

Sorting

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Acknowledgement: Lecture slides based on those created by
J. Michael Moore

Sorting Algorithms

- There are lots of ways to sort
 - you will implement several in CSCE 221
- C++ STL has built in sorting
 - So do many other languages
- Still very useful to know how to implement
 - Good first algorithm to code
 - Even a small amount of code can be tricky

Selection Sort

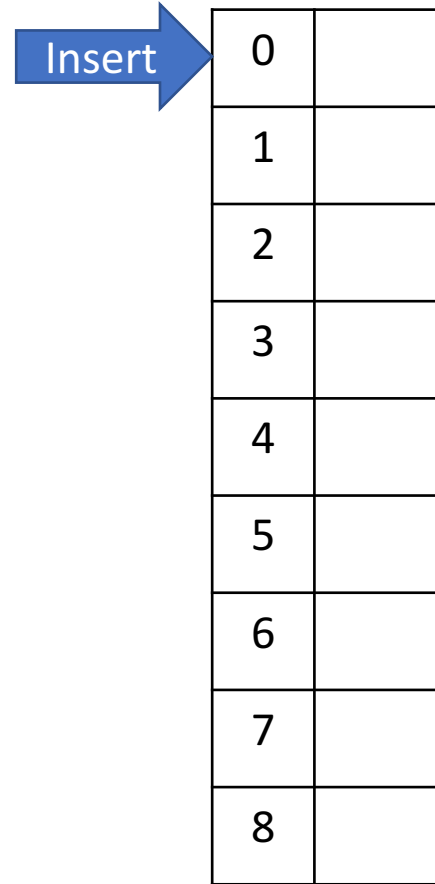
- Start with an ‘empty’ list.
- While we still have values to insert,
 - Find smallest value and put at end of list.

Outer Loop

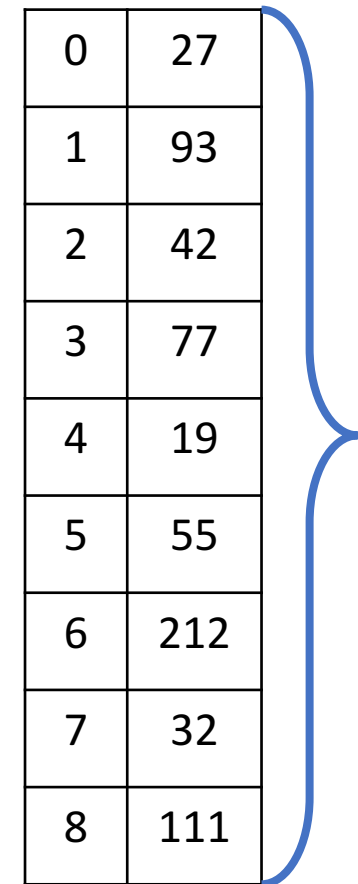
Inner Loop

Selection Sort

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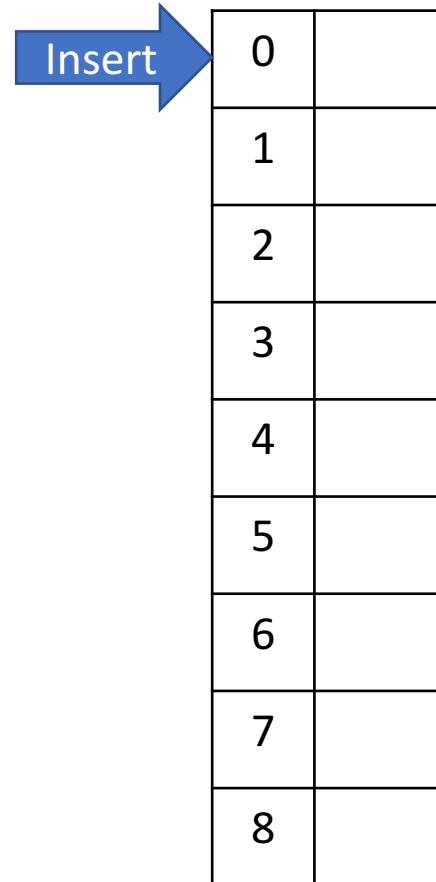
0	
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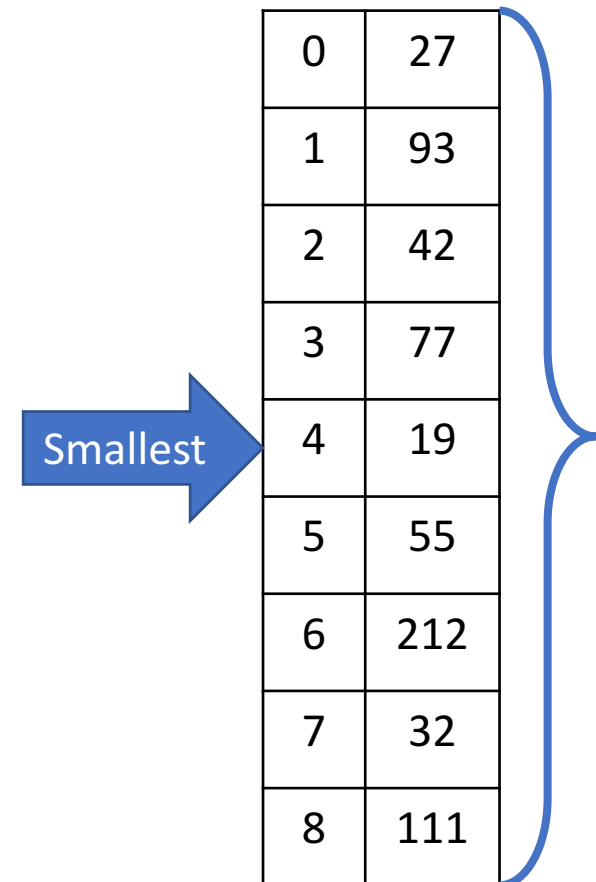
0	27
1	93
2	42
3	77
4	19
5	55
6	212
7	32
8	111

Selection Sort

- Start with an 'empty' list.
- While we still have values to insert,
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0	
1	
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8	



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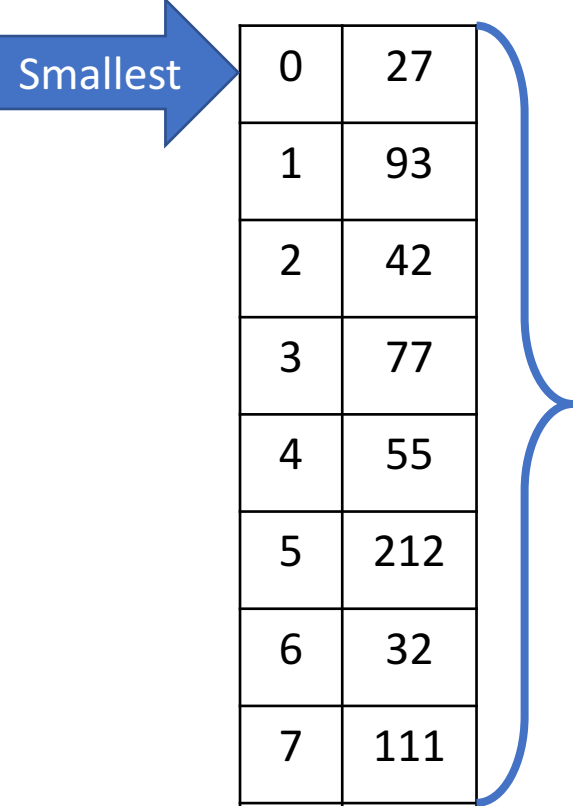


