COUNTING SORT

By Prince Agarwal

[“ Hello World ”]

COUNTING SORT

Main Idea Behind this Algorithm :-

Count the Frequency of all the elements

COUNTING SORT

Example :

5	2	9	5	2	3	5

Sort this array by counting sort

Solution : **Find the Maximum in the array**

Max = 9

Now,

Create an Array of size (Max +1) = 10

Auxiliary Array

0	1	2	3	4	5	6	7	8	9
0	0	0	0	0	0	0	0	0	0

Now , Write the Frequency of respective Elements in Aux. Array

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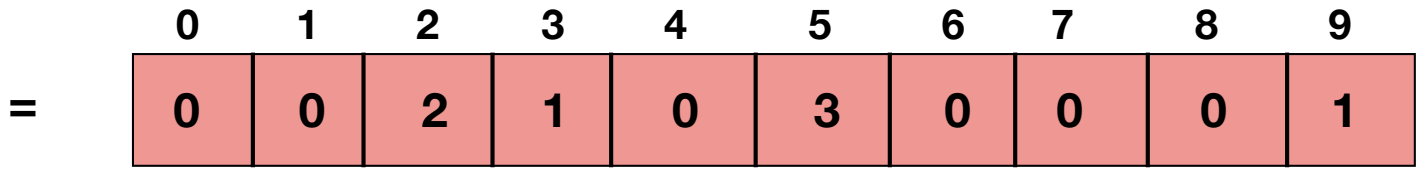
0	1	2	3	4	5	6	7	8	9
0	0	2	1	0	3	0	0	0	1

COUNTING SORT



Now, Iterate the Auxiliary array and Print the index

Aux[i] number of times

Sorted array =

2	2	3	5	5	5	9

COUNTING SORT

Example :

7	2	1	1	4	3	5	4	3	5	7	2

Sort this array by counting sort

Solution : **Find the Maximum in the array**

Max = 7

Now,

Create an Array of size (Max +1) = 8

Auxiliary Array

0	1	2	3	4	5	6	7
0	0	0	0	0	0	0	0

Now , Write the Frequency of respective Elements in Aux. Array

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0	1	2	3	4	5	6	7
0	2	2	2	2	2	0	2

COUNTING SORT

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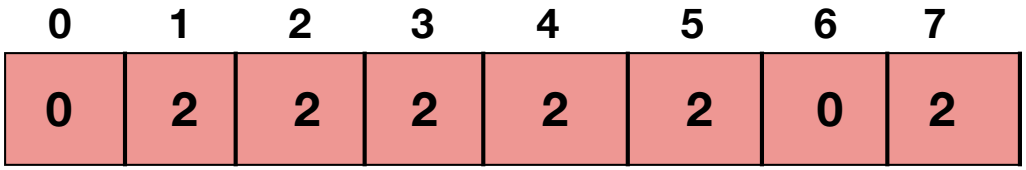
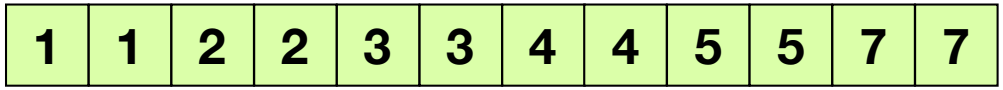


Now, Iterate the Auxiliary array and Print the index

Aux[i] number of times

Sorted array =



COUNTING SORT

Now , suppose a situation

Where only 5 elements are there : 4 , 7 , 8 , 1 & 1000000 (10^6)

And question is :-

Sort this array with the help of counting sort

Then we have to create an array of size = 10^6 +1 = 10^6

It means , lots of consumption of space and time

That will increase the maximum memory - size allocation

So, It is recommended that do not use this Algorithm …….

Either use QUICK sort or MERGE sort

COUNTING SORT

Time Complexity

Firstly we traversed the Unsorted Array of Size N

For finding the maximum element size

So time taken = O (N)

Now, say Maximum element is 'K'

Then we create a Auxiliary array of size = O (K)

And we also traverse Auxiliary array for finally print the sorted array

So time taken = O (K)

so, total time Complexity = O (N + K)

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“ If you feel any problem then comments in my video
I will reply as soon as possible “

- Prince Agarwal