Merge Sort

Merge Sort

- In merge sort, the idea of the algorithm is to sort smaller arrays and then combine those arrays together (merge them) in sorted order.
- Merge sort leverages something called **recursion**, which we'll touch on in more detail in a future video.

In pseudocode:

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• Sort the left half of the array (assuming $n > 1$)
• Sort the right half of the array (assuming $n > 1$)
• Merge the two halves together
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5	**2**	**1**	**3**	**6**	**4**

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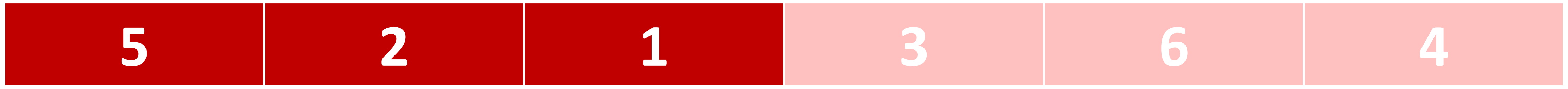

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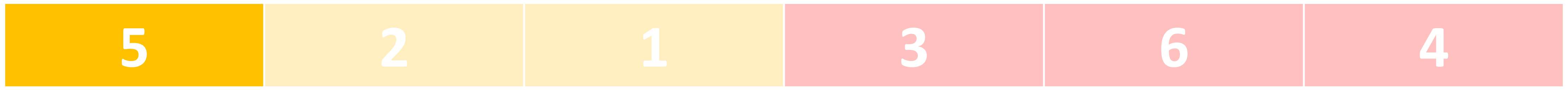

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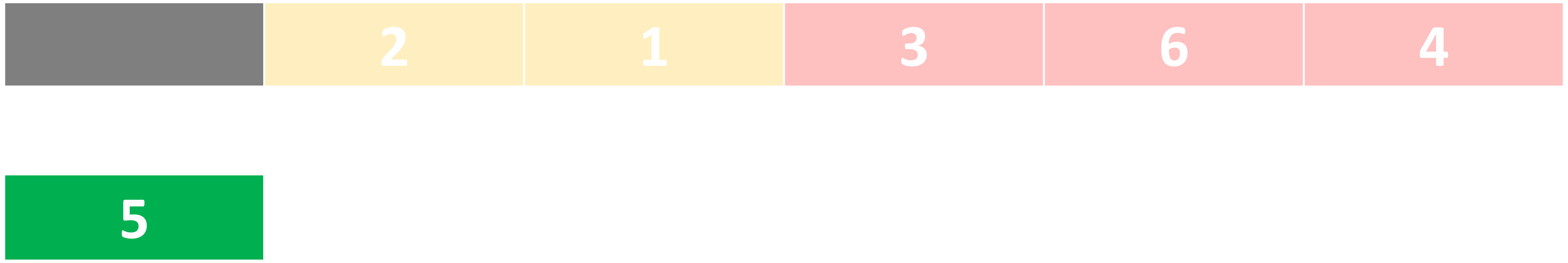

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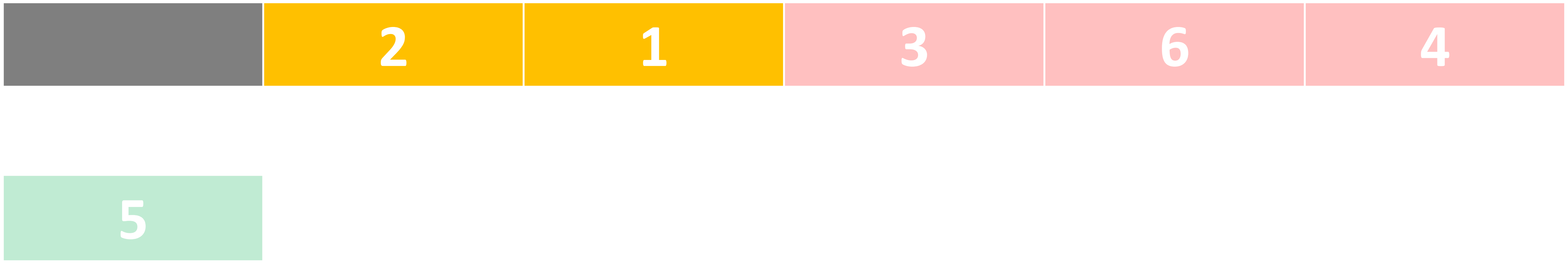

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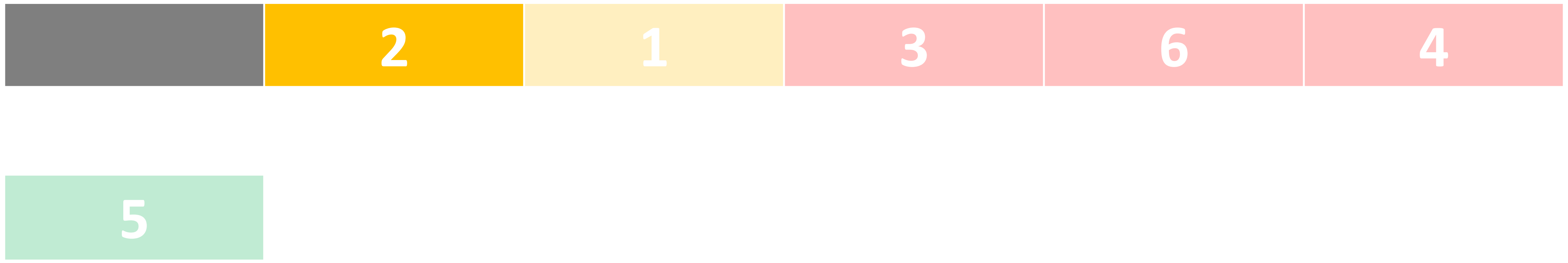

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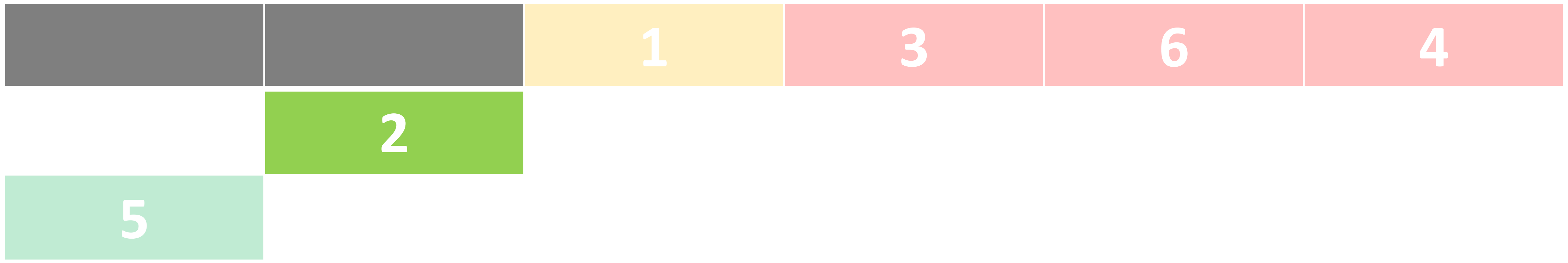