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Insert


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Smallest

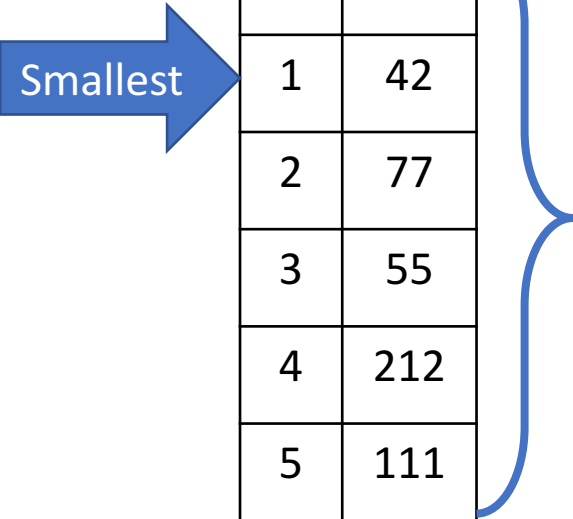
0	93
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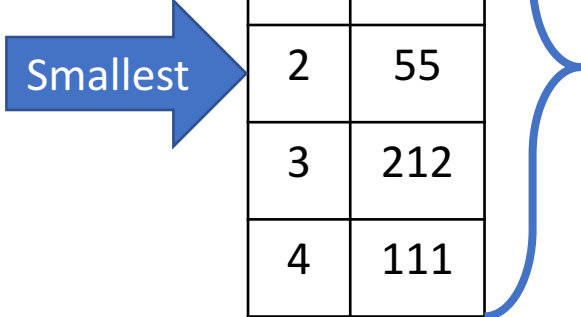


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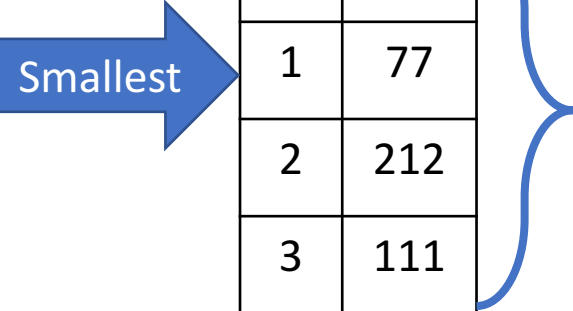
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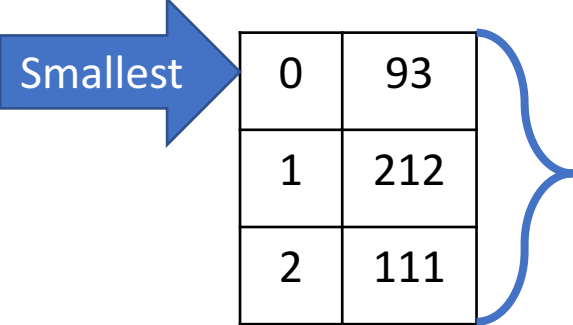
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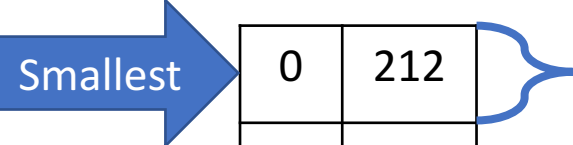
0	212
1	
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Sorted!

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Improve?

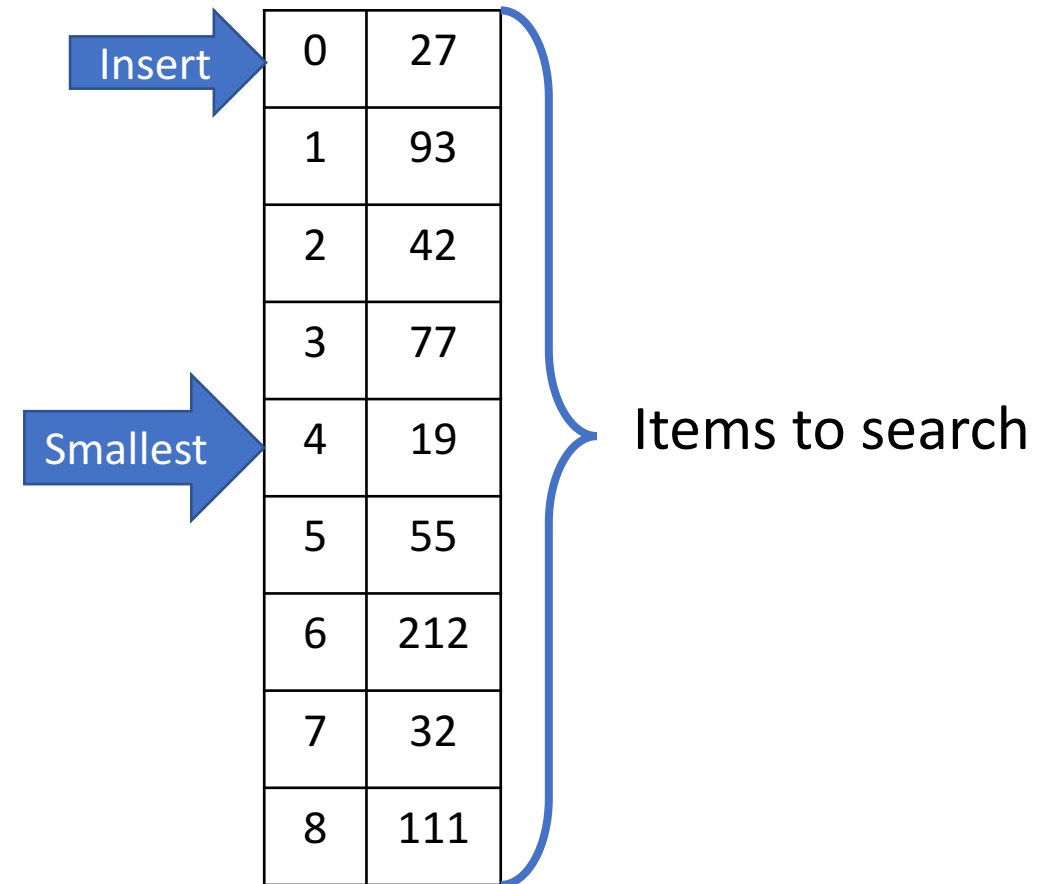
- Created a second vector.
 - Do we have to?
 - NO!
- Keep sorted list and remaining items to place in the same vector.
- When we start
 - the sorted list has size 0 (zero)
 - the number of items to place is the size of the list
- Start with the place to insert at zero
 - Find smallest starting from the place to insert
 - Swap smallest with item in the place to insert
 - Increment place to insert

Selection Sort (Second Version)

- Set place to insert to first location in list
- While we still have values to insert,
 - Find smallest value and swap with location to insert.
 - Increment place to insert

