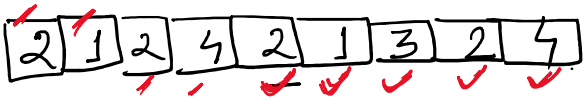
Linear Time Sorting algorithms.

Counting sort – Elements ka frequency (count)

Eg Array

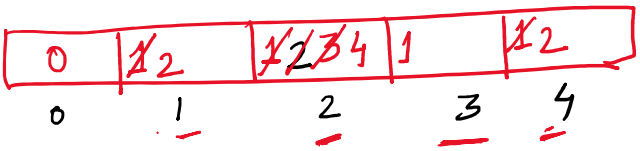


① Array → Count Array → frequency of elements.

↓

countarray.size = Max_element(array) + 1

count array ka size



↓

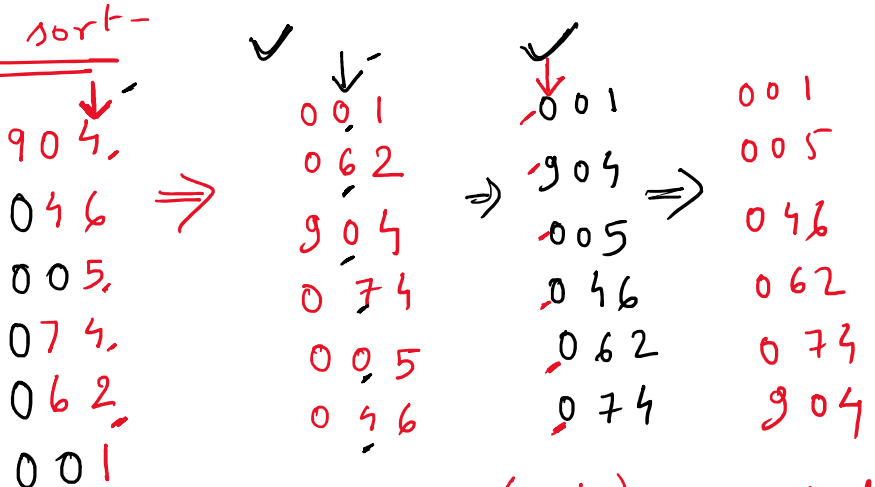
sorted order 1 1 2 2 2 2 3 4 4

SC → O(Max_ele(array))

TC → O(n+k) → n → no of elements input array.
k → Max element of array.

Drawback – ① –ive integer in input array.
② max_ele = 10^9. (Max space = 10^5 to 10^6)

Radix sort –



① Find max_element.
= 904
② Find no. of digit in max_element.
= 3.
③ Append 0's / Add 0's.

Add 0's.

$TC \rightarrow O(n \times k)$ $k \equiv$ No. of digit in max_element

$\downarrow$

$O(n \times 19)$ 10^{19} $k = 19$

$\approx O(n)$.

Hw Shell sort → Imp.