

RADIX SORT

By Prince Agarwal
[“ Hello World ”]

RADIX SORT

Points :-

Quick sort , Merge Sort and Heap sort are Comparison based sorting algorithms

Counting Sort is not comparison based algorithms

We use count sort because It is stable

By the ways, RADIX SORT is an extended version of Count sort

RADIX SORT

Example :-

10	21	17	34	44	11	654	123
----	----	----	----	----	----	-----	-----

Based on the algorithm,

We will sort the input array according to the **one's digit**

0 :	10
1 :	21 11
2 :	
3 :	123
4 :	34 44 654
5 :	
6 :	
7 :	17
8 :	
9 :	

New Array will Become : -

10	21	11	123	34	44	654	17
----	----	----	-----	----	----	-----	----

RADIX SORT

Now,

10	21	11	123	34	44	654	17
----	----	----	-----	----	----	-----	----

Based on the algorithm,

We will sort the input array according to the **ten's digit**

0 :	
1 :	10 11 17
2 :	21 123
3 :	34
4 :	44
5 :	654
6 :	
7 :	
8 :	
9 :	

New Array will Become : -

10	11	17	21	123	34	44	654
----	----	----	----	-----	----	----	-----

RADIX SORT

Now,

010	011	017	021	123	034	044	654
-----	-----	-----	-----	-----	-----	-----	-----

Based on the algorithm,

We will sort the input array according to the **hundred's digit**

0 :	010	011	017	021	034	044
1 :	123					
2 :						
3 :						
4 :						
5 :						
6 :	654					
7 :						
8 :						
9 :						

New Array will Become : -

010	011	017	021	034	044	123	654
-----	-----	-----	-----	-----	-----	-----	-----

RADIX SORT

Example :-

170	45	75	90	802	24	2	66
-----	----	----	----	-----	----	---	----

Based on the algorithm,

We will sort the input array according to the **one's digit**

0 :	170	90
1 :		
2 :	802	2
3 :		
4 :	24	
5 :	45	75
6 :	66	
7 :		
8 :		
9 :		

New Array will Become : -

170	90	802	2	24	45	75	66
-----	----	-----	---	----	----	----	----

RADIX SORT

Example :-

170	90	802	2	24	45	75	66
-----	----	-----	---	----	----	----	----

Based on the algorithm,

We will sort the input array according to the **ten's digit**

0 :	802	2
1 :		
2 :	24	
3 :		
4 :	45	
5 :		
6 :	66	
7 :	170	75
8 :		
9 :	90	

New Array will Become : -

802	2	24	45	66	170	75	90
-----	---	----	----	----	-----	----	----

RADIX SORT

Example :-

802	2	24	45	66	170	75	90
-----	---	----	----	----	-----	----	----

Based on the algorithm,

We will sort the input array according to the **Hundred's digit**

0 :	2	24	45	66	75	90
1 :	170					
2 :						
3 :						
4 :						
5 :						
6 :						
7 :						
8 :	802					
9 :						

New Array will Become : -

2	24	45	66	75	90	170	802
---	----	----	----	----	----	-----	-----

RADIX SORT

Time Complexity

Now, It's complexity = $O((n + b) * \log_b(maxx))$

Where,

b = base of representing numbers

= 10 (For Decimal Number system)

maxx = Maximum element in the input array

= 3

If, Value of maxx is very large

Let us limit maxx If $maxx < n^c$

Where 'c' is any constant

Then time complexity = $O(n * \log_b(n))$

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

- Prince Agarwal