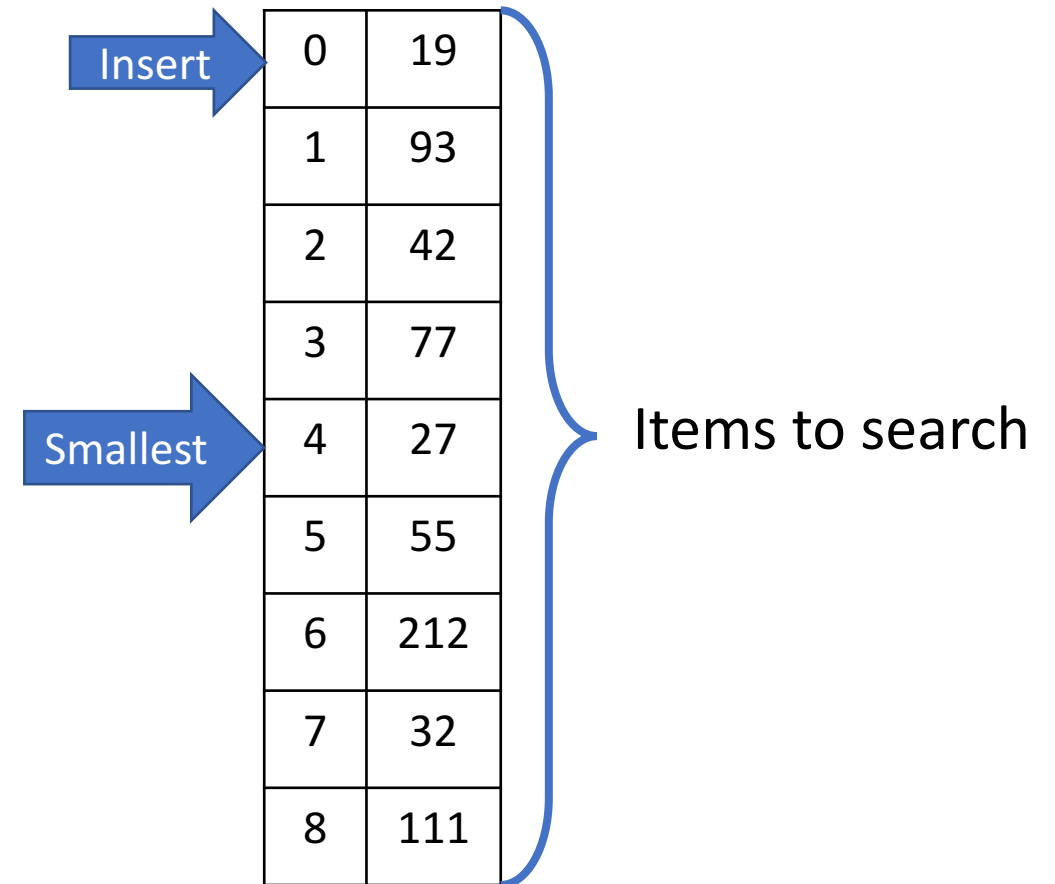
Selection Sort

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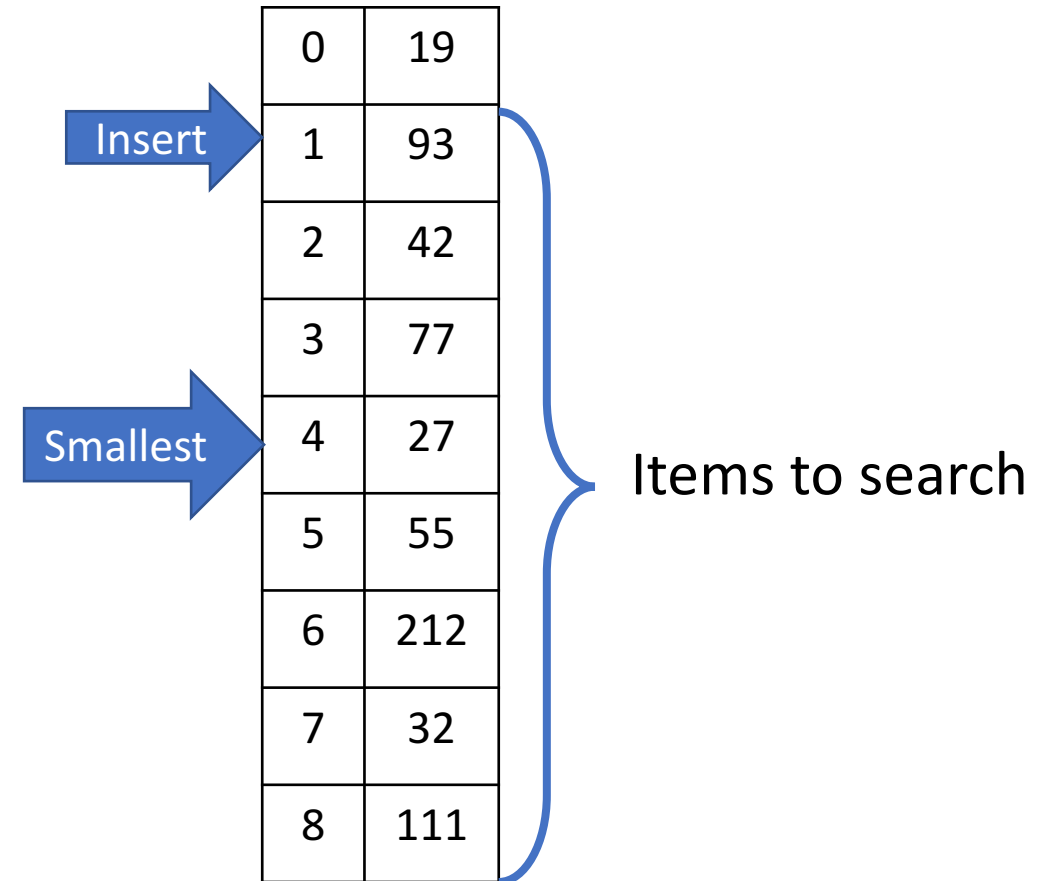
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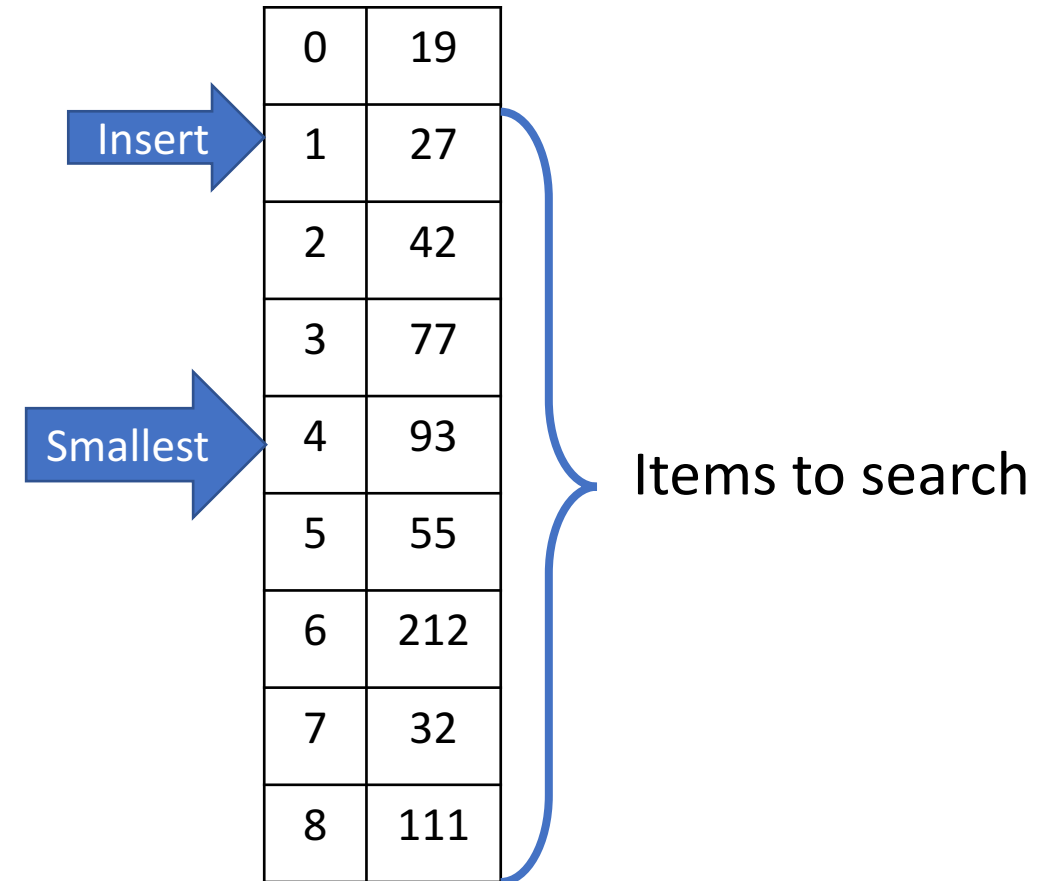
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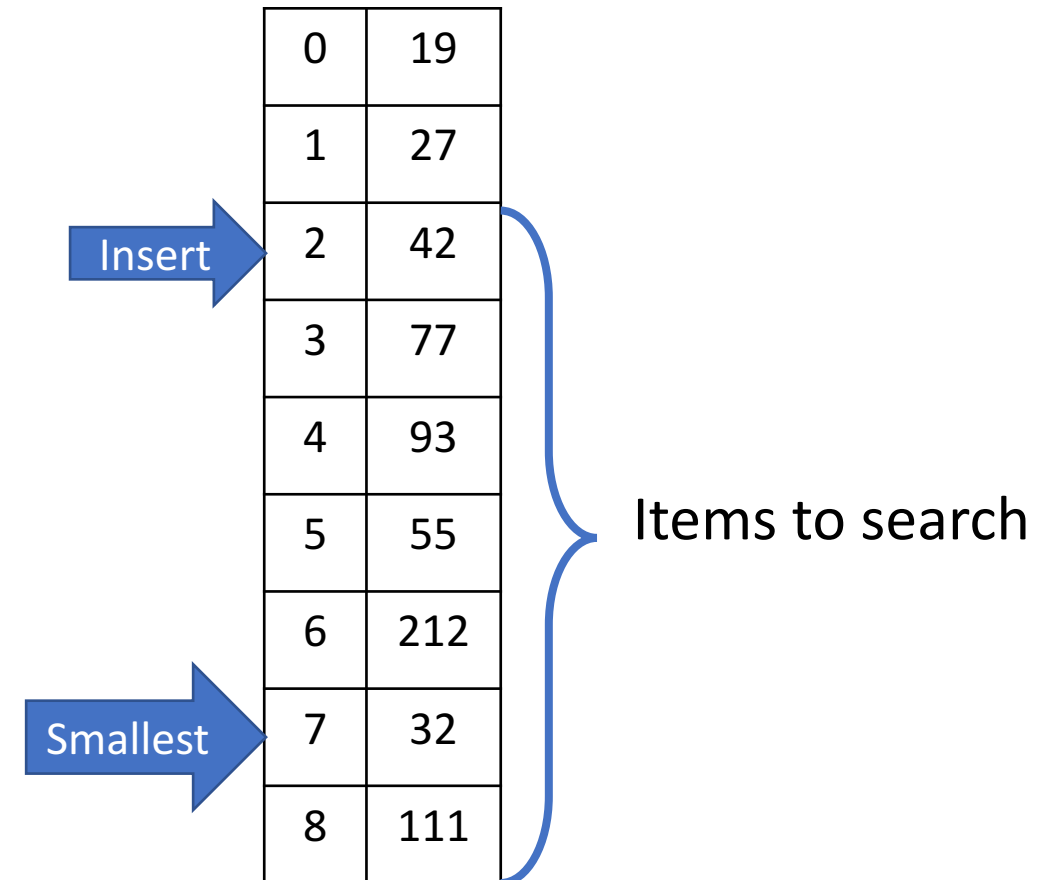
Selection Sort