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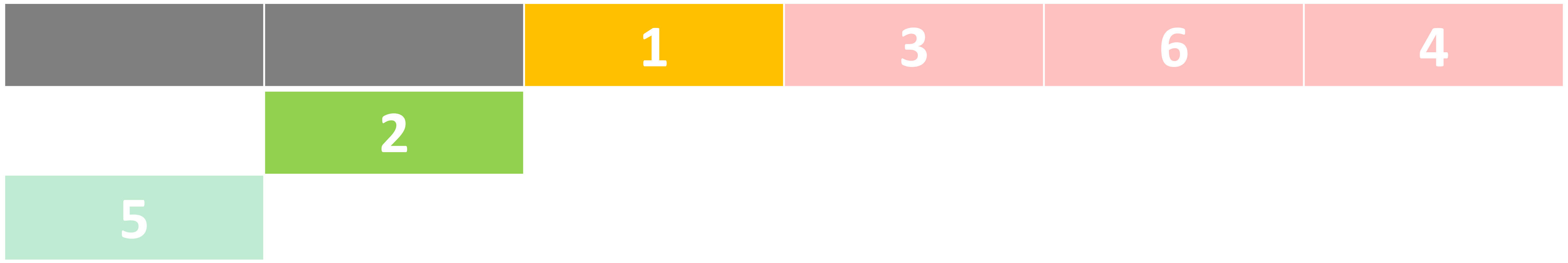

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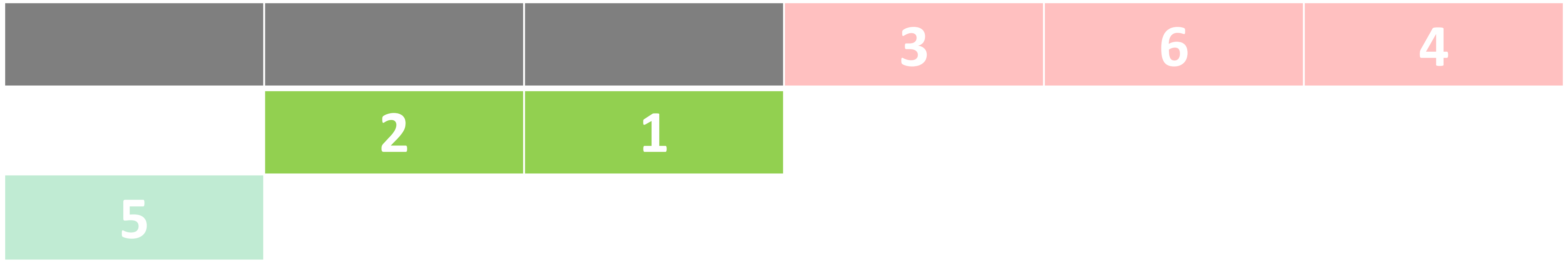

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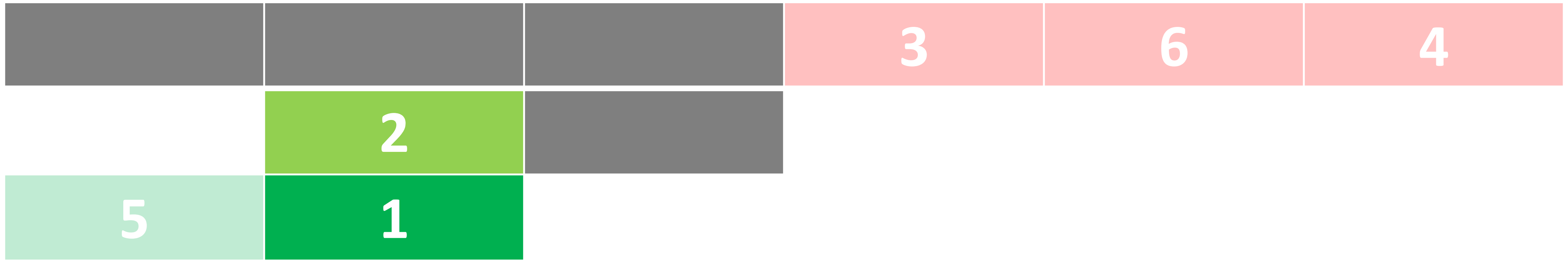

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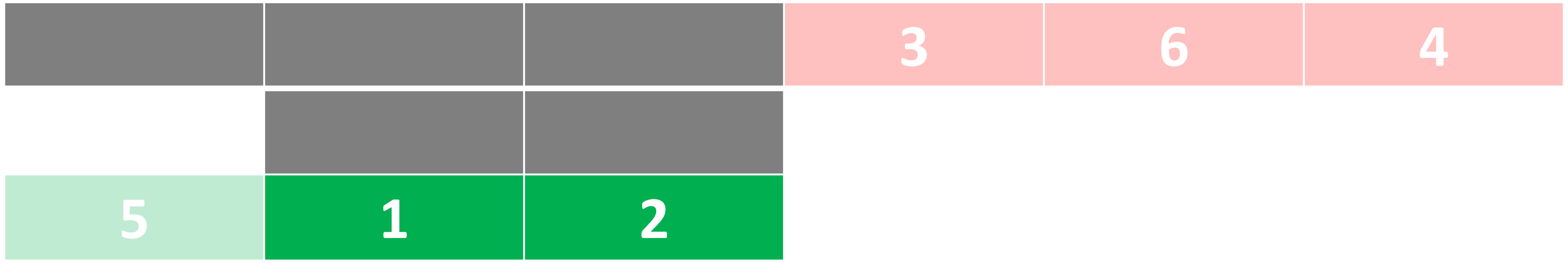

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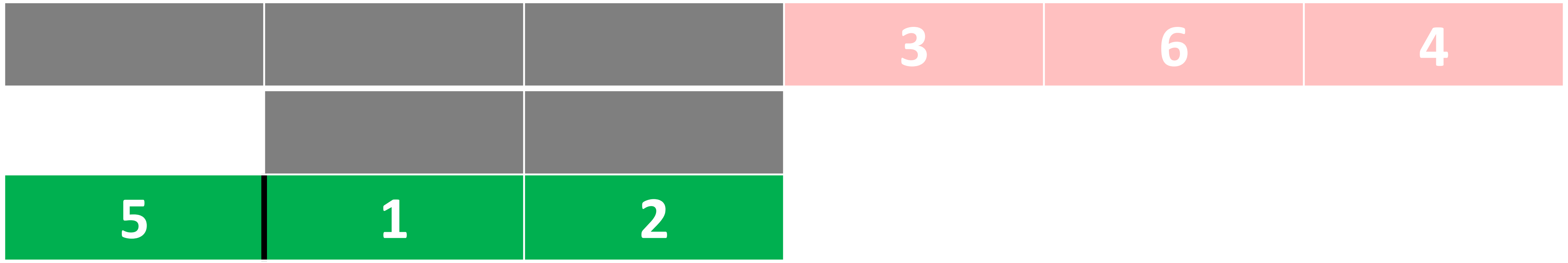

