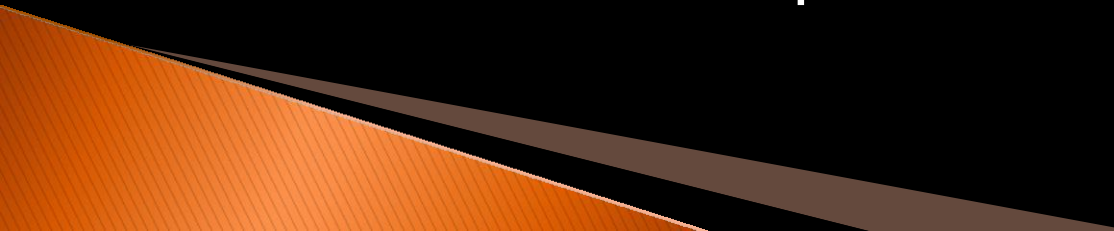


Selection Sort

- Selection Sort is a simple comparison-based sorting algorithm. It works by dividing the array into two parts: a sorted portion and an unsorted portion
 - In each pass, the smallest (or largest, depending on the sorting order) element is selected from the unsorted portion and swapped with the first element of the unsorted portion.
 - Easy to implement and understand.
 - Not stable (does not always preserve the relative order of equal elements).
- 

Selection Sort algorithm

- **Input:**
 - A list of elements to be sorted.
- **Output:**
 - A sorted list in ascending order.
- **Steps:**
 1. Start with the first element as the minimum.
 2. Compare this element with the rest of the array.
 3. If a smaller element is found, update the minimum.
 4. Swap the minimum element with the first element of the unsorted part.
 5. Move the boundary of the unsorted part one element to the right
 6. Repeat the process for the remaining unsorted part of the array

How selection Sort works

indexes	0	1	2	3	
i = 0, Min_index = 0	99.99	49.95	299.49	19.95	J = 1
i = 0, Min_index = 1	99.99	49.95	299.49	19.95	J = 1
	99.99	49.95	299.49	19.95	J = 2
i = 0, Min_index = 3	99.99	49.95	299.49	19.95	J = 3
	99.99	49.95	299.49	19.95	J = 3
	19.95	49.95	299.49	99.99	
i = 1, Min_index = 1	19.95	49.95	299.49	99.99	J = 2
	19.95	49.95	299.49	99.99	J = 3
i = 2, Min_index = 2	19.95	49.95	299.49	99.99	J = 3
i = 2, Min_index = 3	19.95	49.95	299.49	99.99	J = 3
	19.95	49.95	99.99	299.49	
	19.95	49.95	99.99	299.49	

Time Complexity of selection Sort

- **Best Case $O(n^2)$:**
 - The list is already sorted
 - Even in the best case, Selection Sort still has to go through all the elements to find the minimum for each position.
- **Average Case $O(n^2)$:**
 - The list is in a random order.
 - For each element, the algorithm scans the entire remaining unsorted part of the array to find the minimum. On average, this results in a quadratic number of comparisons.
- **Worst Case $O(n^2)$:**
 - The list is sorted in reverse order.
 - Similar to the average case, the algorithm makes the same number of comparisons as it scans through the entire array for each element to find the minimum.

Space Complexity of selection Sort

- Space Complexity $O(1)$.
- Selection Sort is an in-place sorting algorithm
- It only requires a constant amount of extra space (temporary variables for swapping), regardless of the input size