

Selection sort

Selection sort is a simplest sorting technique and it is good algorithm to sort a small number of elements.

First find the smallest in the array and exchange it with the element in the first position, then find the second smallest element and exchange it with the element in the second position, and continue in this way until the entire array is sorted.

*Selection Sort Algorithm

Input: An array $list[1.. Size]$ of n elements.

Output: $list [1.. Size]$ sorted in ascending order.

Process :

1. for $Pass \leftarrow 0$ to $Size - 1$
2. $min \leftarrow Pass$
3. for $Comp \leftarrow Pass + 1$ to $Size$ {Find the i th smallest element.}
4. if $list [Comp] < list [min]$ then
 $min \leftarrow Comp$
5. end for
6. if $min \neq Pass$ then
 swap $list [Pass]$ and $list [min]$
7. end for

***Selection Sort Example:**

To Re-arrange the following List in ascending order using selection sort:

0	1	2	3	4
25	57	37	12	33

Step (1):

Look for the smallest element in the List, it is the element List [3], and we exchange it with the element List [0].

0	1	2	3	4
<u>12</u>	57	37	<u>25</u>	33

Step (2):

Look for the smallest element in the elements from List [1] to List [4] and we exchange it with the element List [1]

0	1	2	3	4
12	<u>25</u>	37	<u>57</u>	33

Step (3):

Look for the smallest element in the elements from List [2] to List [4] and we exchange it with the element List [2]

0	1	2	3	4
12	25	<u>33</u>	57	<u>37</u>

Step (4):

Look for the smallest element in the elements from List [3] to List [4] and we exchange it with the element List [3]

0	1	2	3	4
12	25	33	<u>37</u>	<u>57</u>

We find that the last element is in the correct location.

***selection sort function**

```
void selection_sort(int list [ ], int size)
{
    int temp,min;
    for( int Pass = 0 ; Pass < size -1 ; Pass ++ )
    {
        min= Pass ;
        for (int Comp = Pass +1 ; Comp < size ; Comp ++ )
        {
            if (list [Comp] < list [min] )
            {
                min= Comp;
            }
        }
        if(Pass!=min)
        {
            temp= list [Pass] ;
            list [Pass]= list [min];
            list [min]=temp;
        }
    }
}
```