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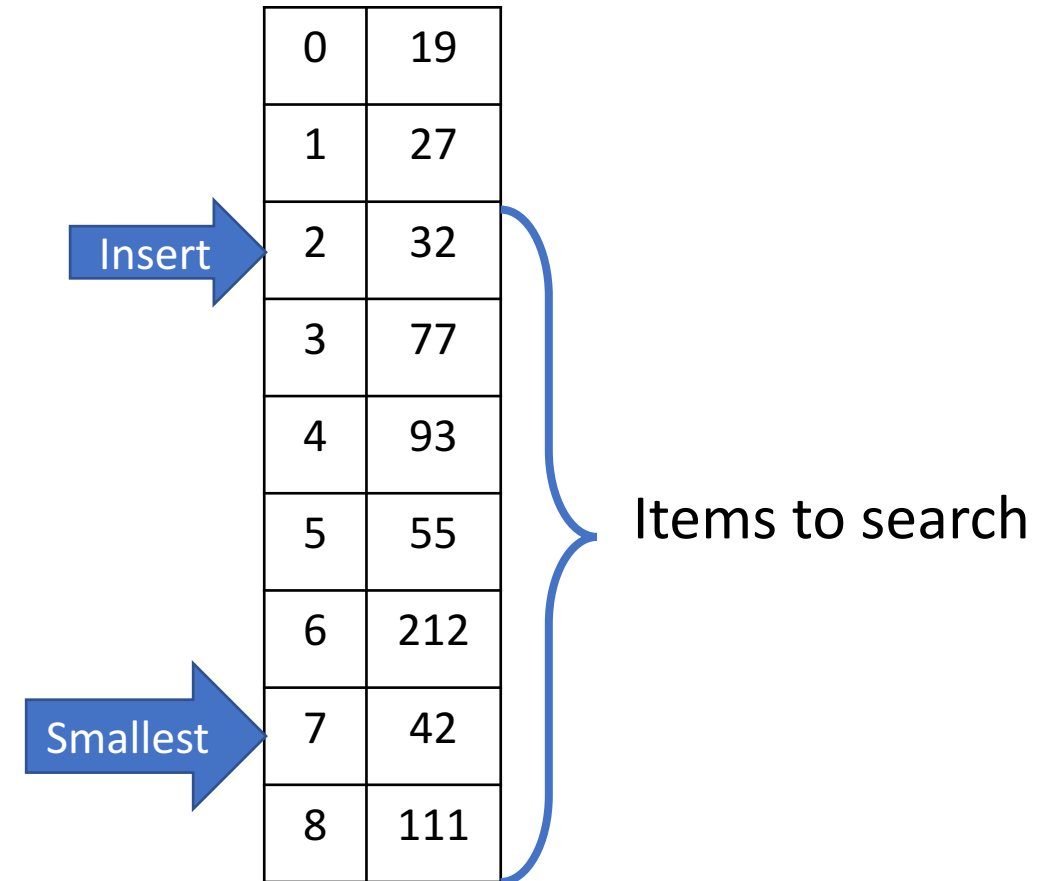
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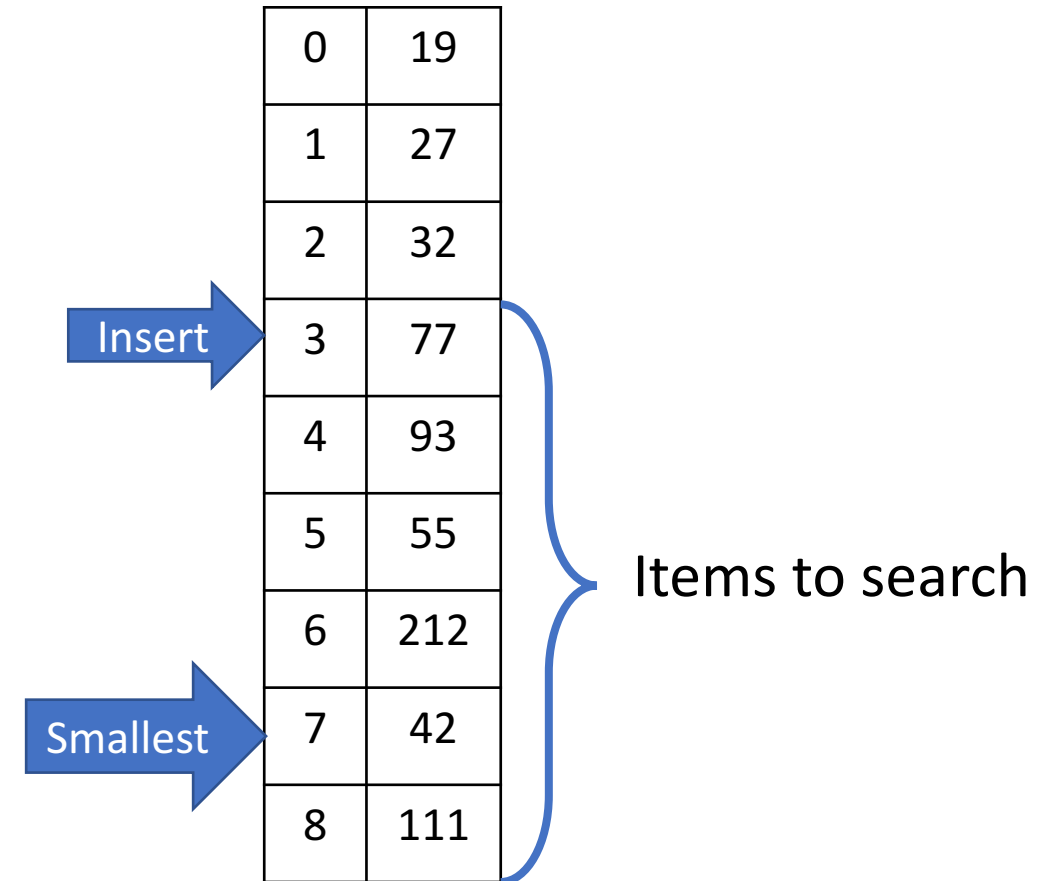
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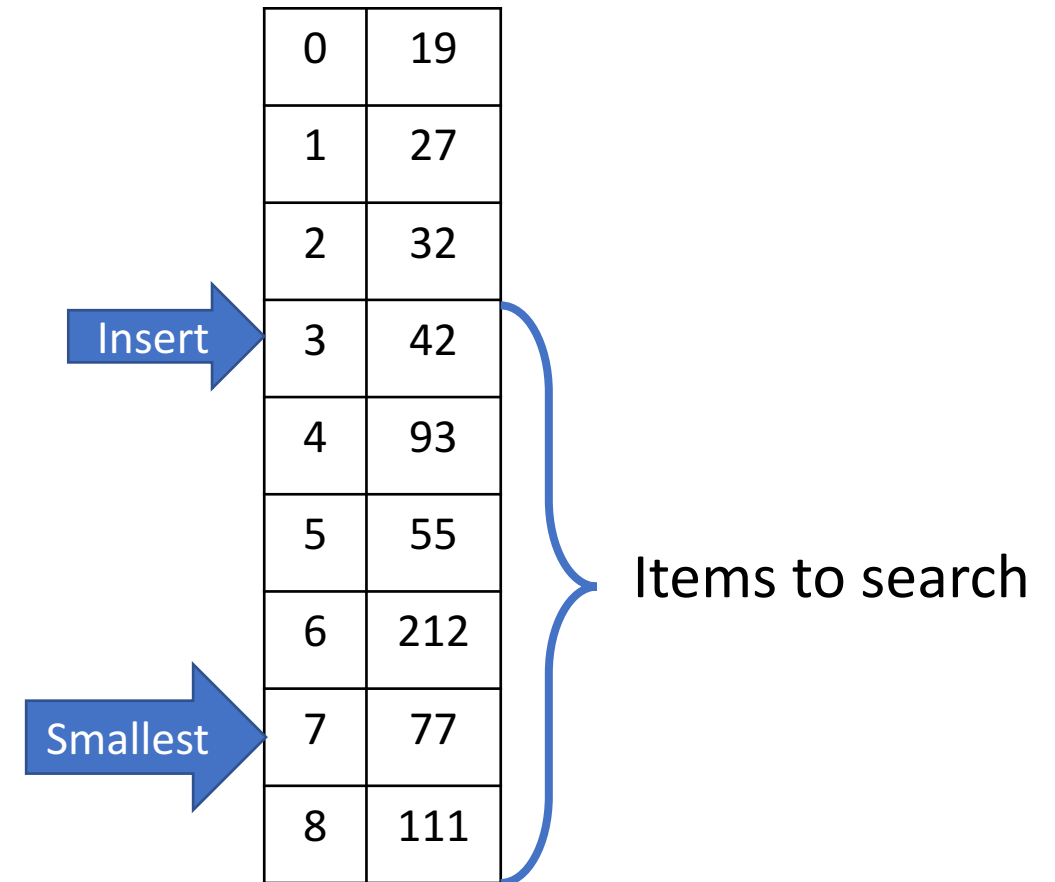
