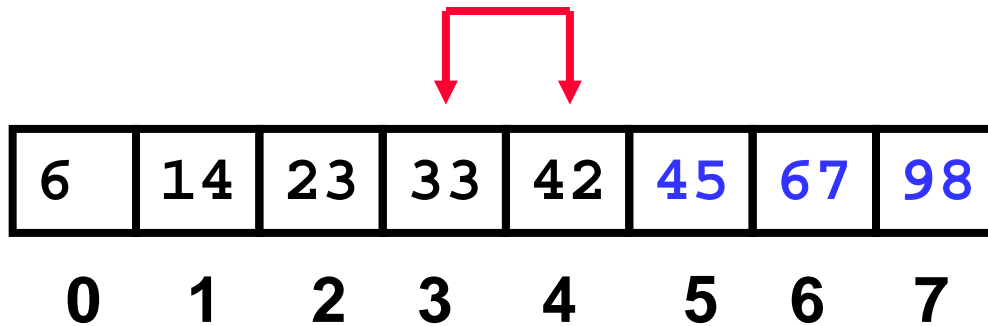
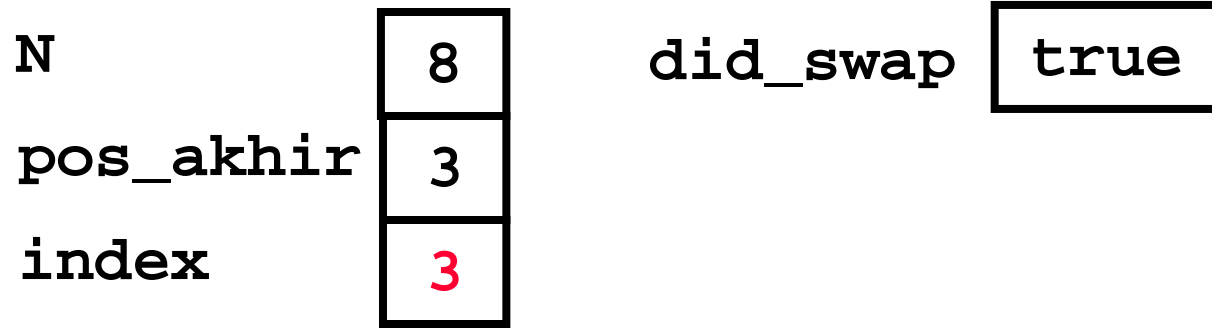
# The Fourth "Bubble Up"



