**Tutorial – Finishing Insertion Sort**

**Part I – Insertion Sort**

1. Write down the *insertion sort* algorithm so that the numbers are sorted in ascending order.
2. Sort the following list with the algorithm in 1. - [3, 1, 8, 7, 2, 4, 6, 5].
3. Write down the *insertion sort* algorithm so that the numbers are sorted in descending order.
4. Sort the following list with the algorithm in 2. - [3, 1, 8, 7, 2, 4, 6, 5].

**Part II – General Sorting**

1. What is the first change that selection sort would make to this sequence to put it into ascending order: "3 1 4 2"?
   1.   3 2 4 1
   2.   1 3 4 2
   3.   2 4 1 3
   4.  4 2 3 1
2. Sort the following list - [5, 6, 4, 1, 8, 7, 2, 3] with:
3. ~~Insertion sort~~
4. Selection sort
5. Bubble sort
6. Which of the following sorting algorithms in its typical implementation gives best performance when applied on an array which is sorted or almost sorted (maximum 1 or two elements are misplaced). Prove it using [1,3, 2, 4].
7. Insertion sort
8. Selection sort
9. Bubble sort
10. Modified bubble sort \*
11. Which of the following sorting algorithms is shown in the sort below?   
      
    51 11 56 83 20 26 33  
    11 51 56 83 20 26 33  
    11 20 56 83 51 26 33  
    11 20 26 83 51 56 33  
    11 20 26 33 51 56 83  
    11 20 26 33 51 56 83  
    11 20 26 33 51 56 83  
    1. Selection Sort
    2. Insertion Sort
    3. Bubble Sort
    4. None of the above
12. Which of the following sorting algorithm(s) is shown in the sort below?   
      
    83 5 8 12 65 72 71  
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    5 8 83 12 65 72 71  
    5 8 12 83 65 72 71  
    5 8 12 65 83 72 71  
    5 8 12 65 72 83 71  
    5 8 12 65 71 72 83  
    1. Selection Sort
    2. Insertion Sort
    3. Bubble Sort
    4. None of the above

**MODIFIED BUBBLE SORT\***

***i=0***

***do***

***swap=0***

***for j = 0 to j < N-1 do***

***if A[j] > A[j+1]***

***temp = A[j]***

***A[j] = A[j+1]***

***A[j+1] = temp***

***swap=1***

***End if***

***End for***

***i++***

***while (i < N-1) && (swap=1)***