

# Selection Sort

# Selection Sort

- In selection sort, the idea of the algorithm is to find the smallest unsorted element and add it to the end of the sorted list.

## In pseudocode:

- Repeat until no unsorted elements remain:
  - Search the unsorted part of the data to find the smallest value
  - Swap the smallest found value with the first element of the unsorted part

# Selection Sort



## In pseudocode:

Repeat until no unsorted elements remain:

Search the unsorted part of the data to find the smallest value

Swap the smallest found value with the first element of the unsorted part

# Selection Sort



## In pseudocode:

Repeat until no unsorted elements remain:

Search the unsorted part of the data to find the smallest value

Swap the smallest found value with the first element of the unsorted part

# Selection Sort



## In pseudocode:

Repeat until no unsorted elements remain:

Search the unsorted part of the data to find the smallest value

Swap the smallest found value with the first element of the unsorted part

# Selection Sort



## In pseudocode:

Repeat until no unsorted elements remain:

Search the unsorted part of the data to find the smallest value

Swap the smallest found value with the first element of the unsorted part

# Selection Sort



## In pseudocode:

Repeat until no unsorted elements remain:

Search the unsorted part of the data to find the smallest value

Swap the smallest found value with the first element of the unsorted part

# Selection Sort



## In pseudocode:

Repeat until no unsorted elements remain:

Search the unsorted part of the data to find the smallest value

Swap the smallest found value with the first element of the unsorted part



# Selection Sort



## In pseudocode:

Repeat until no unsorted elements remain:

Search the unsorted part of the data to find the smallest value

Swap the smallest found value with the first element of the unsorted part

# Selection Sort



## In pseudocode:

Repeat until no unsorted elements remain:

Search the unsorted part of the data to find the smallest value

Swap the smallest found value with the first element of the unsorted part

# Selection Sort



## In pseudocode:

Repeat until no unsorted elements remain:

Search the unsorted part of the data to find the smallest value

Swap the smallest found value with the first element of the unsorted part

# Selection Sort



## In pseudocode:

Repeat until no unsorted elements remain:

Search the unsorted part of the data to find the smallest value

Swap the smallest found value with the first element of the unsorted part

# Selection Sort



## In pseudocode:

Repeat until no unsorted elements remain:

Search the unsorted part of the data to find the smallest value

Swap the smallest found value with the first element of the unsorted part

# Selection Sort



## In pseudocode:

Repeat until no unsorted elements remain:

Search the unsorted part of the data to find the smallest value

Swap the smallest found value with the first element of the unsorted part

# Selection Sort



## In pseudocode:

Repeat until no unsorted elements remain:

Search the unsorted part of the data to find the smallest value

Swap the smallest found value with the first element of the unsorted part

# Selection Sort



## In pseudocode:

Repeat until no unsorted elements remain:

Search the unsorted part of the data to find the smallest value

Swap the smallest found value with the first element of the unsorted part



# Selection Sort



## In pseudocode:

Repeat until no unsorted elements remain:

Search the unsorted part of the data to find the smallest value

Swap the smallest found value with the first element of the unsorted part

# Selection Sort



## In pseudocode:

Repeat until no unsorted elements remain:

Search the unsorted part of the data to find the smallest value

Swap the smallest found value with the first element of the unsorted part

# Selection Sort



## In pseudocode:

Repeat until no unsorted elements remain:

Search the unsorted part of the data to find the smallest value

Swap the smallest found value with the first element of the unsorted part

# Selection Sort

- **Worst-case scenario:** We have to iterate over each of the  $n$  elements of the array (to find the smallest unsorted element) and we must repeat this process  $n$  times, since only one element gets sorted on each pass.
- **Best-case scenario:** Exactly the same! There's no way to guarantee the array is sorted until we go through this process for all the elements.

# Selection Sort

$$O(n^2)$$

$$\Omega(n^2)$$