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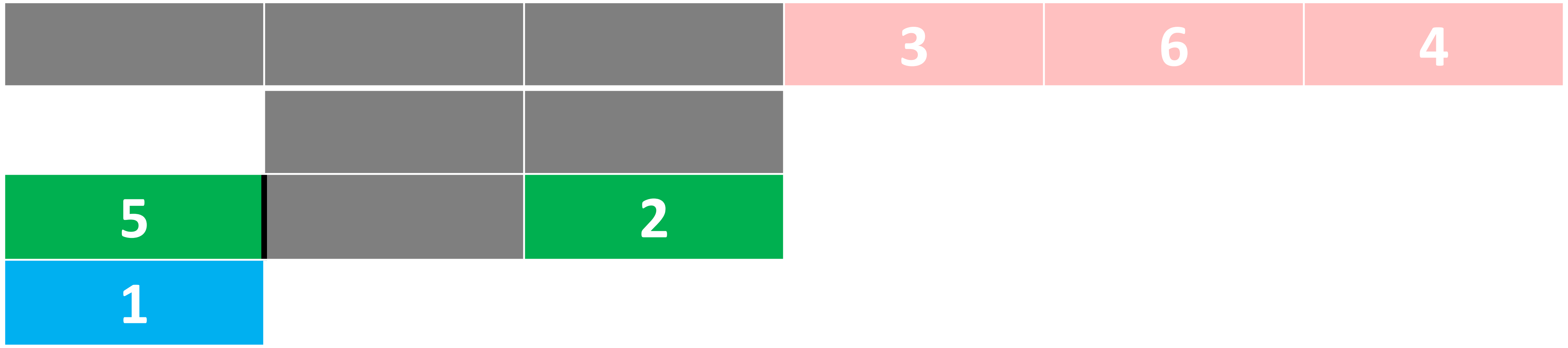

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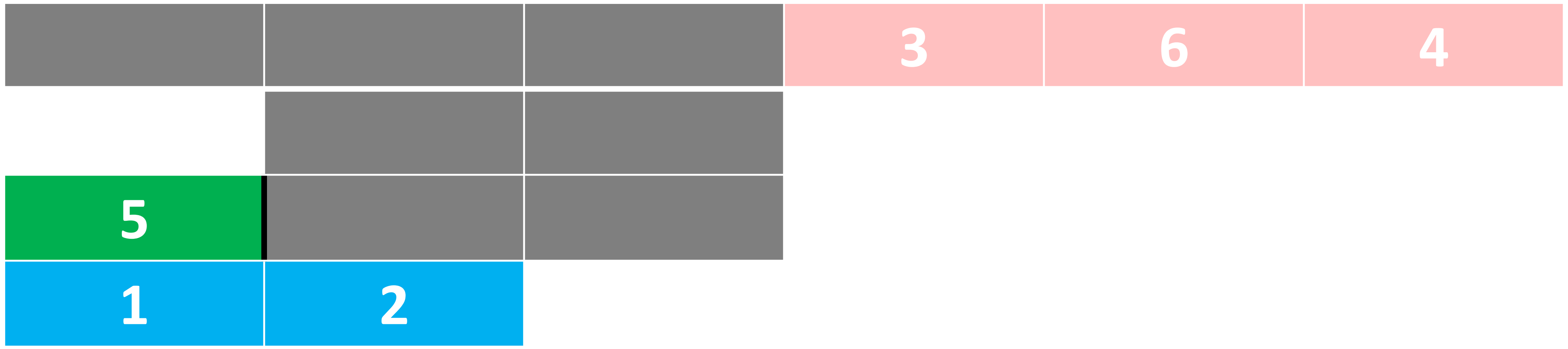

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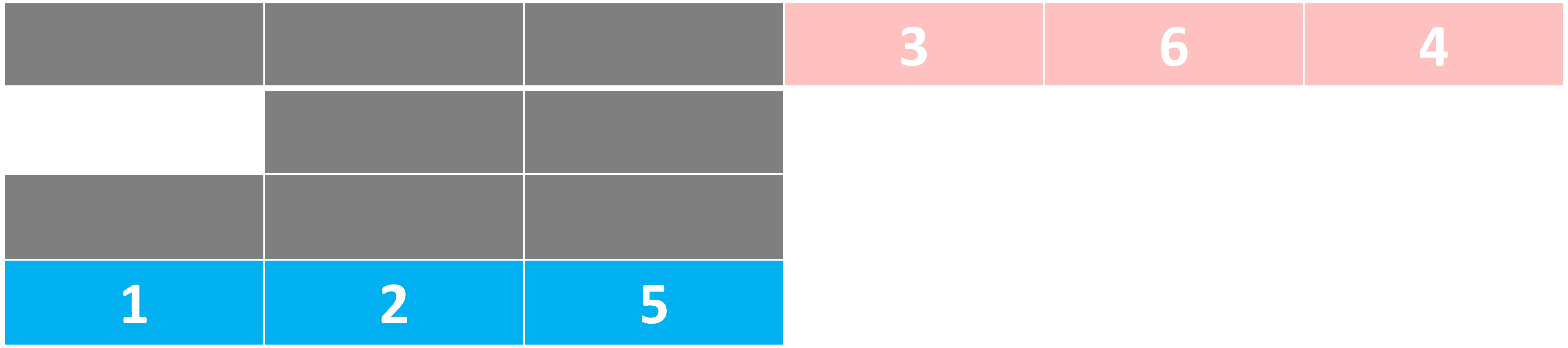

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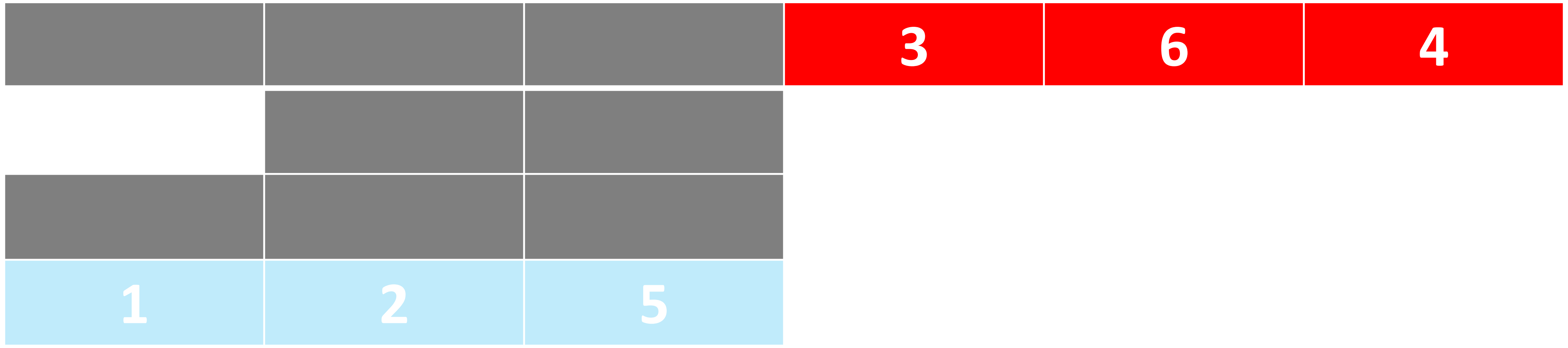