No Swap

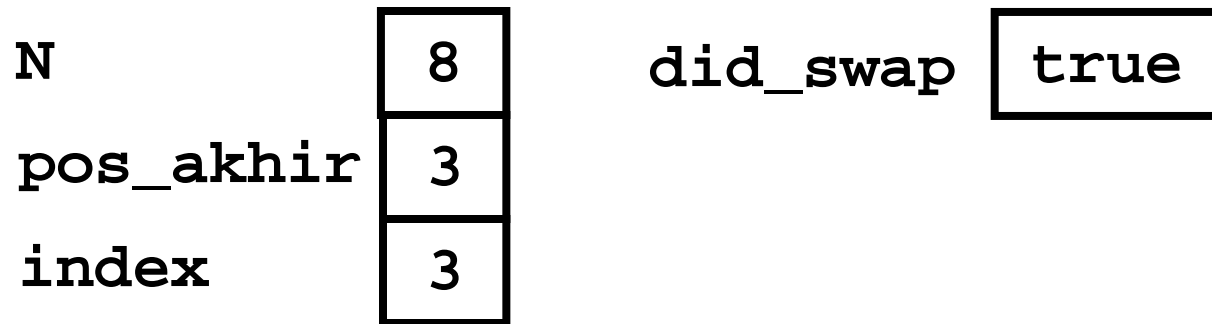


# The Fourth "Bubble Up"

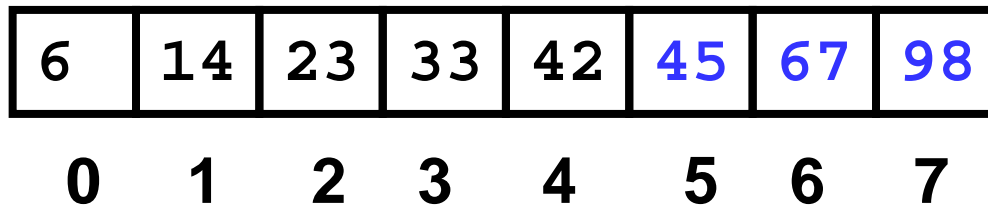




# The Fourth "Bubble Up"



No Swap



# After Fourth Pass of Outer Loop

N 

8
---

    did\_swap 

true
------

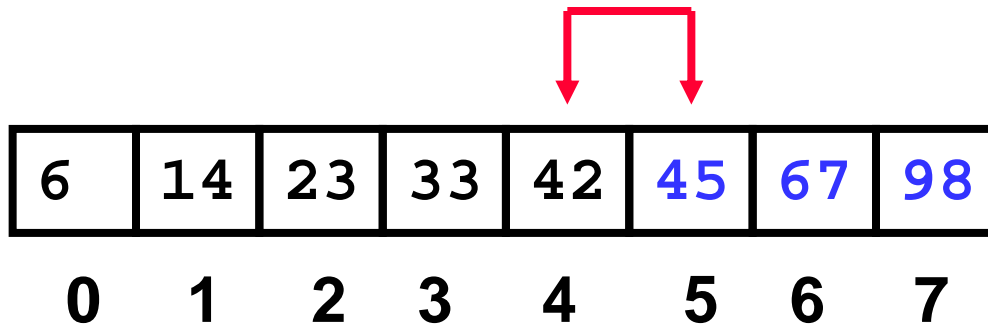
pos\_akhir 

3
---

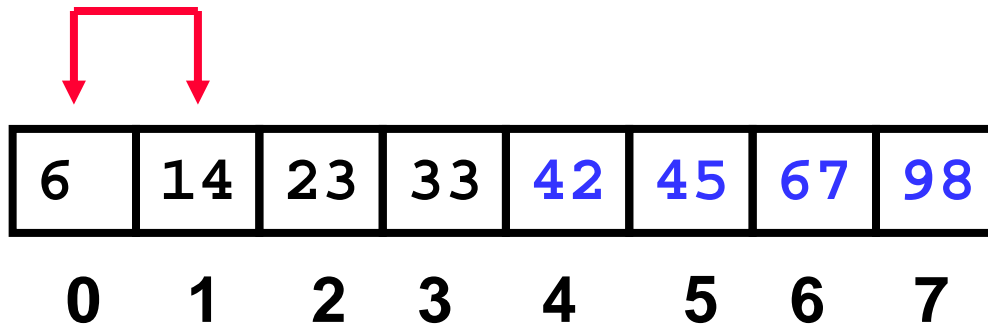
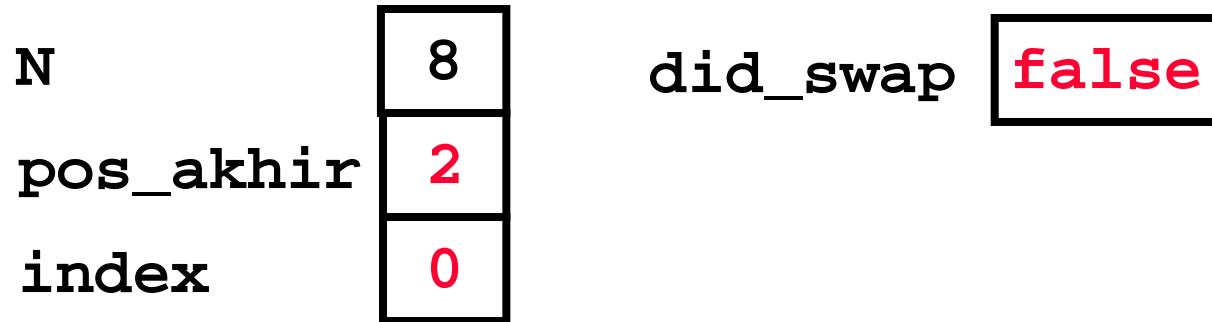
index 

