

# Data Structures

## Lecture: Selection Sort

By

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# Selection Sort

<b>5</b>	<b>1</b>	<b>3</b>	<b>4</b>	<b>6</b>	<b>2</b>
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Comparison



Data Movement



Sorted

# Selection Sort

<b>5</b>	<b>1</b>	<b>3</b>	<b>4</b>	<b>6</b>	<b>2</b>
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Comparison



Data Movement



Sorted

# Selection Sort

5	1	3	4	6	2
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Comparison



Data Movement



Sorted

# Selection Sort

5	1	3	4	6	2
---	---	---	---	---	---



Comparison

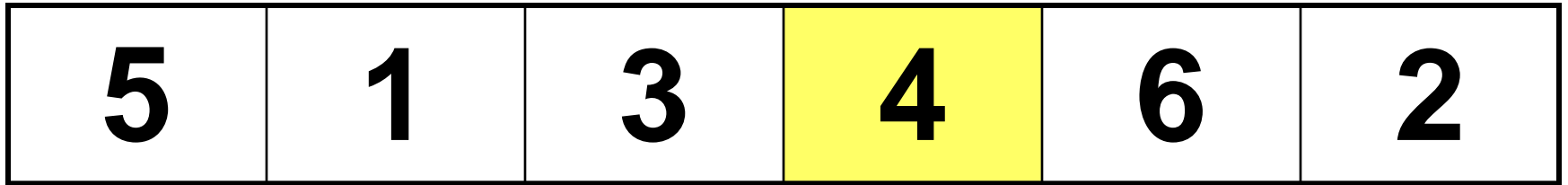


Data Movement



Sorted

# Selection Sort



Comparison



Data Movement



Sorted

# Selection Sort

5	1	3	4	6	2
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Comparison



Data Movement



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# Selection Sort

5	1	3	4	6	2
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Comparison



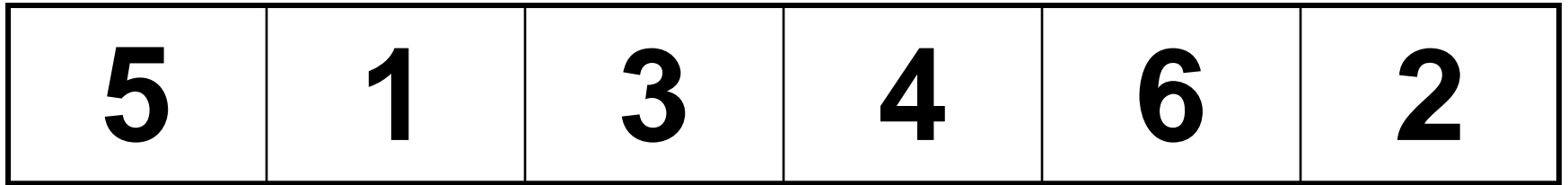
Data Movement



Sorted



# Selection Sort



↑  
Min



Comparison



Data Movement



Sorted

# Selection Sort

<b>1</b>	<b>5</b>	<b>3</b>	<b>4</b>	<b>6</b>	<b>2</b>
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Comparison