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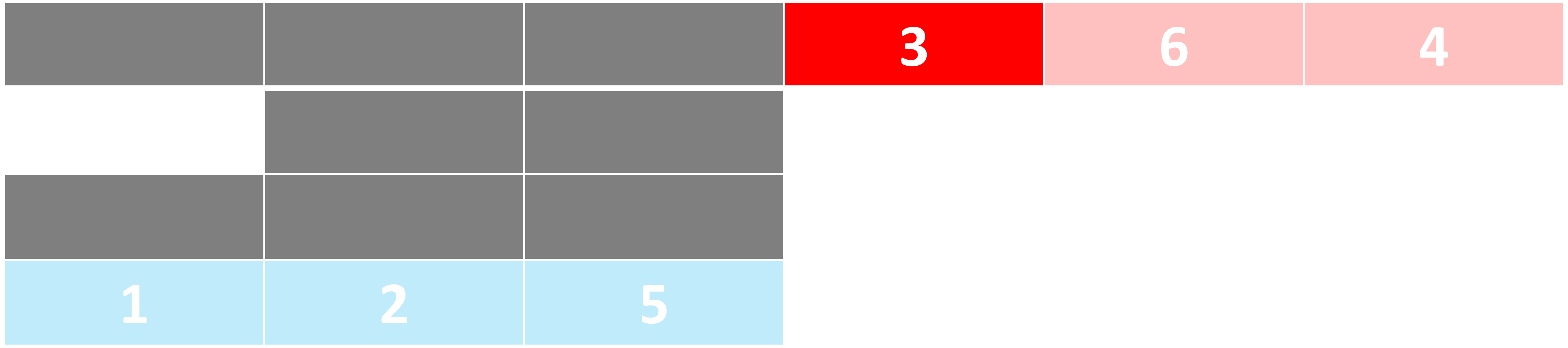

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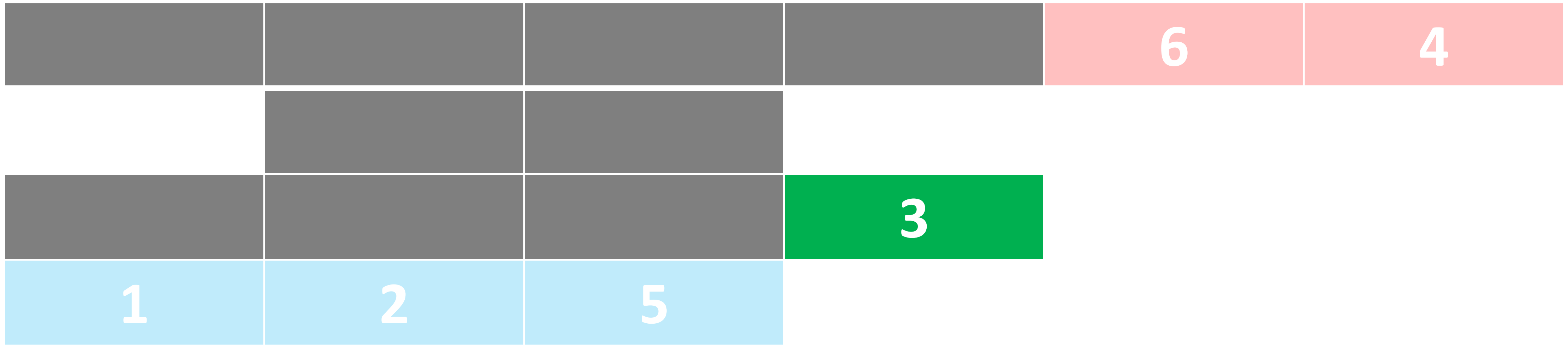

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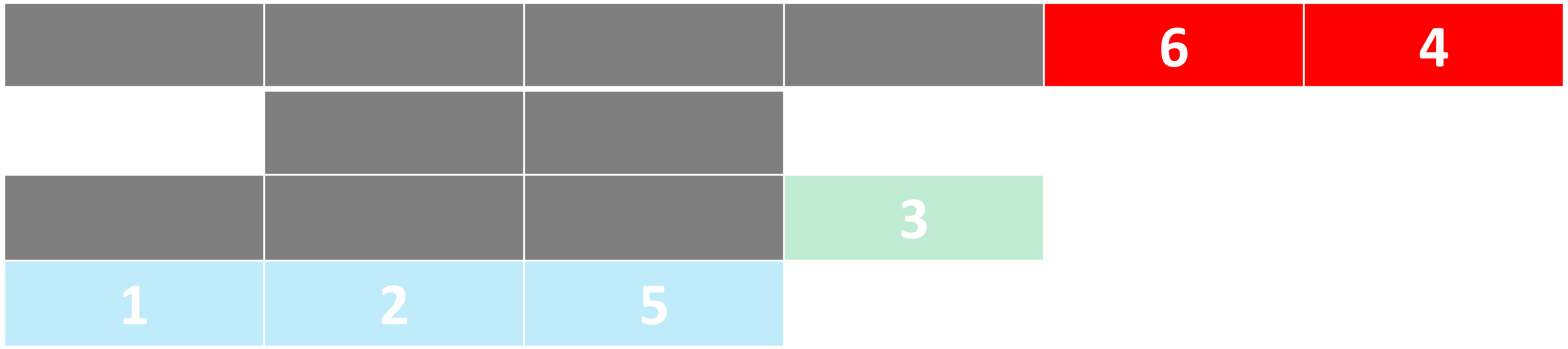

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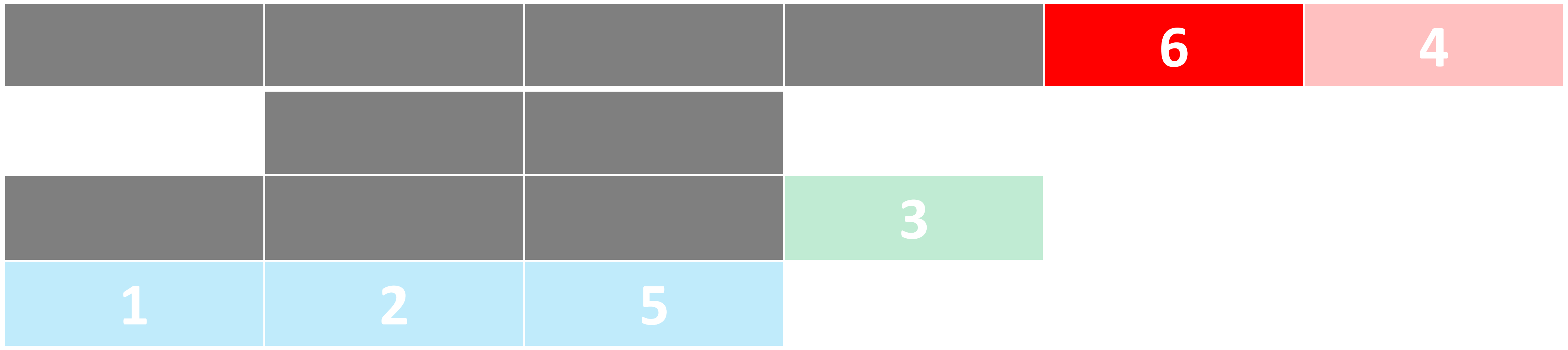