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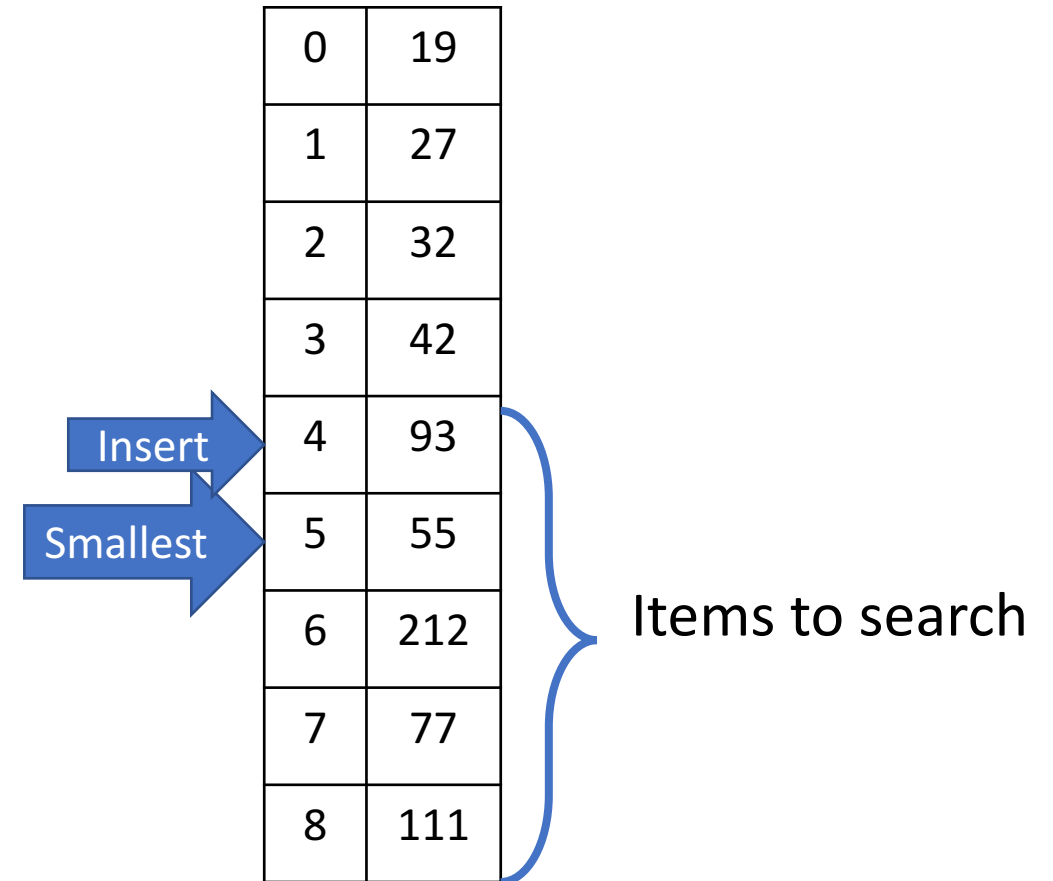
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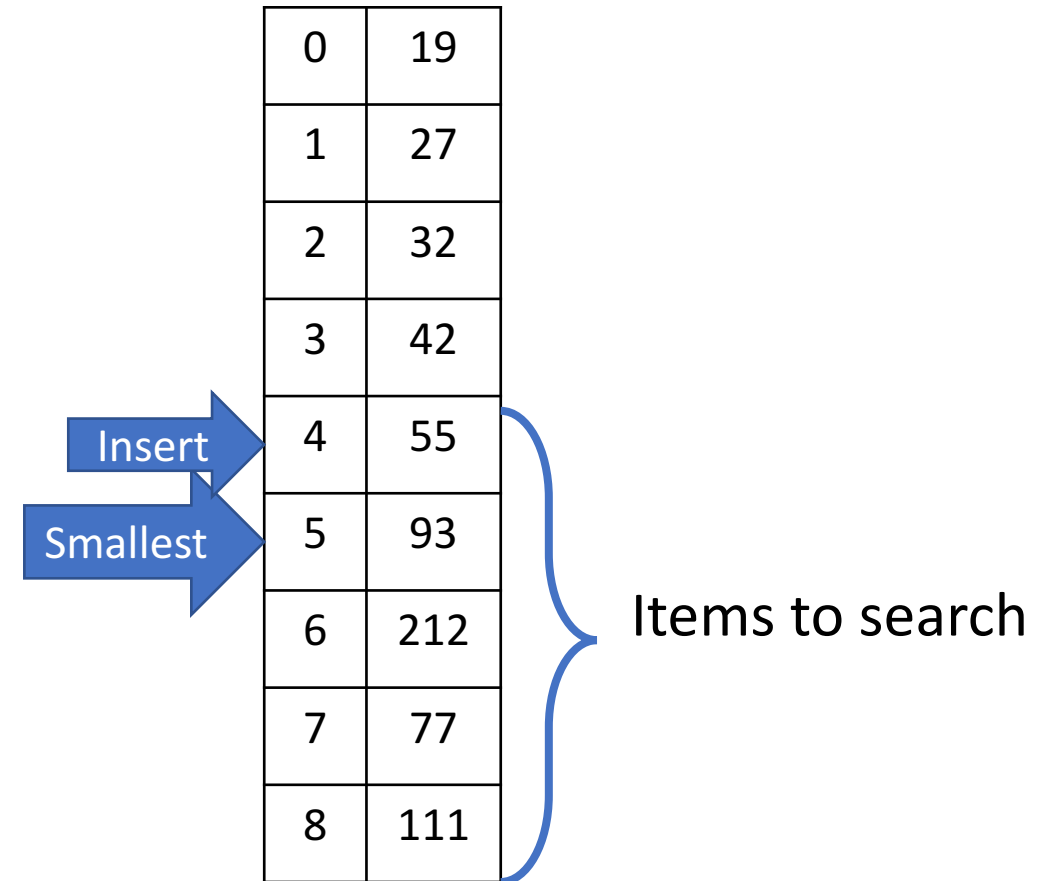
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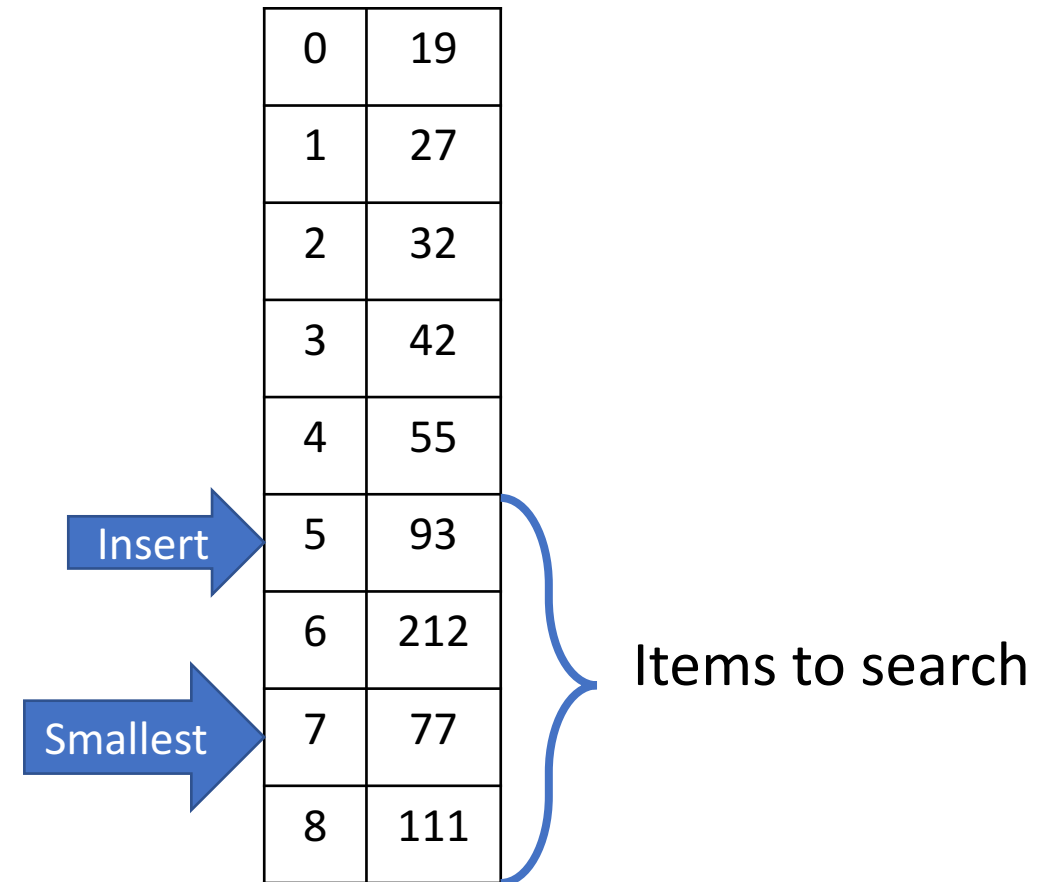
Selection Sort