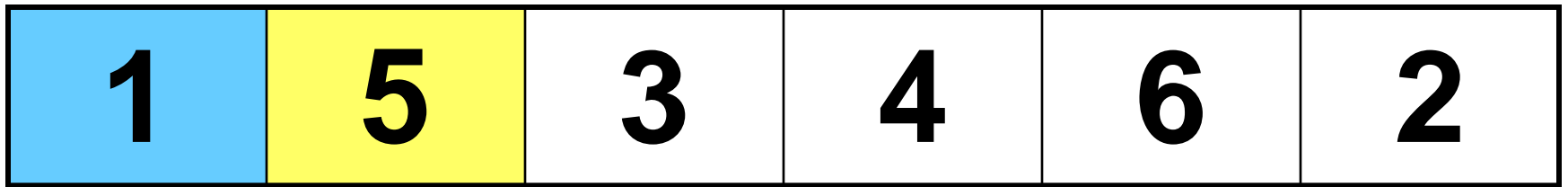


Data Movement



Sorted

# Selection Sort



Comparison



Data Movement



Sorted

# Selection Sort



Comparison

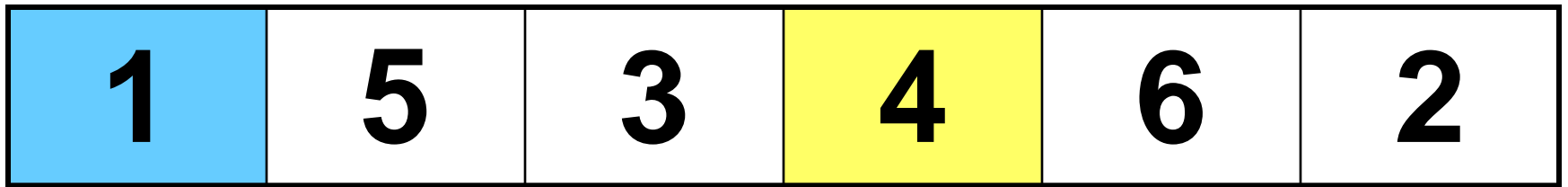


Data Movement



Sorted

# Selection Sort



Comparison

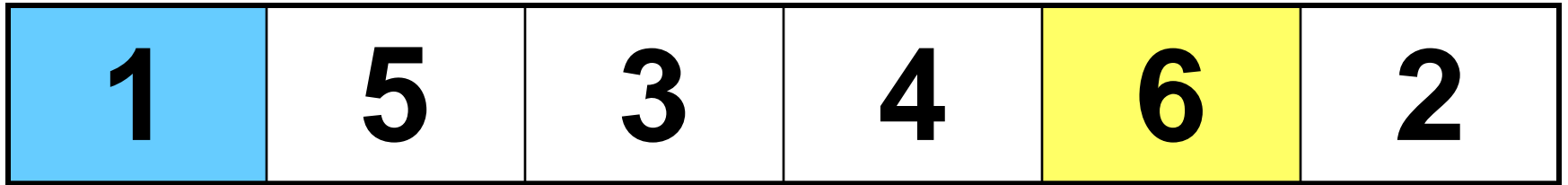


Data Movement



Sorted

# Selection Sort



Comparison

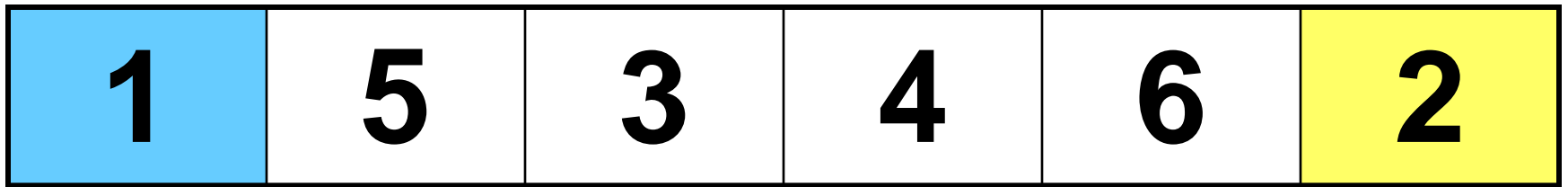


Data Movement



Sorted

# Selection Sort



↑  
Min



Comparison

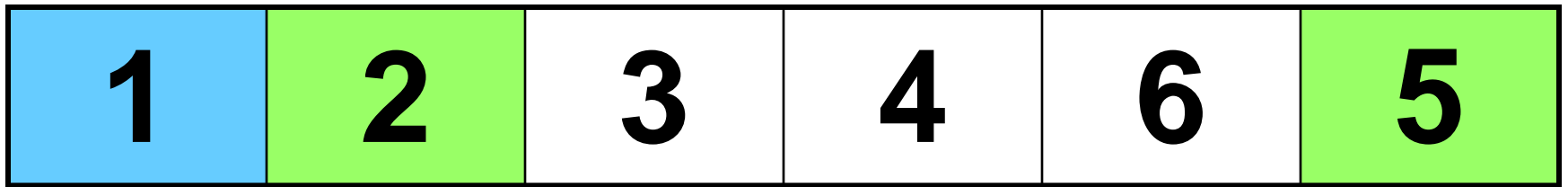


Data Movement



Sorted

# Selection Sort



Comparison



