

Illustration of Bubble Sort using Role Play

Dr.M.Anil Kumar

Professor





Department of C.S.E

Aditya College of Engineering & Technology, Surampalem.

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= $(n-1)+(n-2)+ \dots + 1$

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

$= n(n-1)/2$

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: $O(n)$.

Role Play

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



Fig.1. Bubble Sort Demonstration