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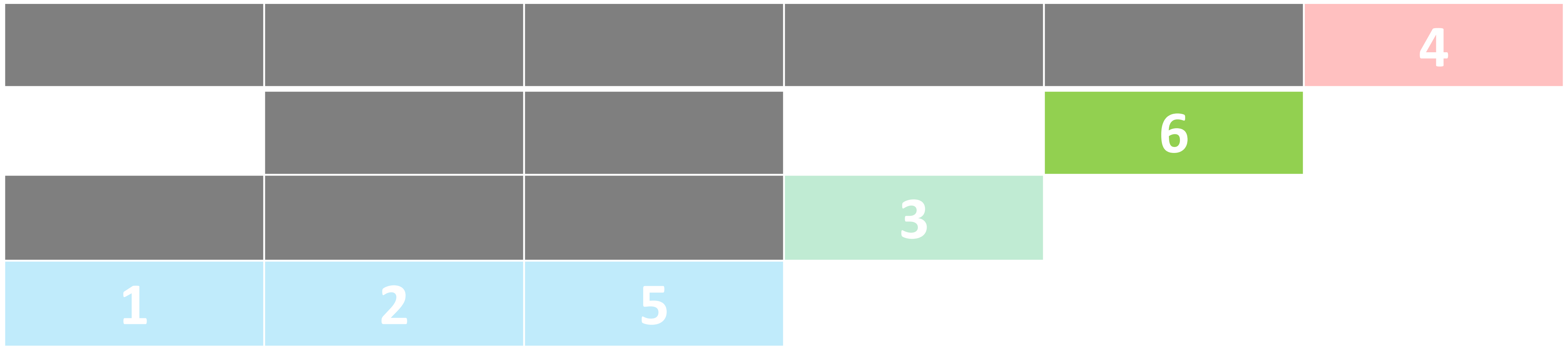

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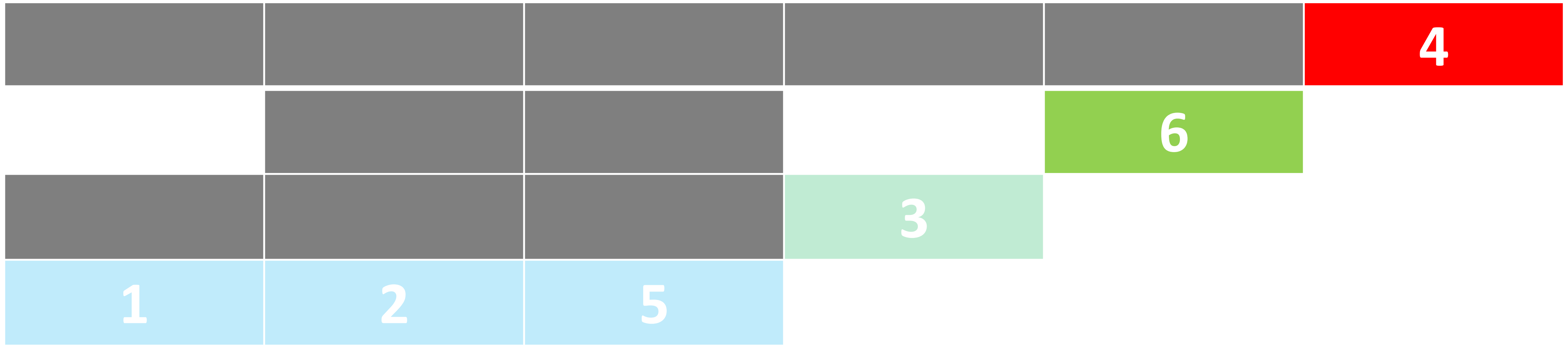

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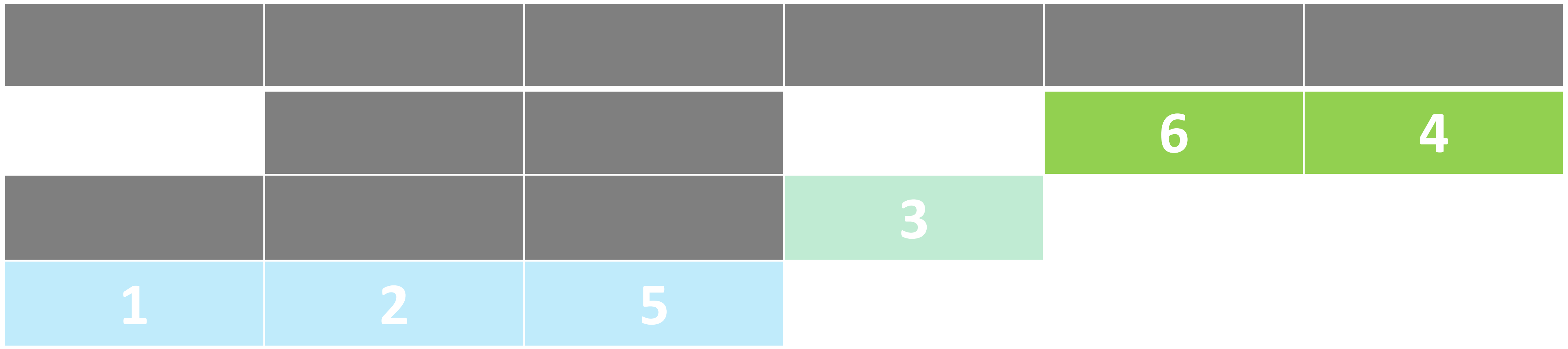

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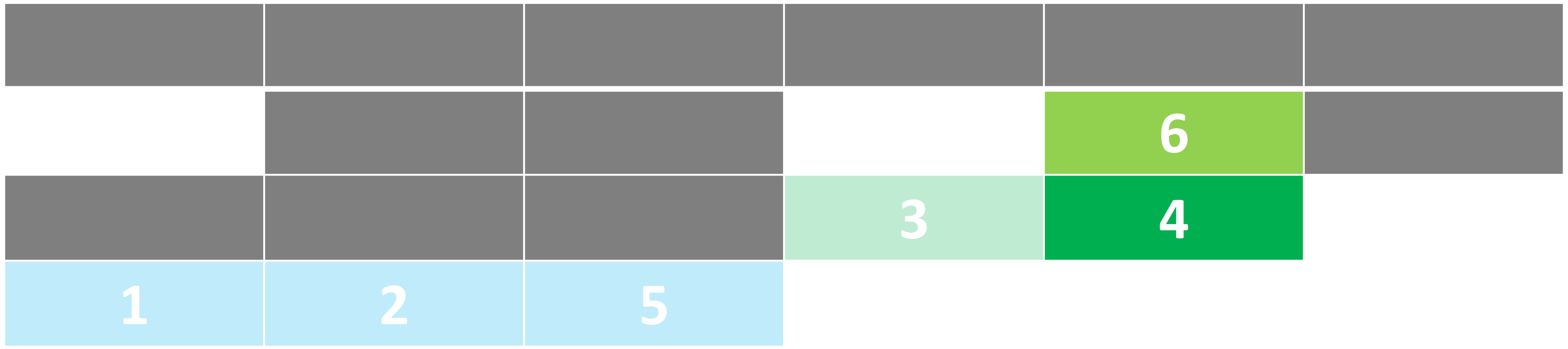