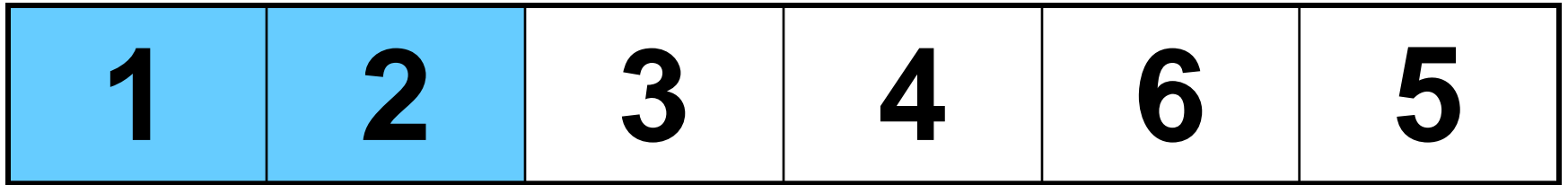
Data Movement



Sorted



# Selection Sort



Comparison



Data Movement



Sorted

# Selection Sort



Comparison



Data Movement



Sorted

# Selection Sort



Comparison

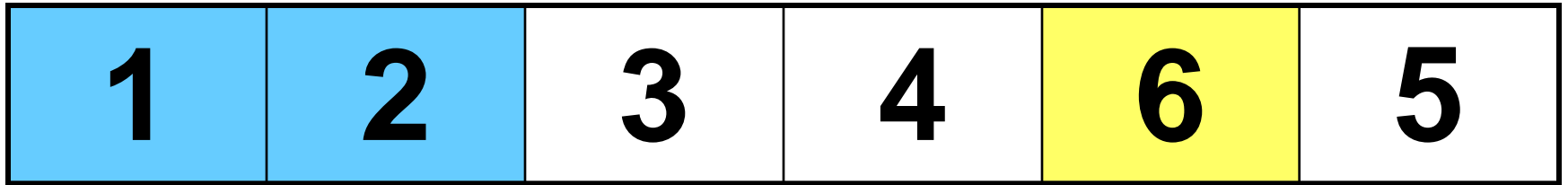


Data Movement



Sorted

# Selection Sort



Comparison

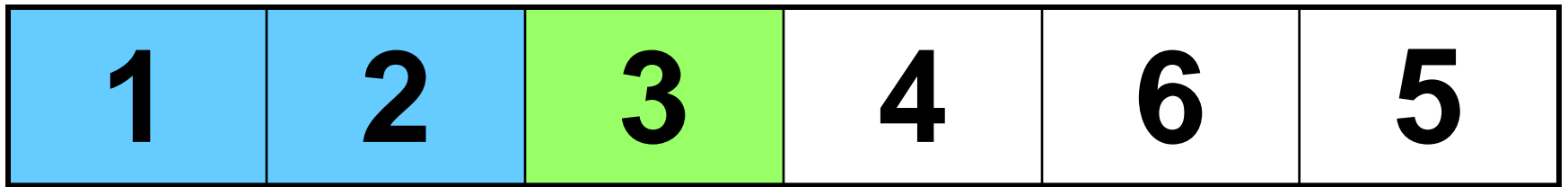


Data Movement



Sorted

# Selection Sort



↑  
Min



Comparison

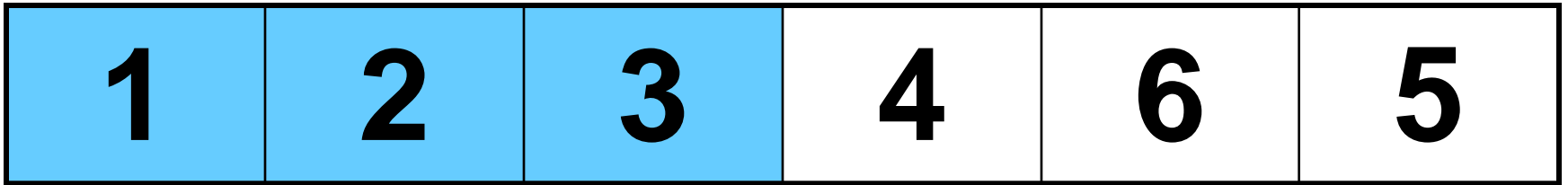


Data Movement



Sorted

# Selection Sort



Comparison

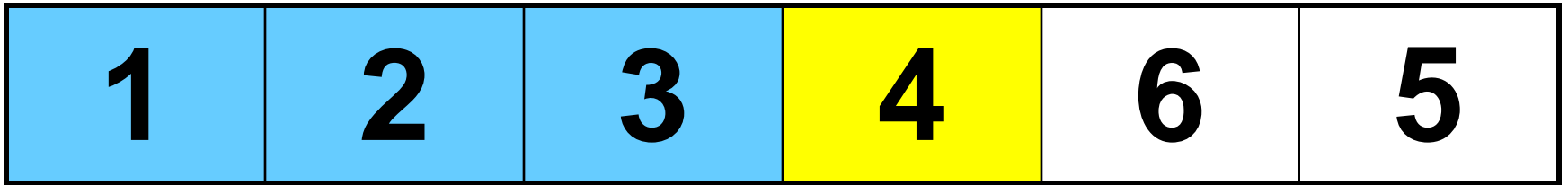


