Distribution sorts

make history.

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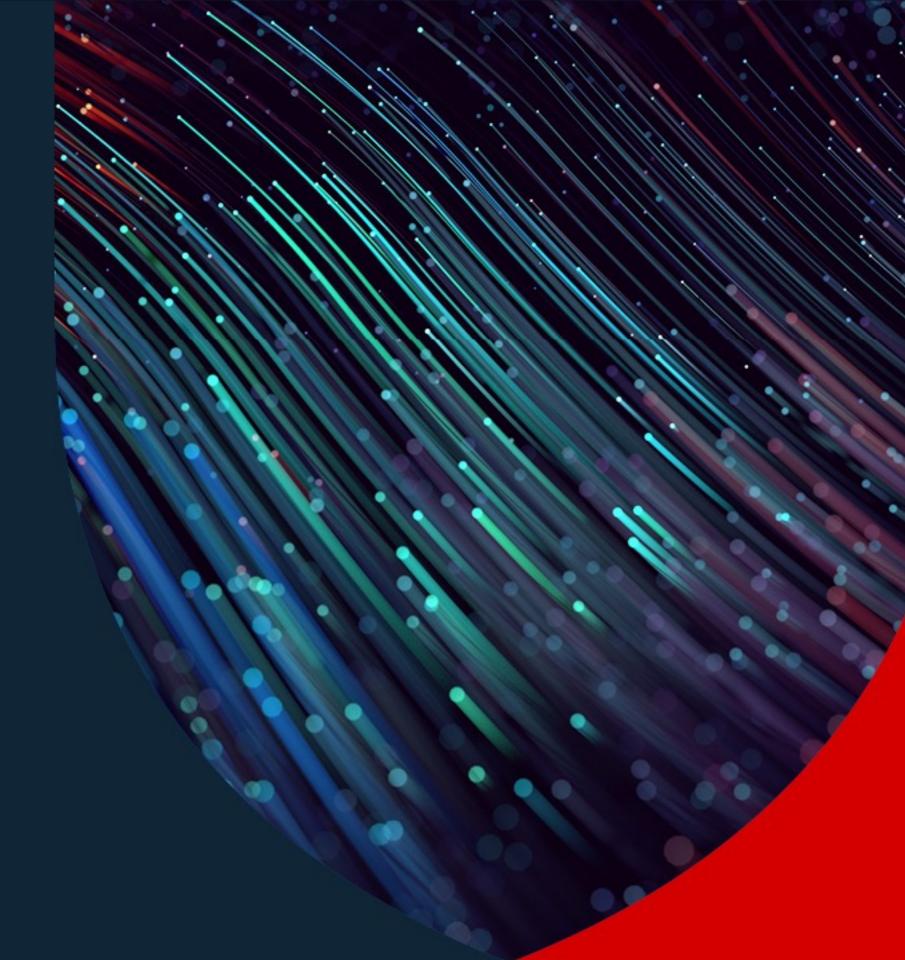
Dr. Anna Kalenkova

Bucket sorts

- Setup empty buckets.

- Go over the original list and map the objects into the buckets.

- Sort each bucket.

- Visit the buckets in order and join the results in sequence.

Counting sort (an example of Bucket sort)

- Counting sort:
    - Bucket size: m buckets.
    - O(m+n)
        - m is the number of possible values (number of buckets).
        - n is the size of array to be sorted.
    - Steps:
        - Count the number of each value I in the input array and store it in an array of size m called count: count [i] stores the number of times I appears in the input array.
        - Update count to hold a cumulative sum: count [i+1] = count[i+1] + count[i].
        - Go through input array. Look at value and put value to count[value] index. Subtract 1 from count[value].

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Example

Input array: 2, 5, 6, 6, 2, 3, 4, 10, 3, 6, 7, 8

Buckets: 1,…, 10

Count = [0, 2, 2, 1, 1, 3, 1, 1, 0, 1]

Cumulative sum = [0, 2, 4, 5, 6, 9, 10, 11, 11, 12]

1	2	3	4	5	6	7	8	9	10	11	12

Example

Input array: 2, 5, 6, 6, 2, 3, 4, 10, 3, 6, 7, 8

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	2										

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1	2	3	4	5	6	7	8	9	10	11	12
	2				5						

Example

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Buckets: 1,…, 10

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Cumulative sum = [0, 1, 4, 5, 5, 8, 10, 11, 11, 12]

1	2	3	4	5	6	7	8	9	10	11	12
	2				5			6			

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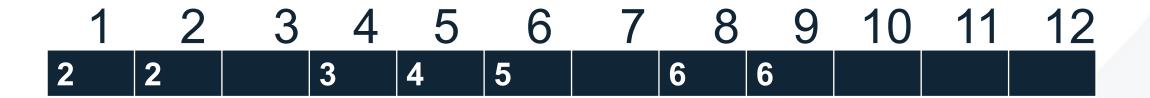Cumulative sum = [0, 0, 3, 5, 5, 7, 10, 11, 11, 12]

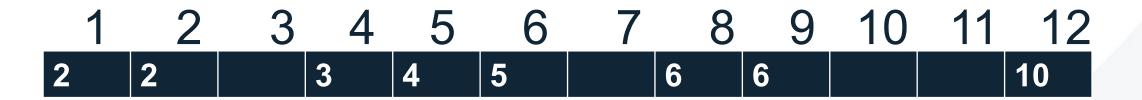| 1	2	3	4	5	6	7	8	9	10	11	12
2	2		3		5		6	6			

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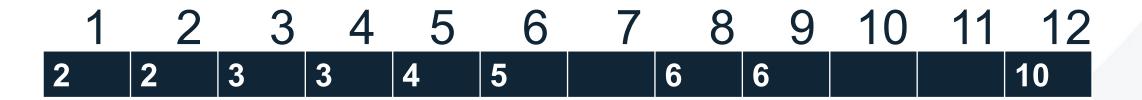
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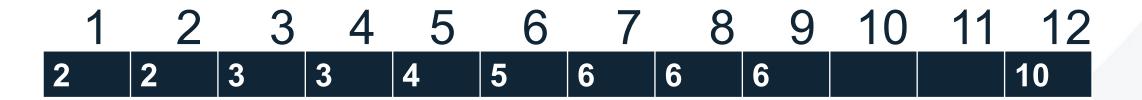| 1	2	3	4	5	6	7	8	9	10	11	12
2	2	3	3	4	5		6	6			10

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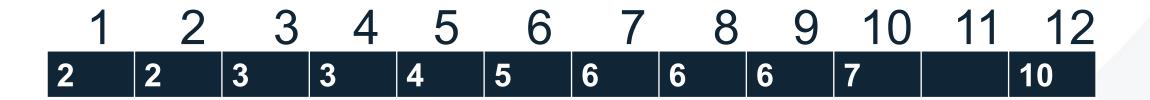| 1	2	3	4	5	6	7	8	9	10	11	12
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