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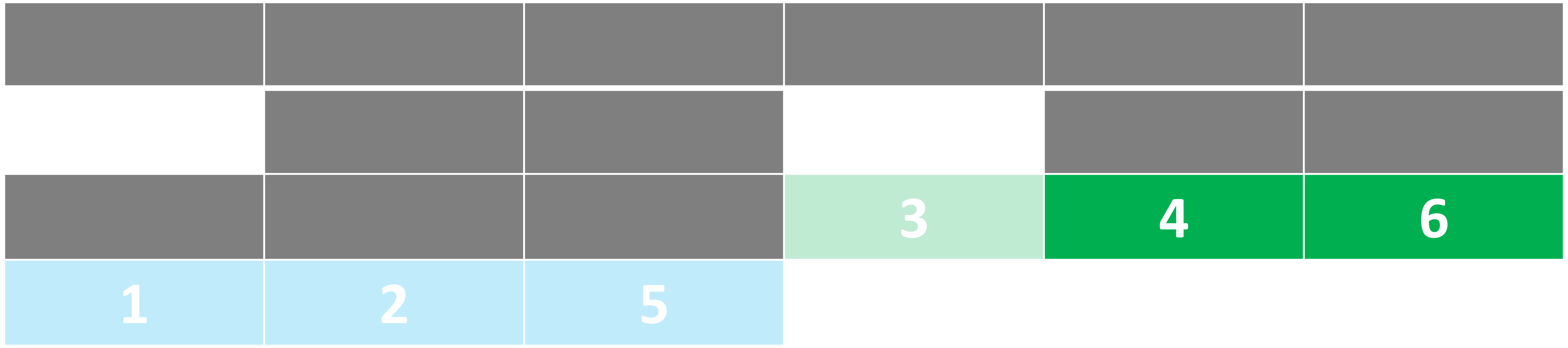

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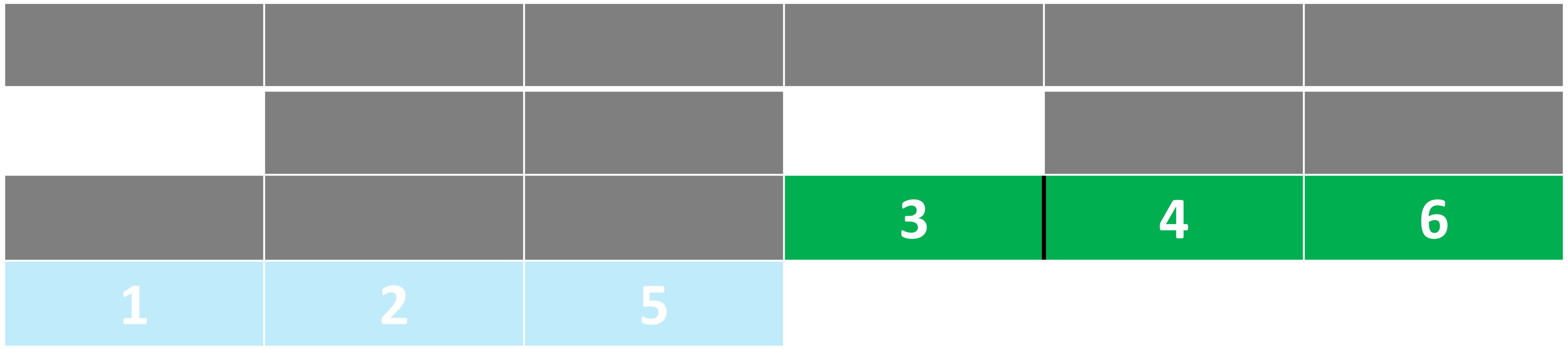

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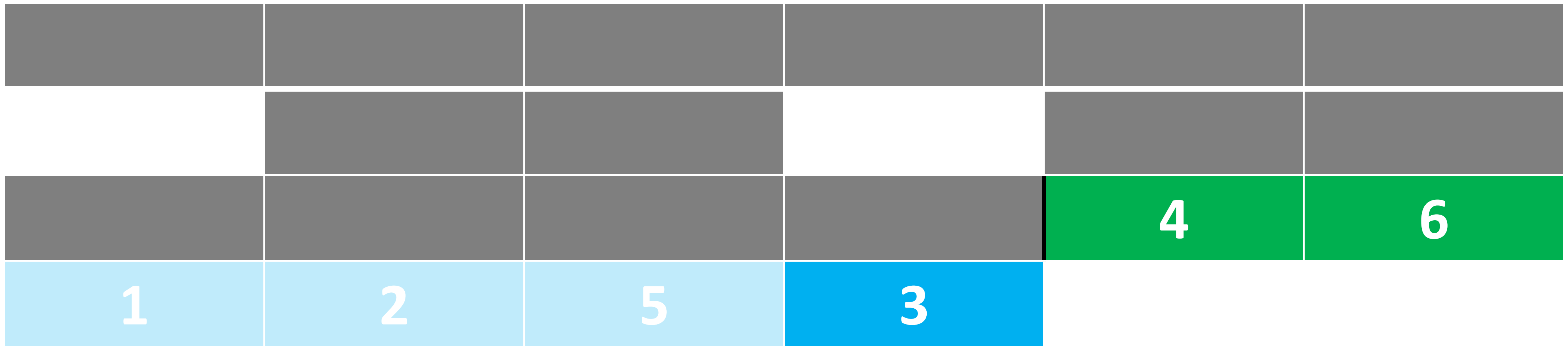

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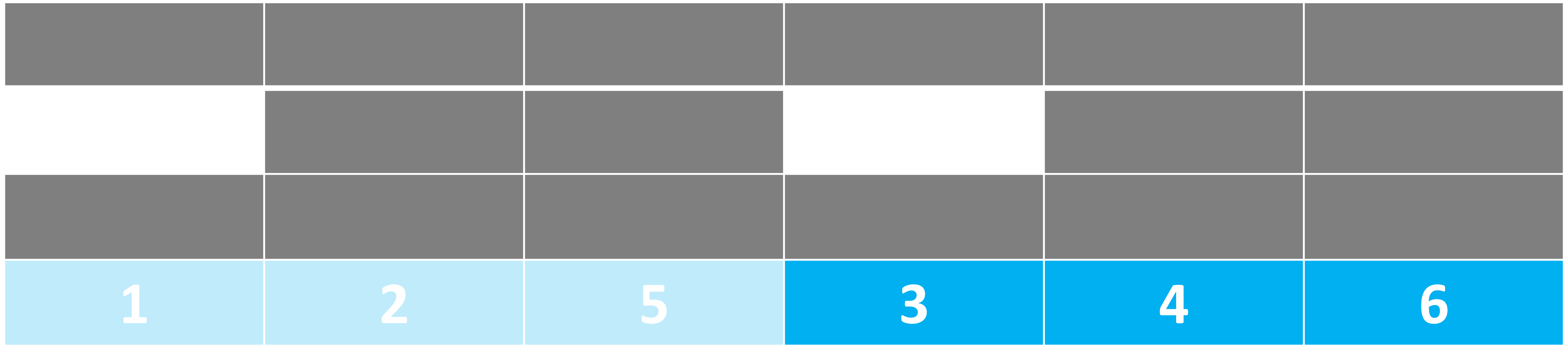

