Mohammed Abu-Hadhoud
MBA, PMOC, PgMPD, PMPD, PMI-RMPD, CM, ITILF, MCPD, MCSD
26+ years of experience


مهم جداً
هذا الملف للمراجعة السريعة واخذ الملاحظات عليه فقط ،لانه يحتوي
على اقل من 20٪ مما يتم شرحه في الفيديوهات
الاستعجال والاعتماد عليه فقط سوف يجعلك تخسر كميه معلومات
وخبرات كثيره
يجب عليك مشاهدة فيديو الدرس كاملا
لاتنسى عمل لايك ومشاركة القناة لتعم الفائدة للجميع
لا تنسونا من دعائكم
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STOP
PROGRAMMING
ADVICES
LEARN THE
RIGHT WAY


Algorithms & Problem Solving
Level 6
Insertion Sort
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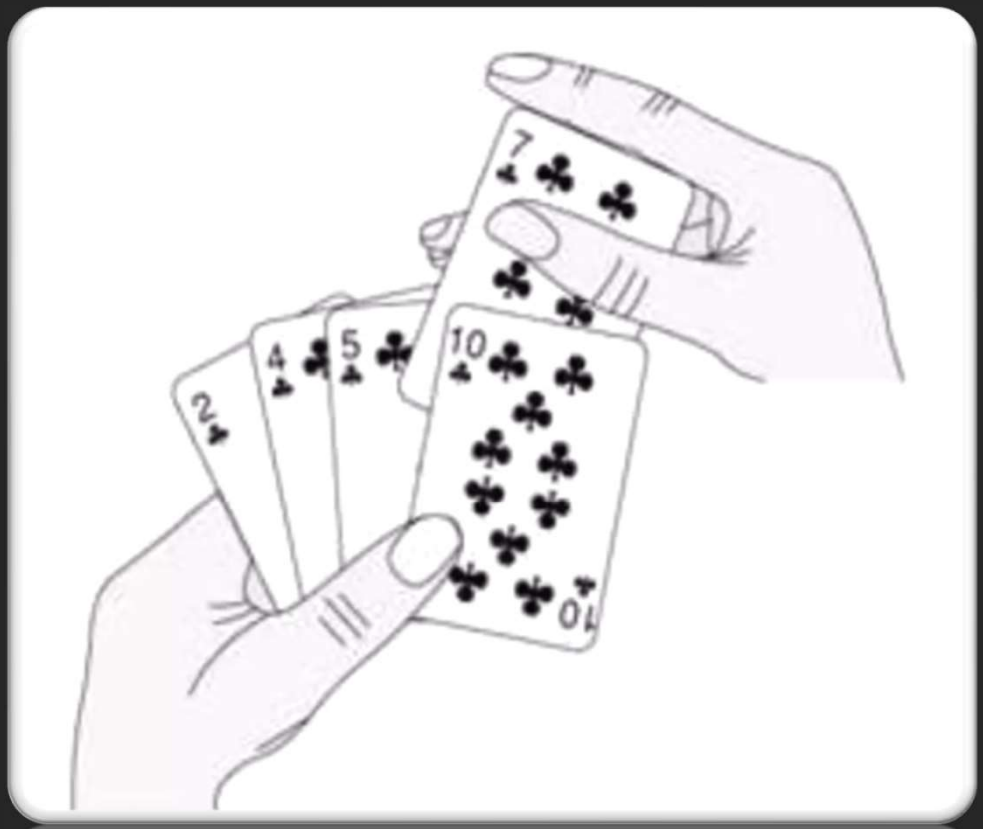
Why It’s called Insertion Sort?



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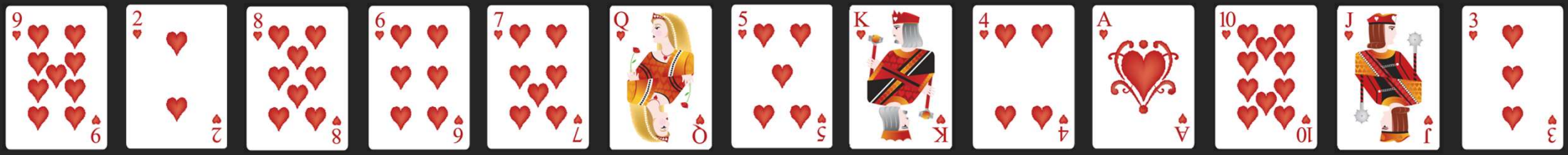
Unsorted List