4
---

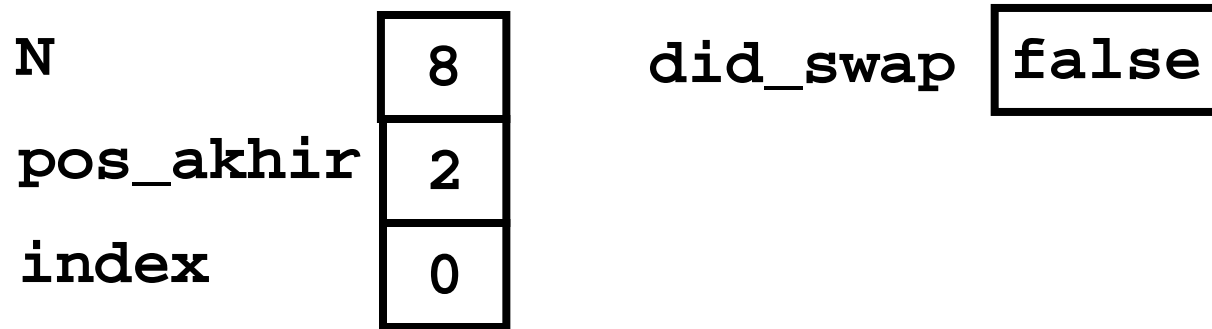
**Finished fourth "Bubble Up"**



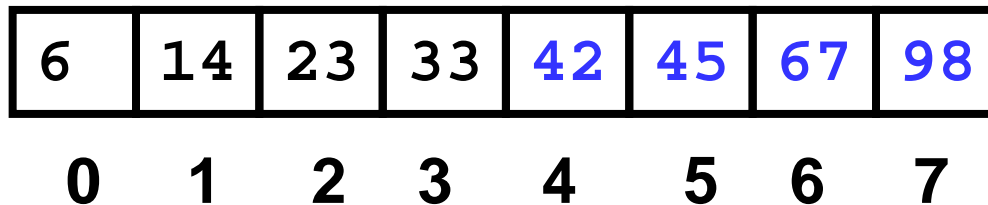
# The Fifth "Bubble Up"



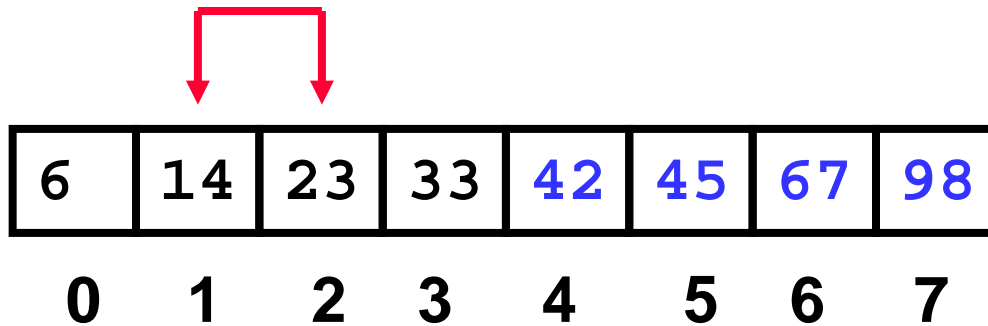
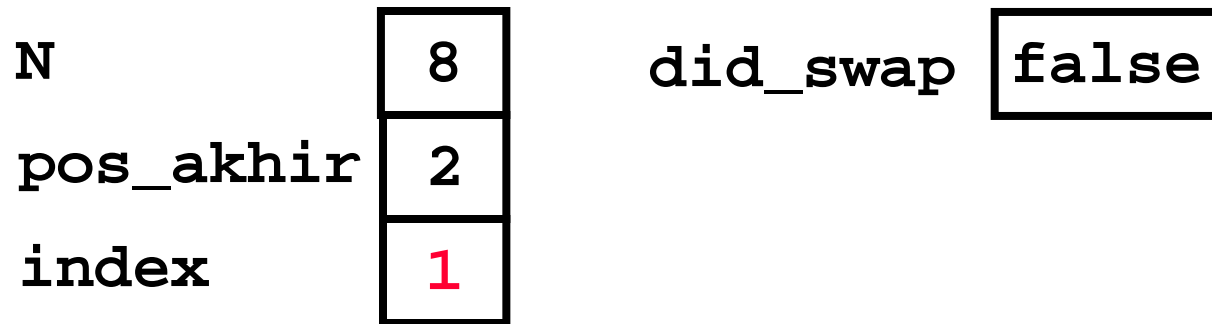
# The Fifth "Bubble Up"