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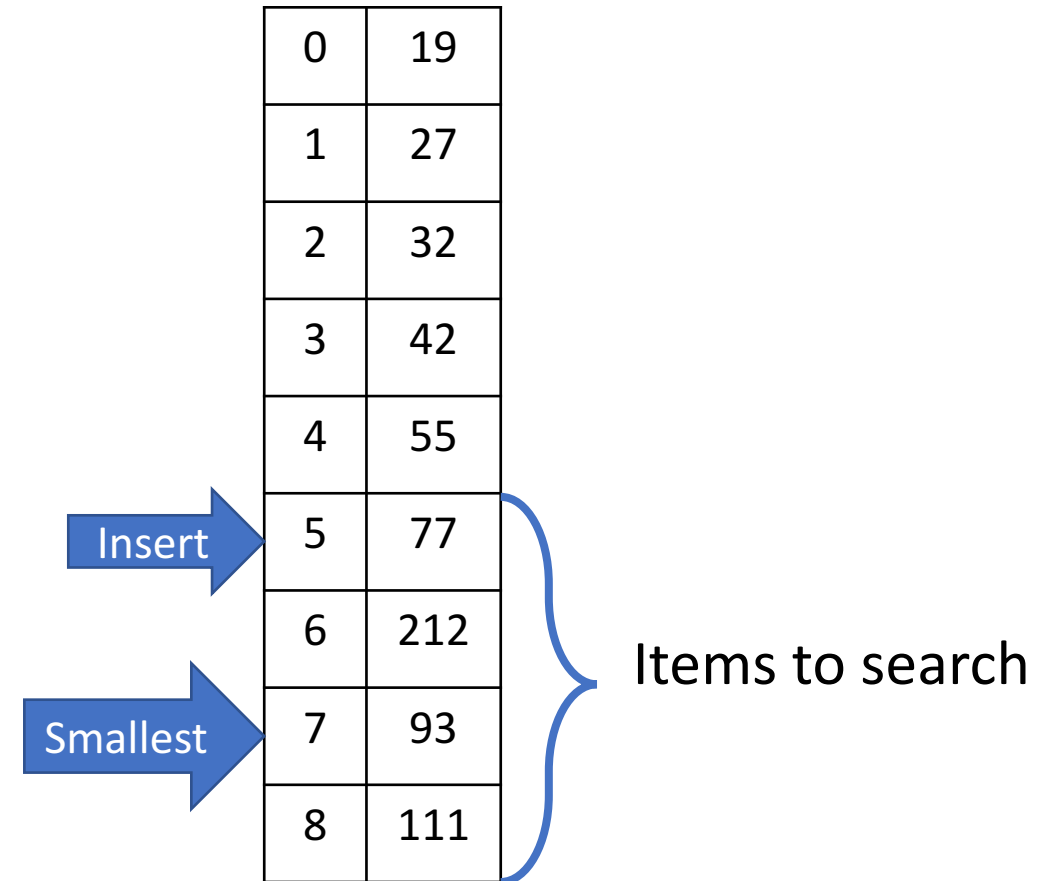
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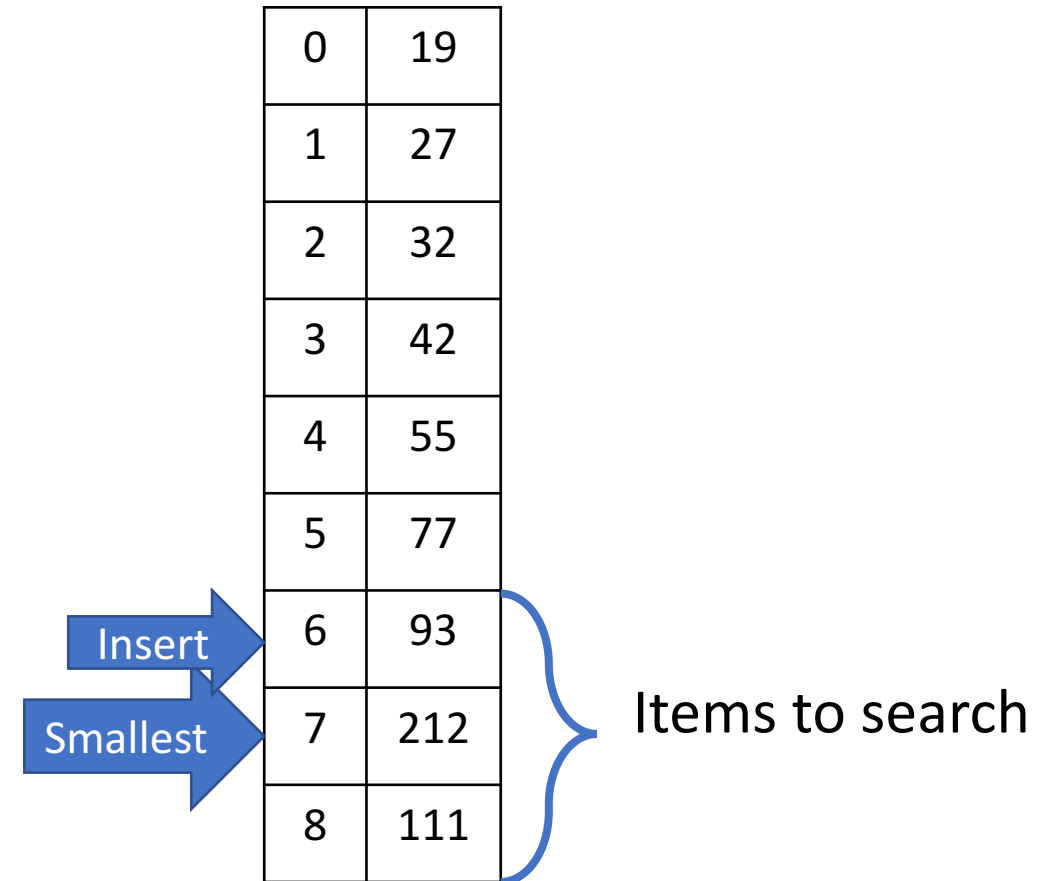
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