Radix Sort

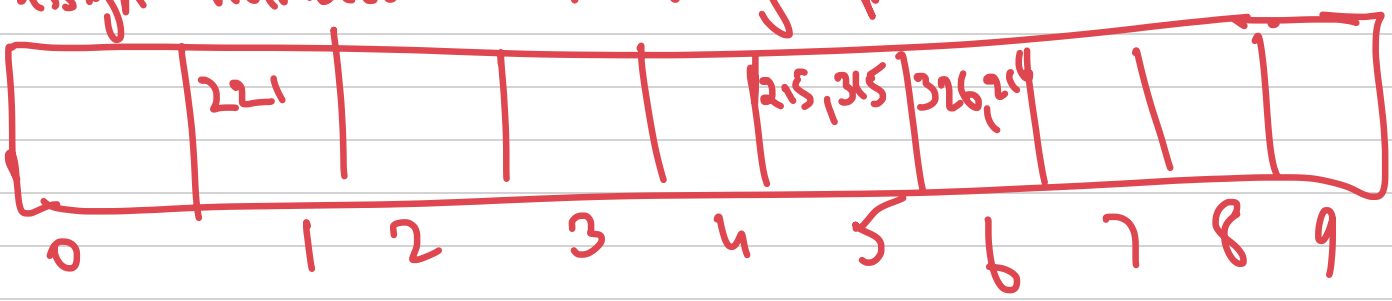
based on sorting on Keys

Keys are digits of a number (while sorting array)

eg:

Sort 225, 315, 221, 326, 216

Step1 assign numbers to their group:

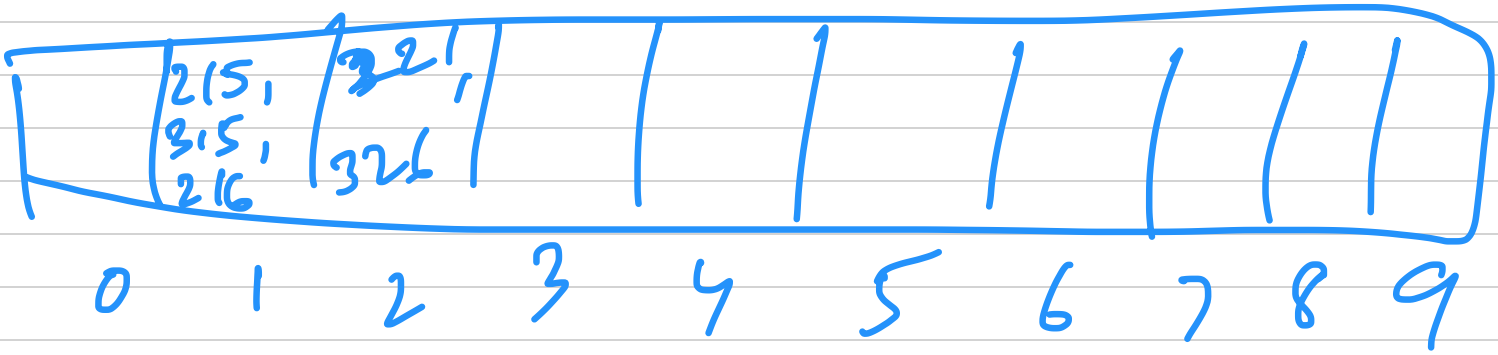


if two numbers have same key value they are inserted in dictionary in the order they come.

flatten 221, 215, 315, 326, 216

221, 215, 315, 326, 216

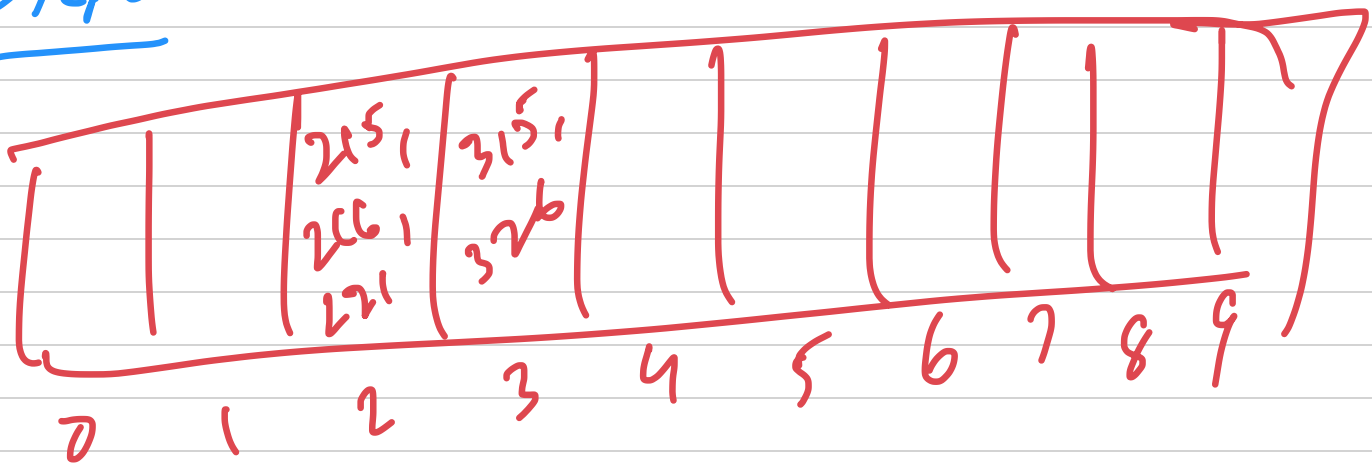
Step2



flatten:

215, 315, 216, 221, 326

Step3



flatten:

215, 216, 221, 315, 326 final answer

pseudocode

```
nums = [225, 315, 221, 326, 216]
W = len(str(max(nums)))   # digits in max number
def radixsort(nums):
    for digit in range(0, W):          # O(W)
        B = [[] for x in range(10)]
        for item in nums:              # O(size of the array)
            insert_index = item // (10**digit) % 10
            B[insert_index].append(item)
    nums = flatten(B)
```

Time Complexity

$O(n \cdot w)$

Number of values to be sorted

Length of longest value