Data Movement



Sorted

# Selection Sort



Comparison

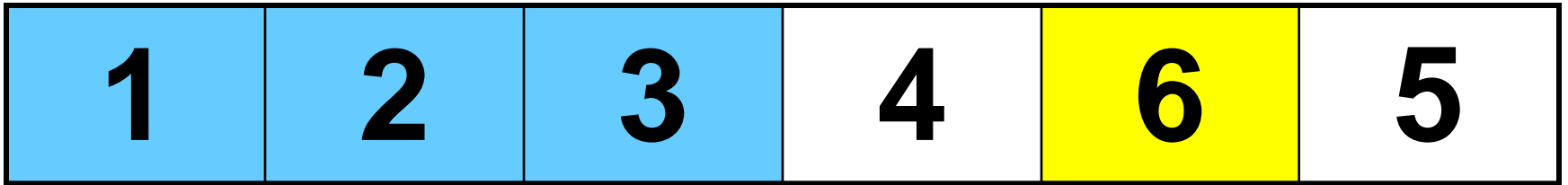


Data Movement



Sorted

# Selection Sort



Comparison



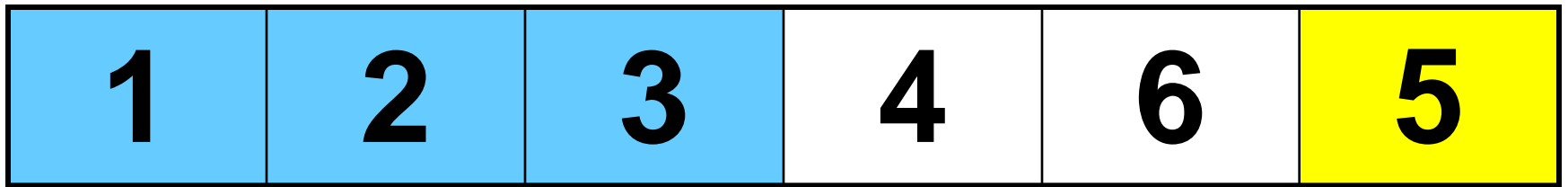
Data Movement



Sorted



# Selection Sort



↑  
Min



Comparison

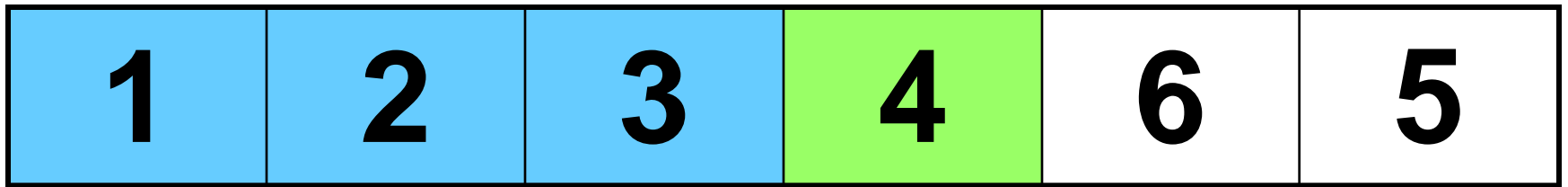


Data Movement



Sorted

# Selection Sort



Comparison

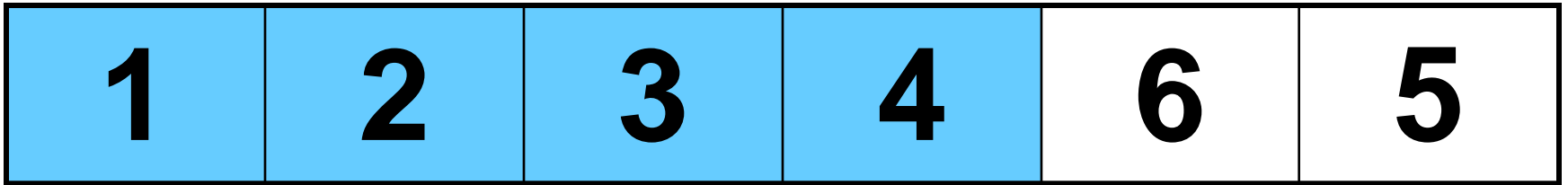


Data Movement



Sorted

# Selection Sort



Comparison

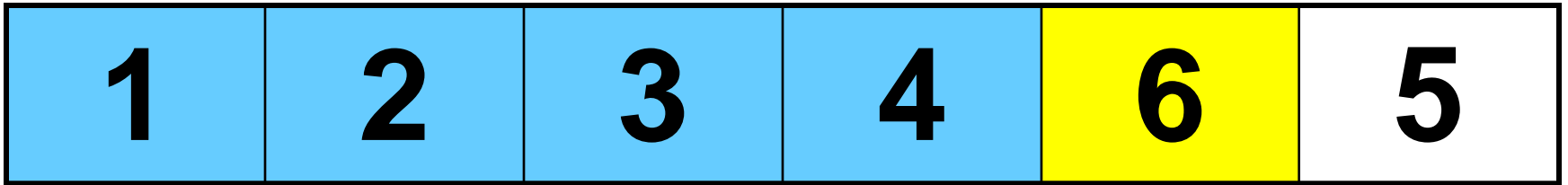


Data Movement



Sorted