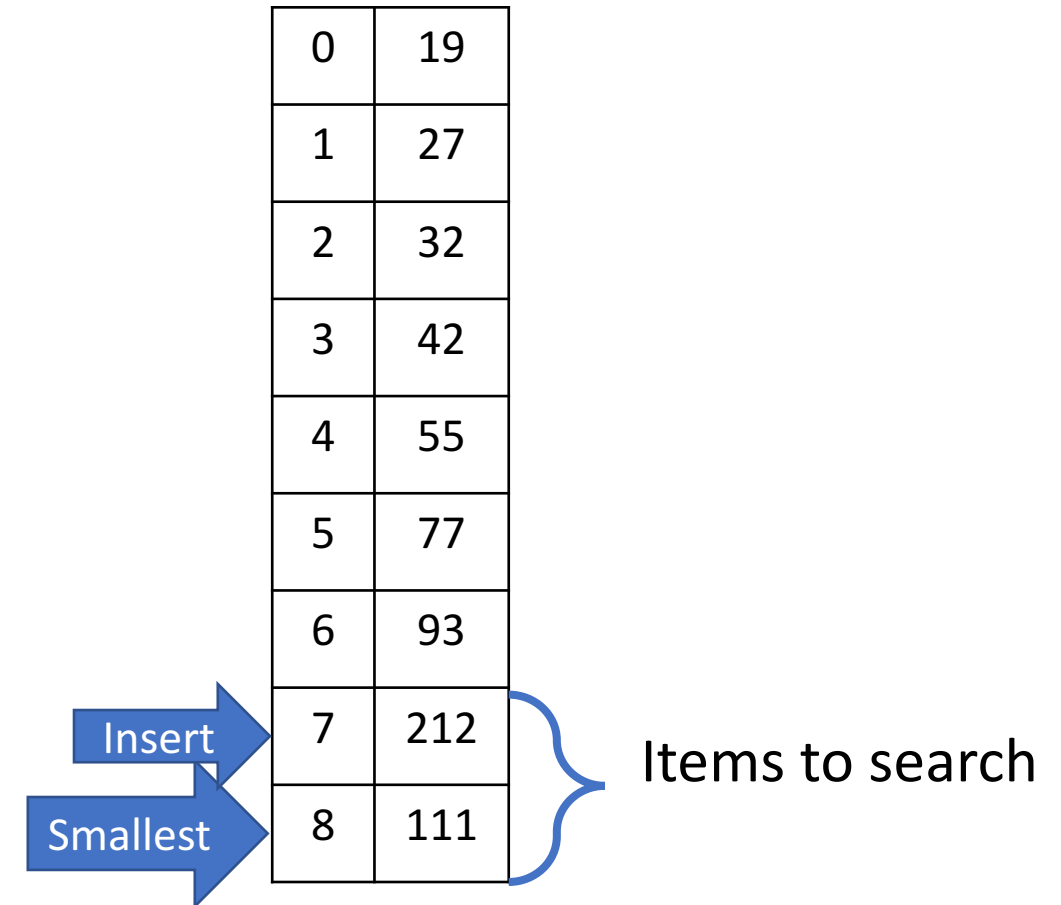
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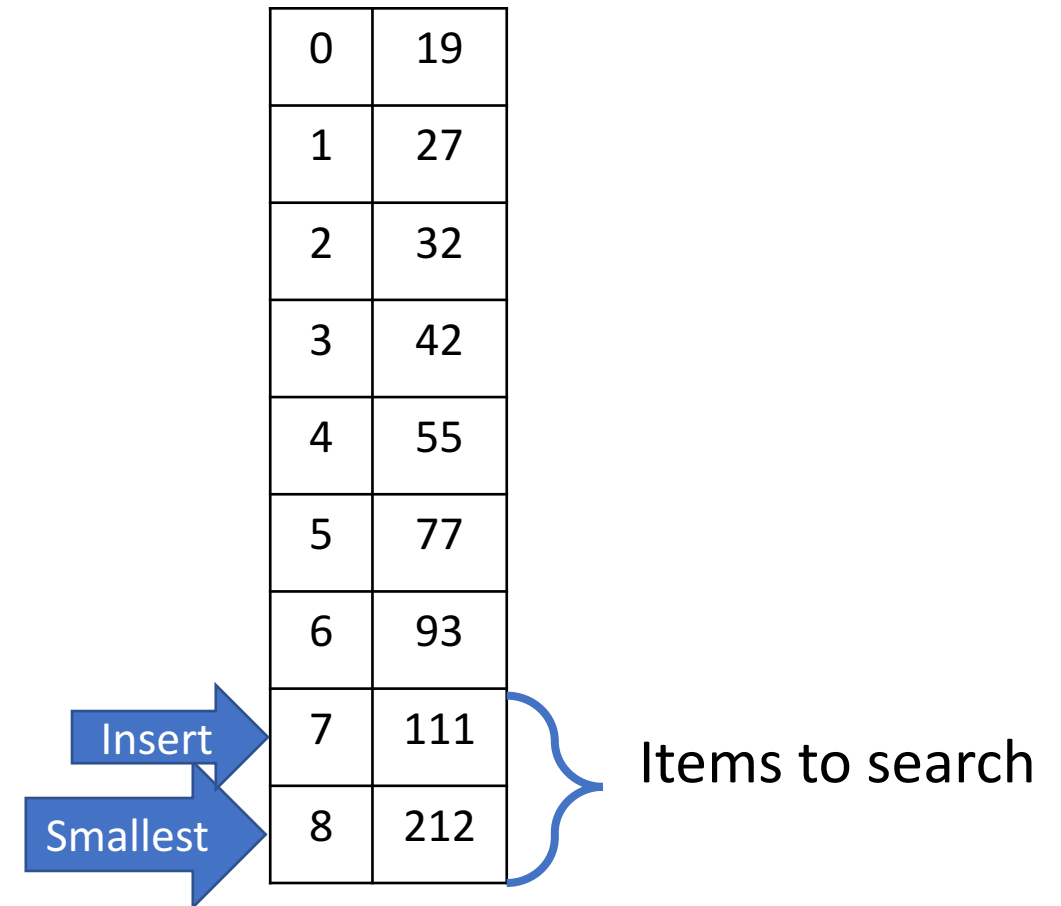
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Selection Sort