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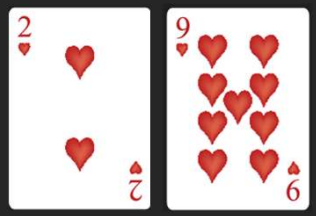

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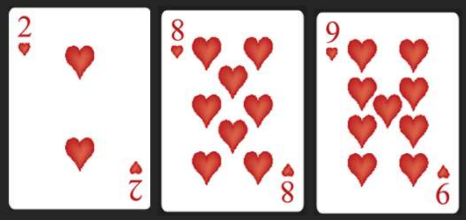

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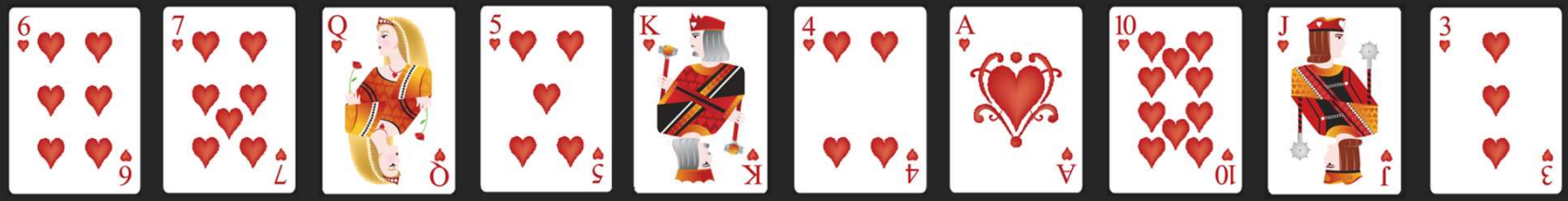

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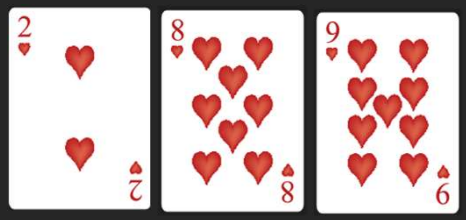

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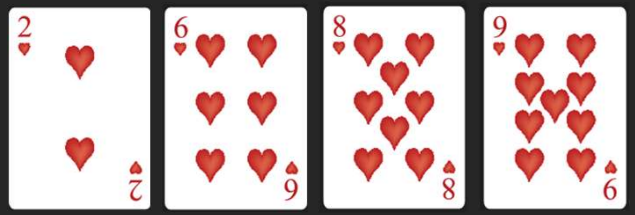

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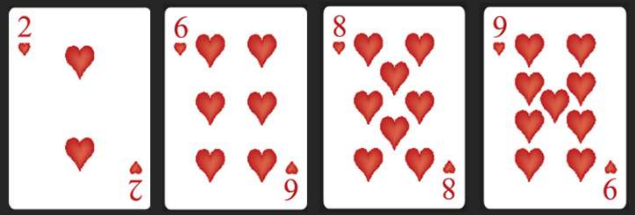

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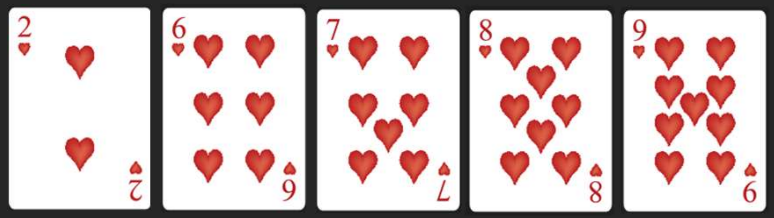

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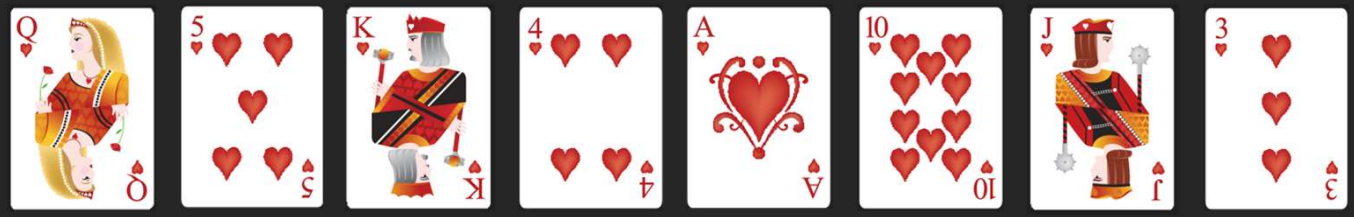

