Illustration of Bubble Sort using Role Play

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Fig.1. Bubble Sort demonstration

Role Play

Role Play is a pedagogical technique that improves learning. Here we are going to learn sorting of elements using Bubble Sort.

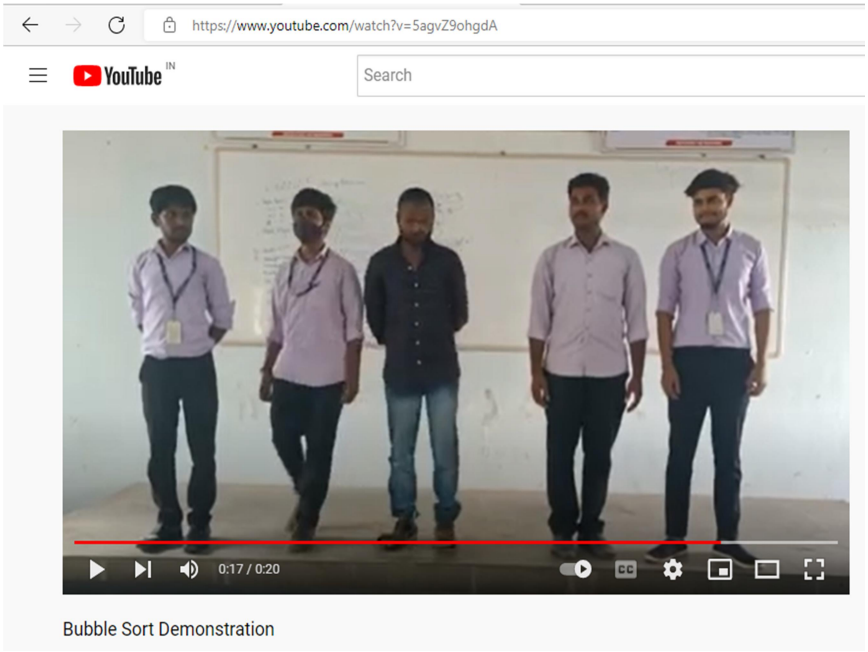

Fig.2. Bubble Sort Demonstration- Role Play

https://www.youtube.com/watch?v=5agvZ9ohgdA

In this hand-out, the algorithm, example how swapping of elements takes place, computing its time complexity and illustration with the help of Role Play are discussed.

Algorithm

Pass 1

- Compare the first and second elements, starting with the first index.
- Swap if the first element is greater than the second.
- Compare the second and third elements now and perform swap operation if one is greater than the other.
- Repeat until it reaches the final element.

Continue up to Pass n, till all the elements are sorted.

Bubble Sort: Illustration using Role Play

Bubble sort is used to sort the elements by comparing adjacent elements. This is not used for sorting large datasets as it's time complexity is $O(n^2)$ where n is number of elements.

Example:

6	4	9	5	7
6	4	7	5	7
4	6	9	5	7
4	6	9	5	7
4	6	5	9	7
4	6	5	7	9

Fig.1. First iteration of Bubble sort

Pass 1

Number of comparisons=n-1

Number of swaps=n-1

Pass 2

Number of comparisons=n-2

Number of swaps=n-2

……. .

Pass n-1

Number of comparisons=1

Number of swaps=1

Total number of comparisons=(n-1)+(n-2)+ . . . + 1

= (n-1)*(n-1+1)/2

= n(n-1)/2

Worst case time complexity

Total number of swaps=Total number of comparison

Total number of comparisons=n(n-1)/2

Total number of swaps=n(n-1)/2

Worst case and Average Case Time Complexity: $O(n^2)$.

Best Case Time Complexity: O(n).