# Selection Sort



Comparison

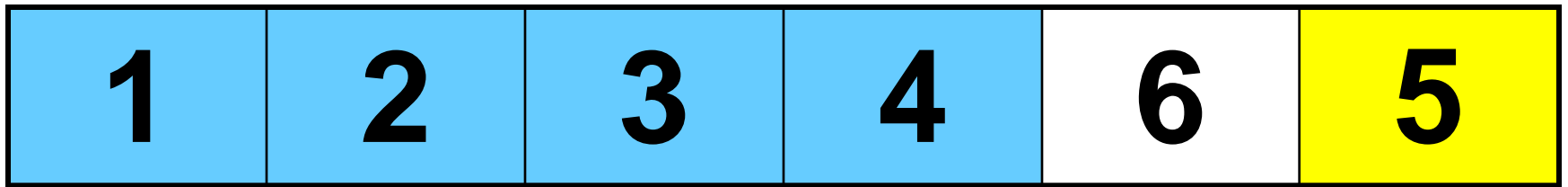


Data Movement



Sorted

# Selection Sort



↑  
Min



Comparison

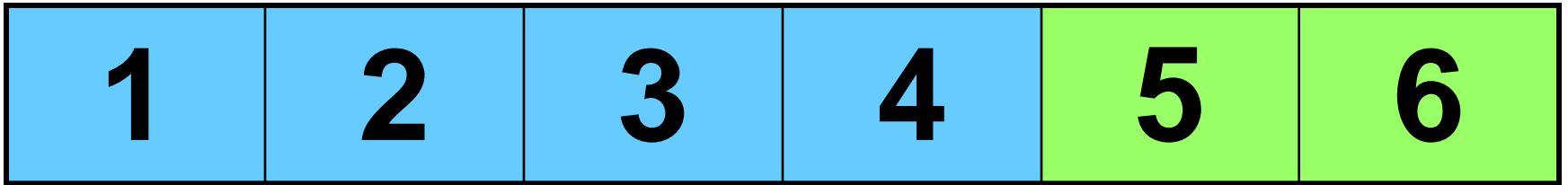


Data Movement



Sorted

# Selection Sort



Comparison

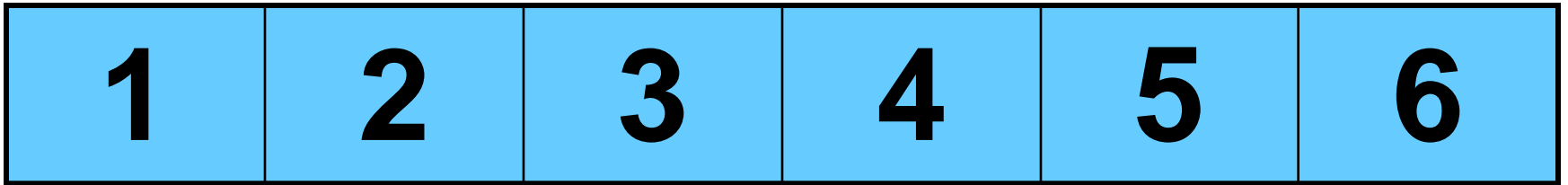


Data Movement



Sorted

# Selection Sort



**DONE!**



Comparison



Data Movement



Sorted

# Selection Sort

Selection\_Sort (A, n)

1. Set  $j = 0$ .
2. Repeat While  $j < n - 1$ :
  3. Set  $\text{Min} = j$  and  $i = j+1$ .
  4. Repeat step 5 while  $i < n$ :
    5. if( $a[i] < a[\text{Min}]$ ), then:  
     $\text{Min} = i$ .
  - [End of step 4 loop.]
6. if ( $\text{Min} \neq j$ ), then:
  7. swap ( $a[j]$ ,  $a[\text{Min}]$ ).
8. [End of step 2 loop.]
9. Return.



# Comparison Table of Sorting

	<b>Best Case</b>	<b>Average Case</b>	<b>Worst Case</b>
Bubble Sort	$O(n)$	$O(n^2)$	$O(n^2)$
Insertion Sort	$O(n)$	$O(n^2)$	$O(n^2)$
Selection Sort	$O(n^2)$	$O(n^2)$	$O(n^2)$
Merge Sort	$O(n \log n)$	$O(n \log n)$	$O(n \log n)$
Quick Sort	$O(n \log n)$	$O(n \log n)$	$O(n^2)$
Heap Sort	$O(n \log n)$	$O(n \log n)$	$O(n \log n)$

Questions?