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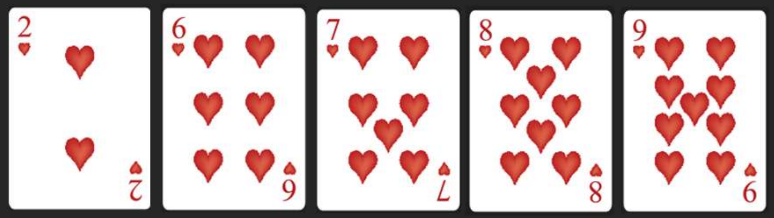

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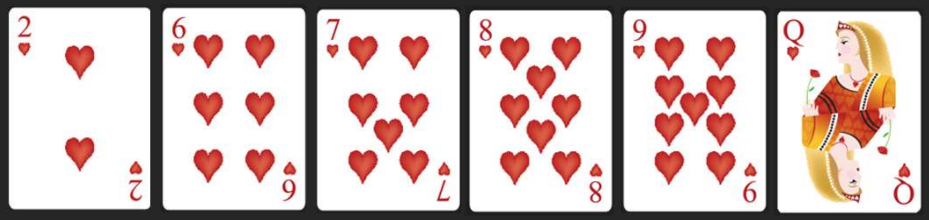

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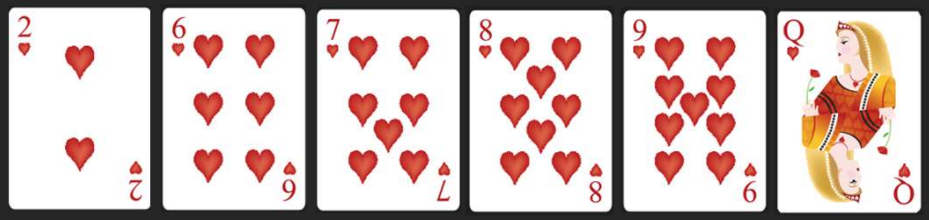

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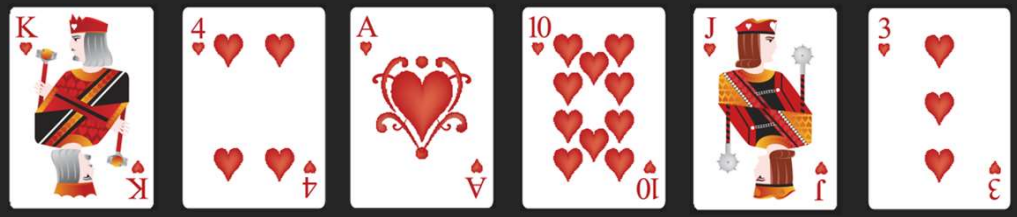

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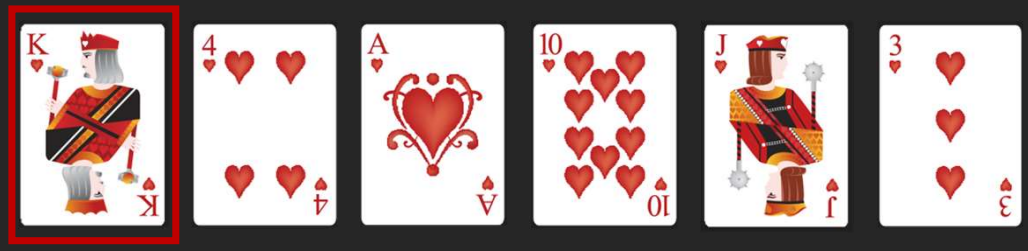

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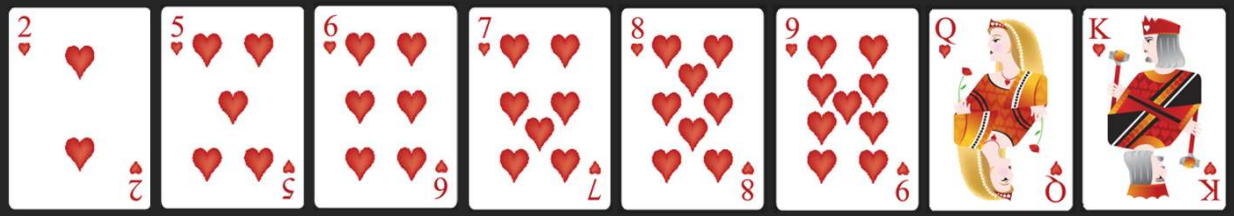