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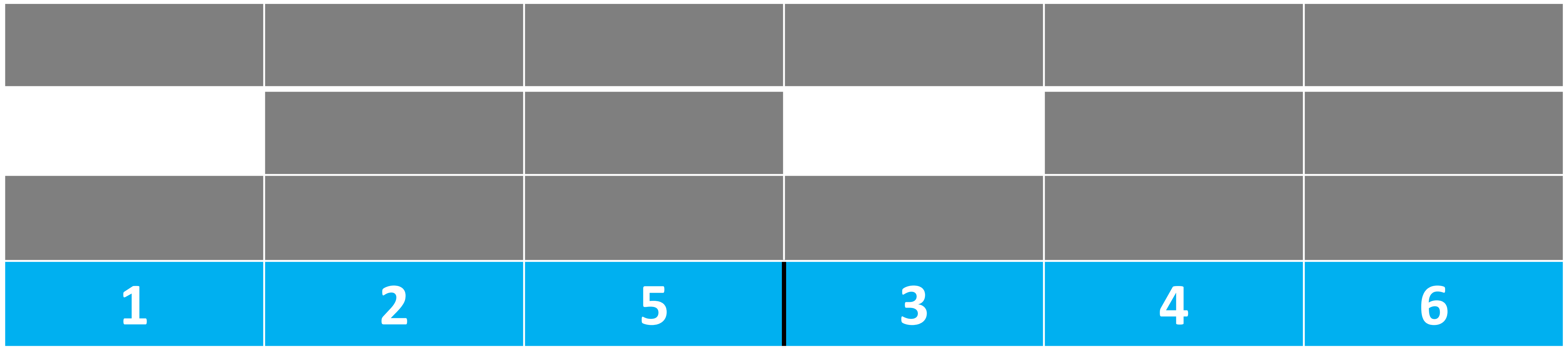

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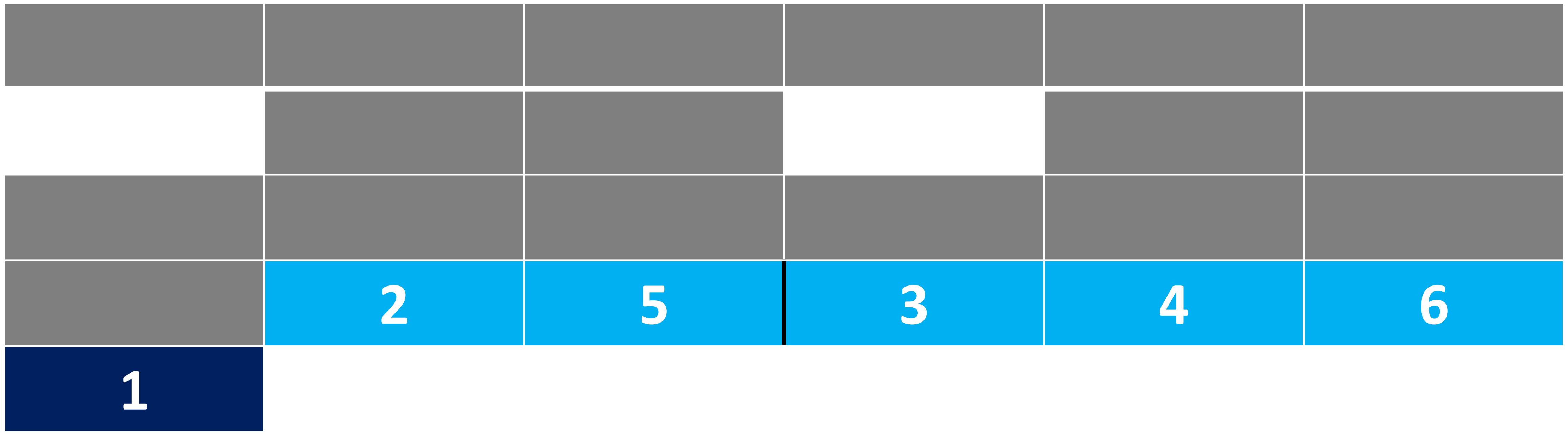

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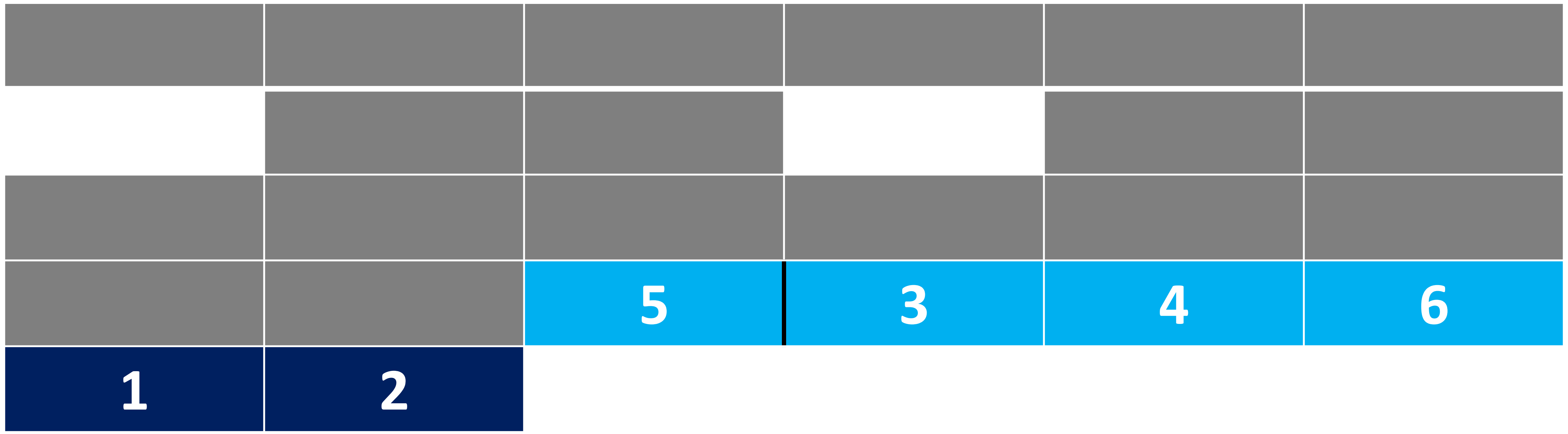

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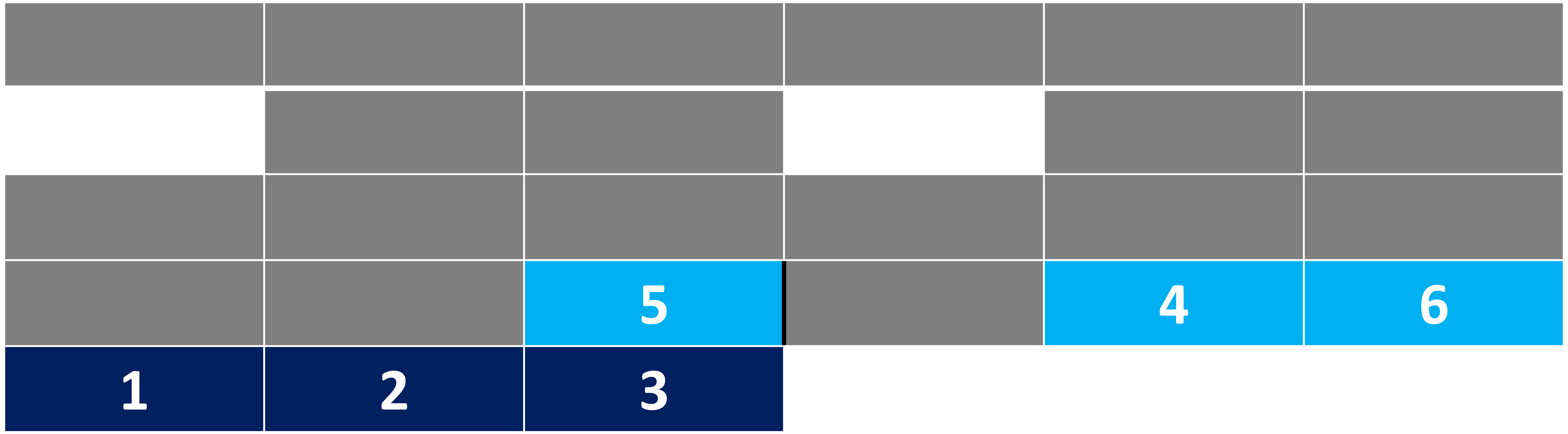