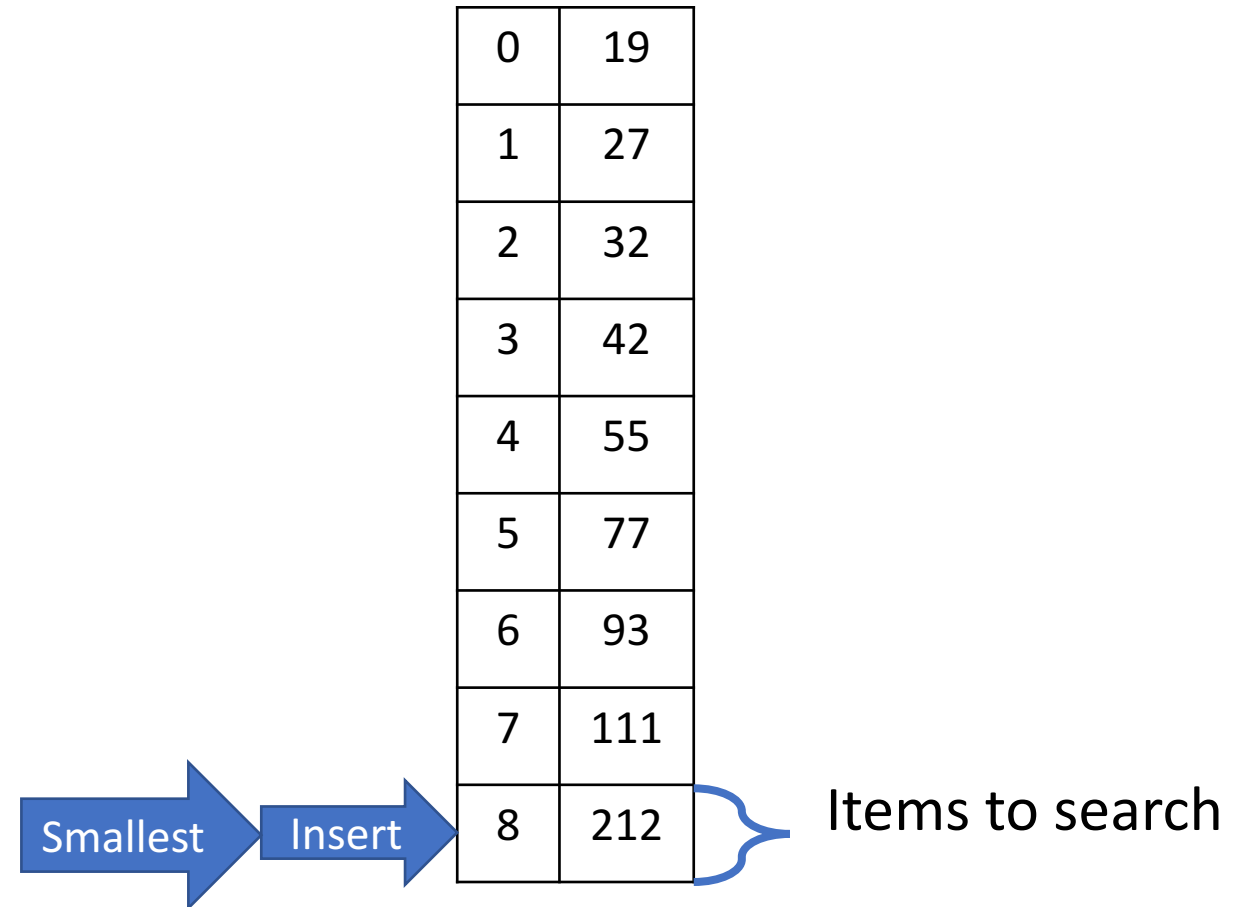
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Selection Sort

Since last item has to be in the right place, we actually stop before inserting into last location.

- Set place to insert to first location in list
- While we still have values to insert,
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 - Increment place to insert



Selection Sort

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Sorted!

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