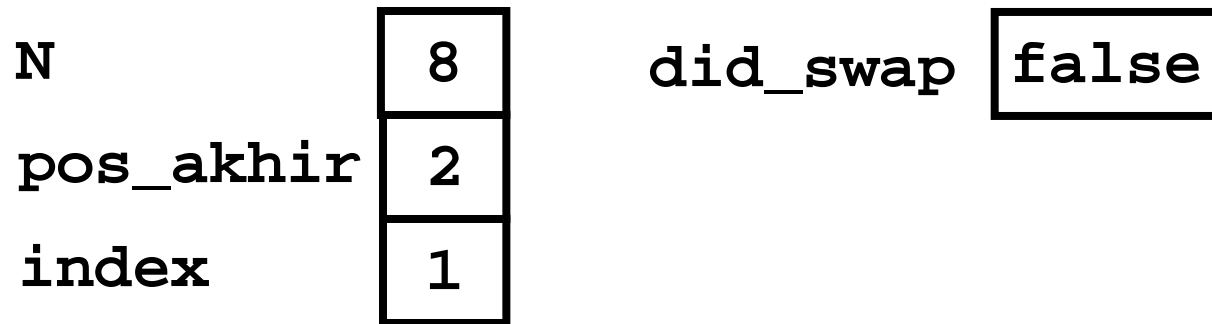
No Swap



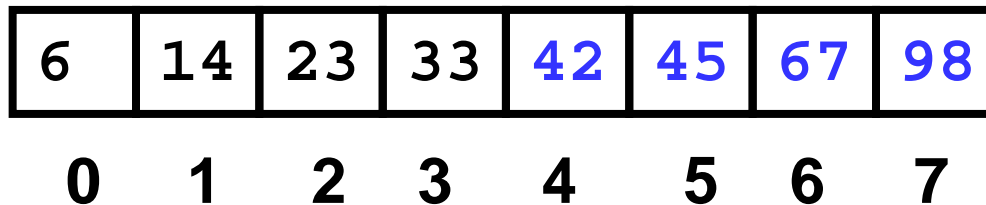
# The Fifth "Bubble Up"