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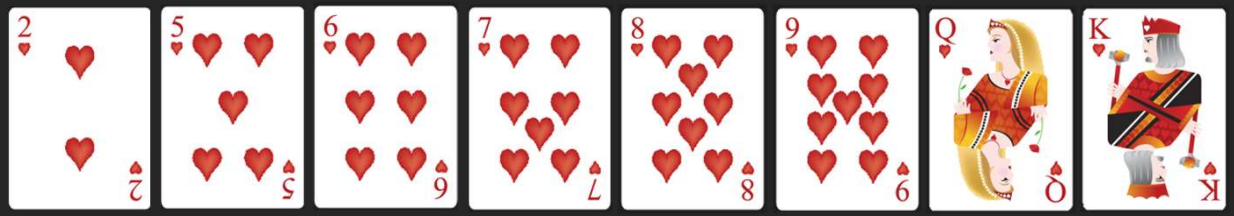

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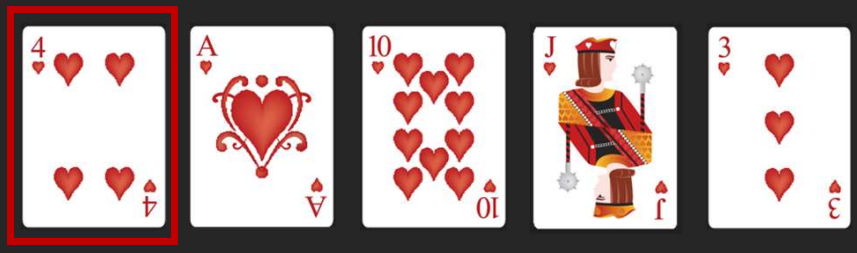

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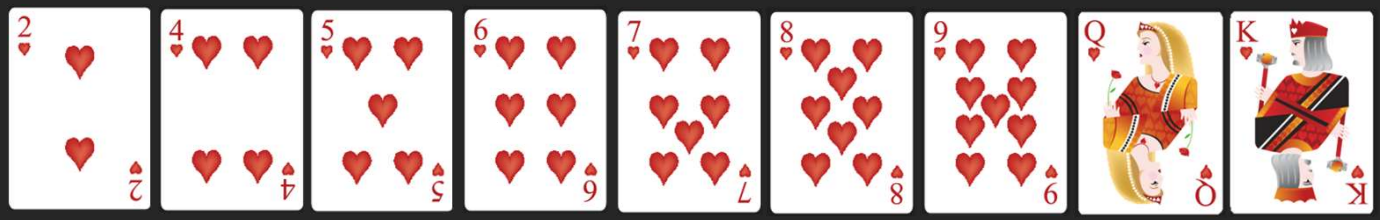

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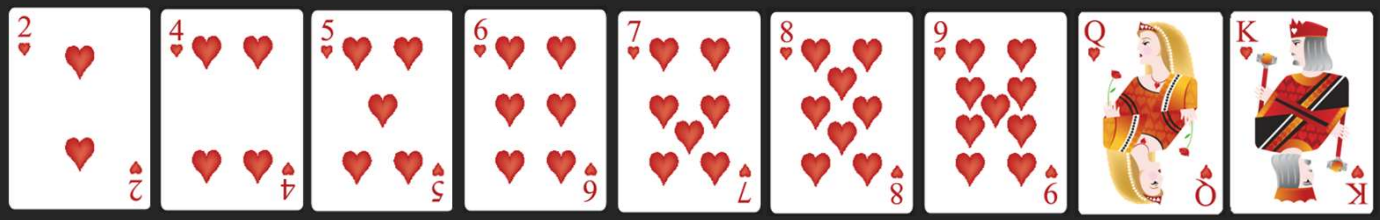