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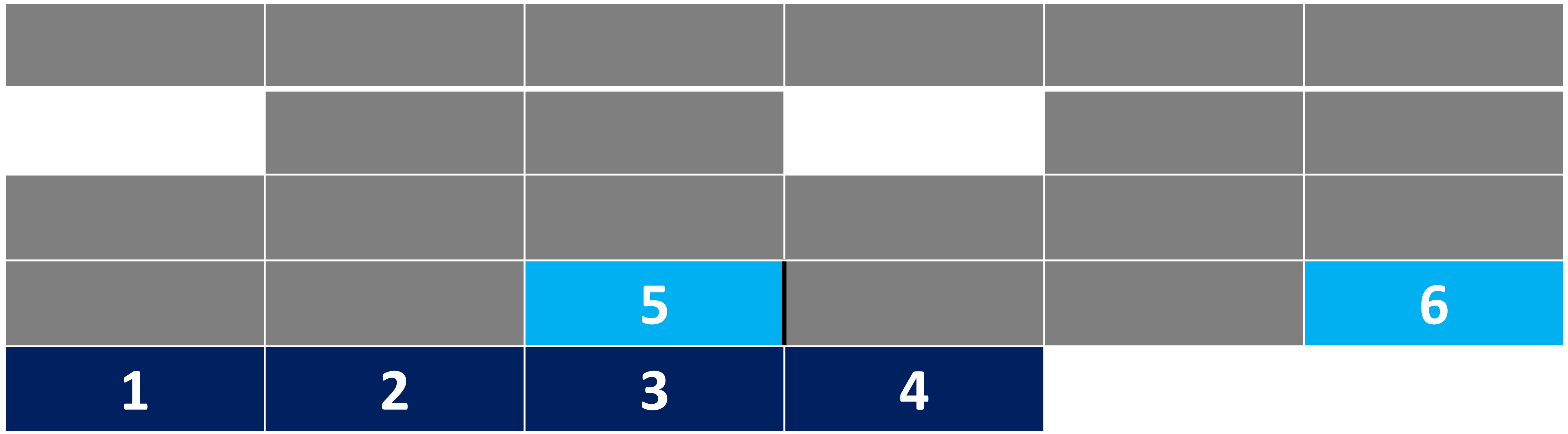

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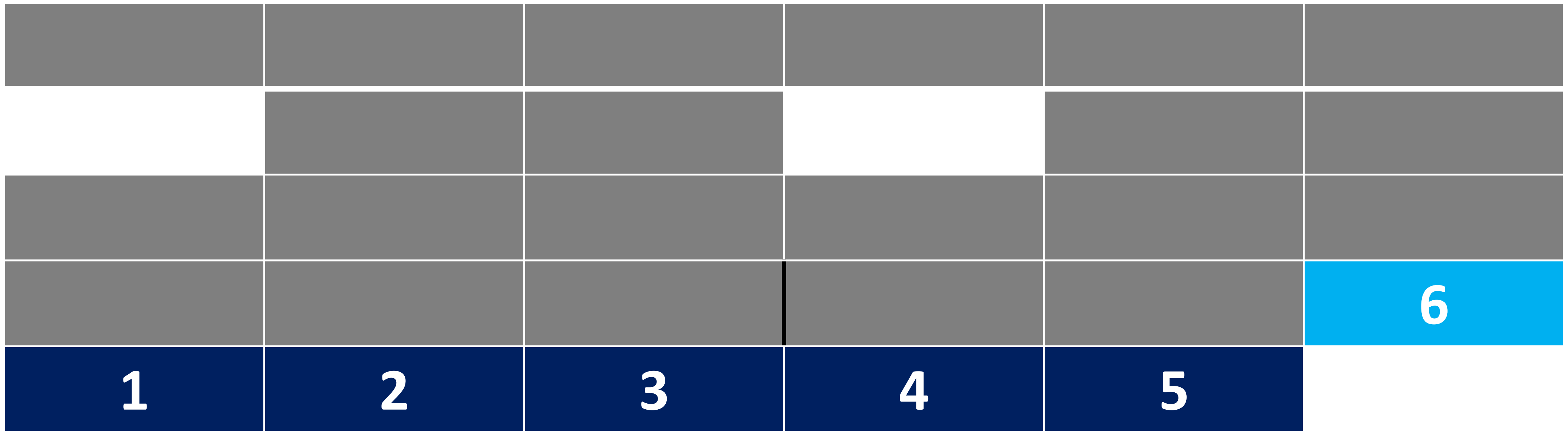

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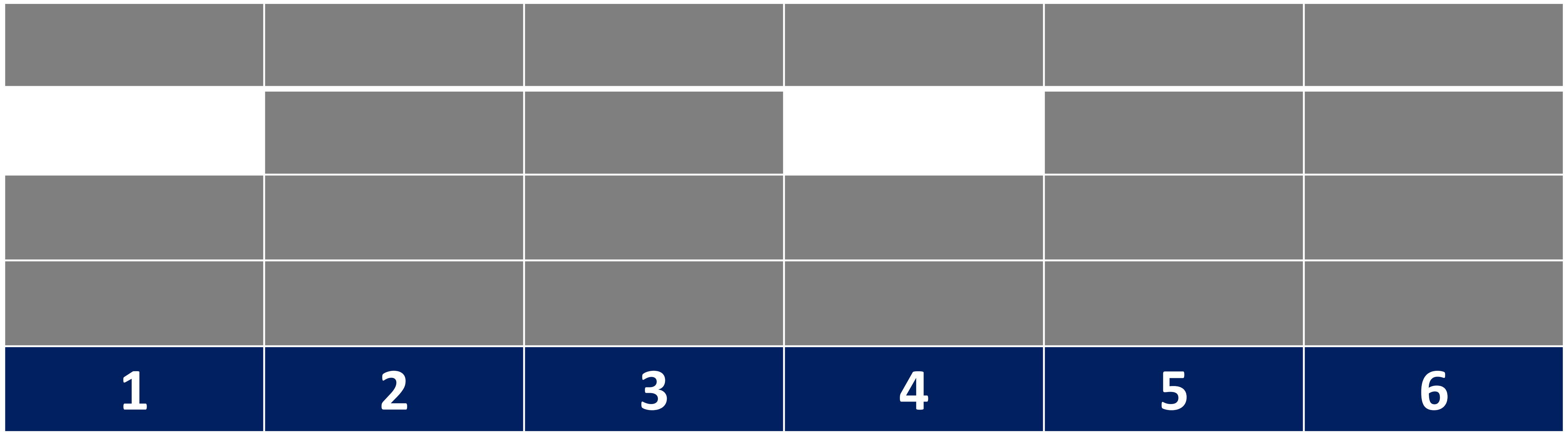

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- **Worst-case scenario**: We have to split *n* elements up and then recombine them, effectively doubling the sorted subarrays as we build them up. (combining sorted 1-element arrays into 2-element arrays, combining sorted 2-element arrays into 4-element arrays…)

- **Best-case scenario**: The array is already perfectly sorted. But we still have to split and recombine it back together with this algorithm.

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$O(n \log n)$
$\Omega(n \log n)$