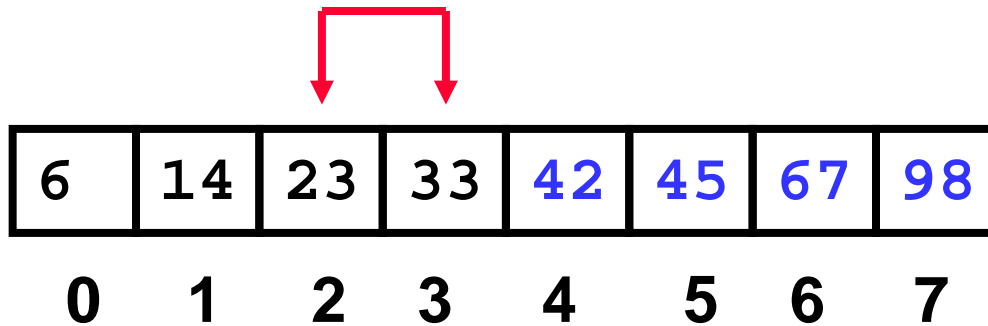
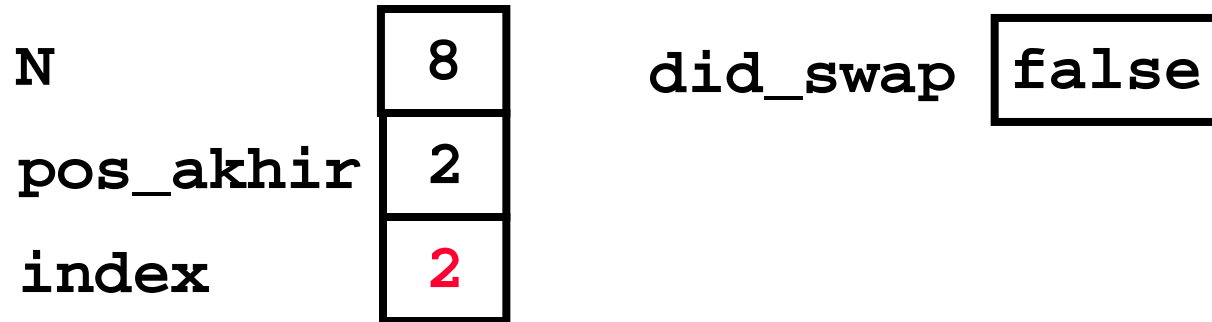
# The Fifth "Bubble Up"



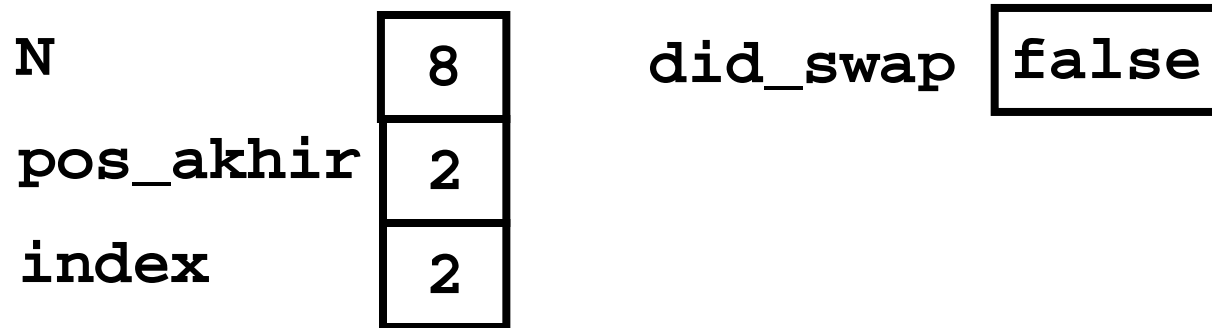
No Swap



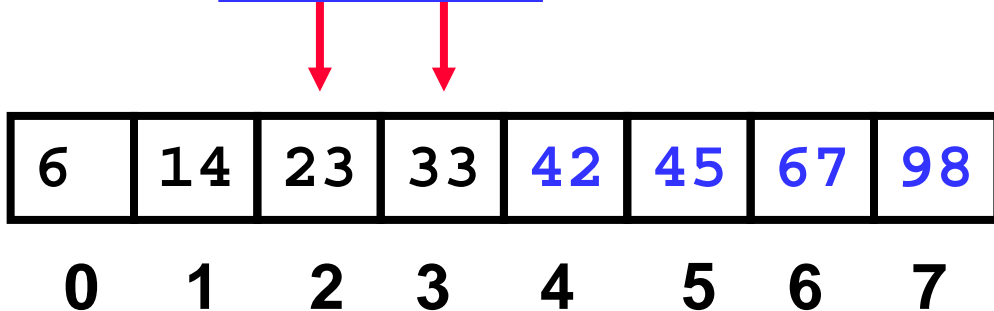
# The Fifth "Bubble Up"



