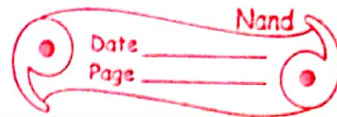


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Insertion sort

1.) for $i = 0$ to $\text{string A.length} (n)$ (Best case time complexity)

2.) $\text{key} = A[i]$

3.) $j = i - 1$

4.) while $j > 0$ & $A[j] > \text{key}$

5.) $A[j+1] = A[j]$, 6.) $j = j - 1$

7.) $A[j+1] = \text{key}$

Example :-

| | | | | |
|----|----|----|----|----|
| 10 | 20 | 30 | 40 | 50 |
|----|----|----|----|----|

 ($n = 5$)

If cost of line 4 & 7 is C_1 & C_2 respectively then,

$$T(5) = C_1 \times 5 + C_2 \times 5 = 5C$$

for general

$$T(n) = Cn \text{ or } O(n)$$

Modification to reduce time complexity of insertion sort.

Binary insertion sort \rightarrow In this we can binary search algorithm.

To find out the correct position of the inserted element in array.