# The Fifth "Bubble Up"



No Swap





# After Fifth Pass of Outer Loop

N 

8
---

    did\_swap 

false
-------

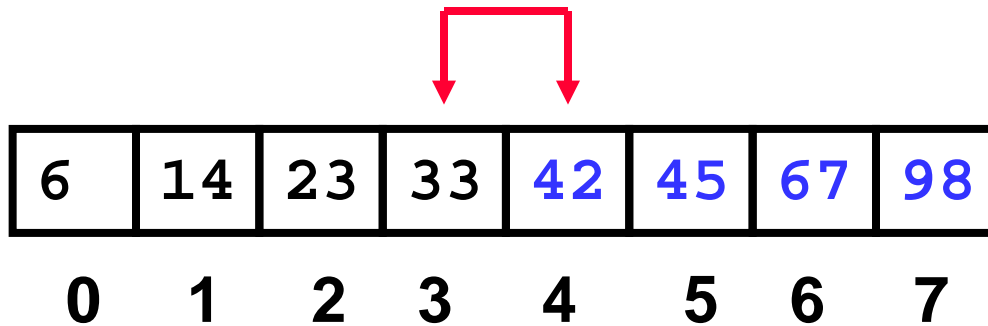
pos\_akhir 

2
---

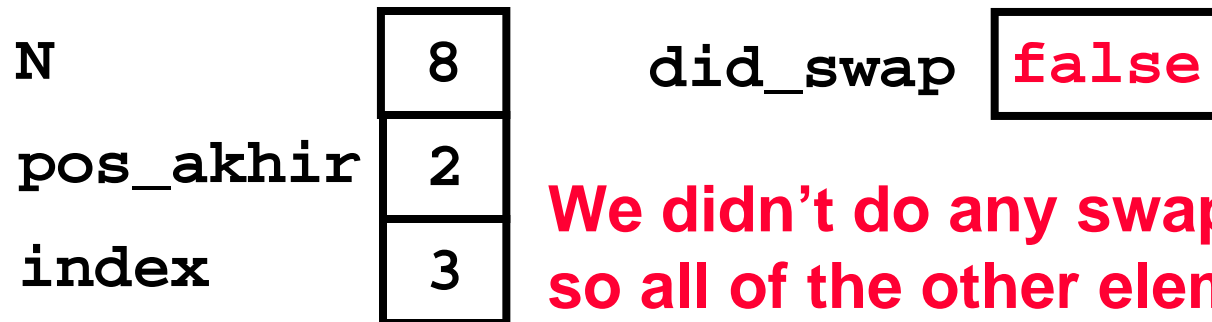
index 

3
---

**Finished fifth "Bubble Up"**



# Finished “Early”



We didn't do any swapping, so all of the other elements must be correctly placed.

We can “skip” the last two passes of the outer loop.

6	14	23	33	42	45	67	98
0	1	2	3	4	5	6	7

# Algoritma

1.  $i \leftarrow N$
2. selama ( $i > 0$ ) kerjakan baris 3 sampai dengan 11
3.  $did\_swap = false$
4.  $j \leftarrow 1$
5. Selama ( $j < i$ ) kerjakan baris 5 sampai dengan 8
6. Jika ( $Data[j-1] > Data[j]$ ) maka kerjakan baris 7 & 8
7. tukar  $Data[j-1]$  dengan  $Data[j]$
8.  $did\_swap = true$
9.  $j \leftarrow j + 1$
10. Jika  $did\_swap = false$  keluar dari loop
11.  $i \leftarrow i - 1$