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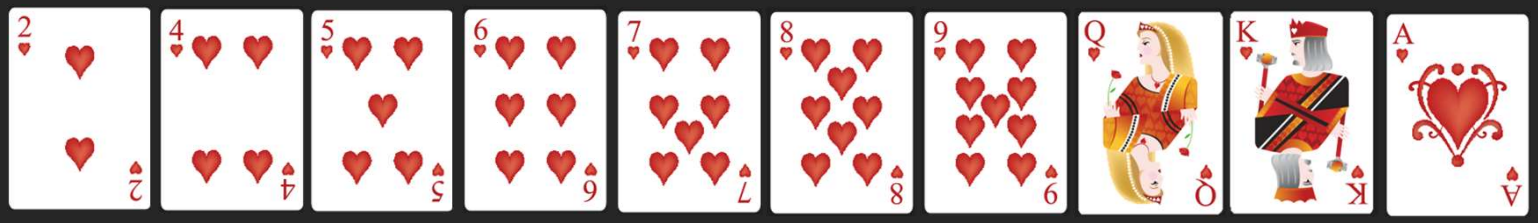

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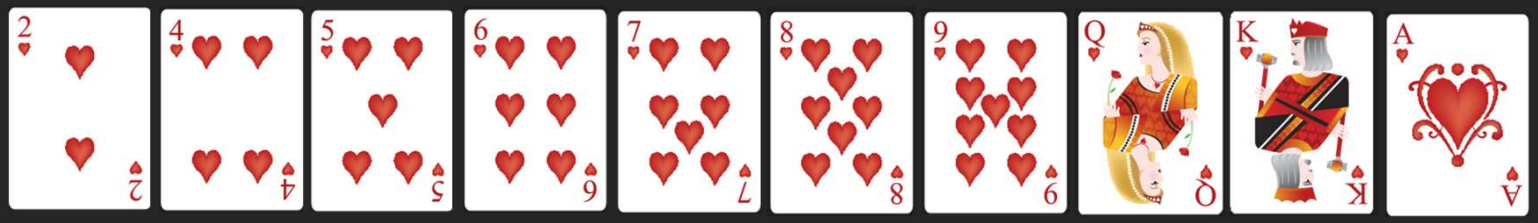

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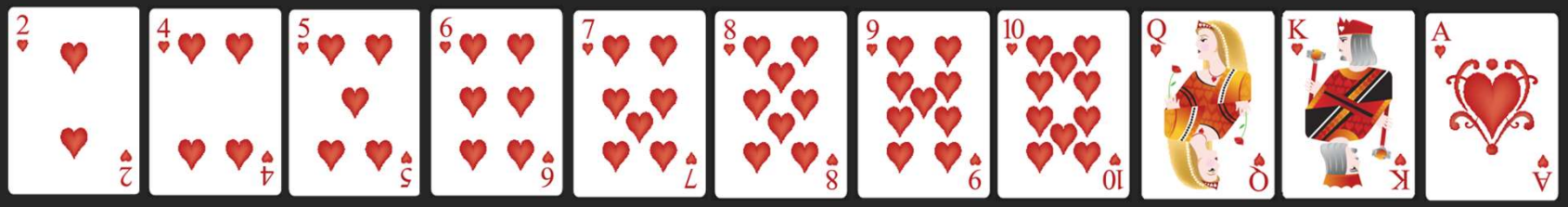

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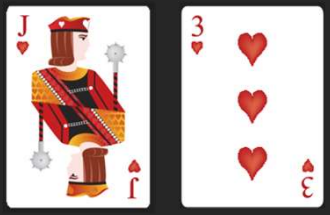

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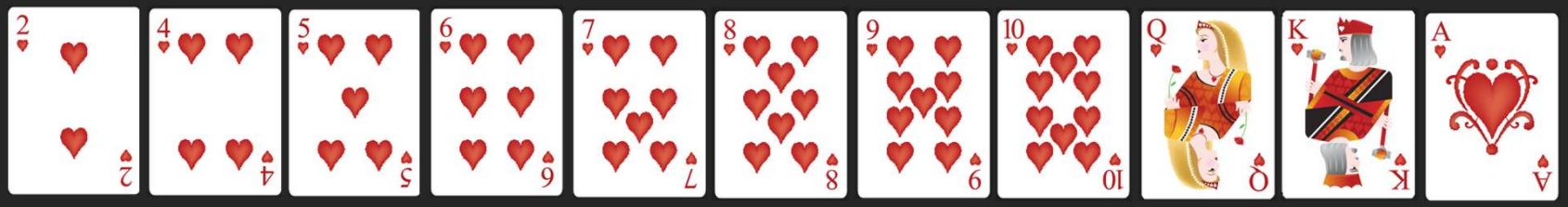

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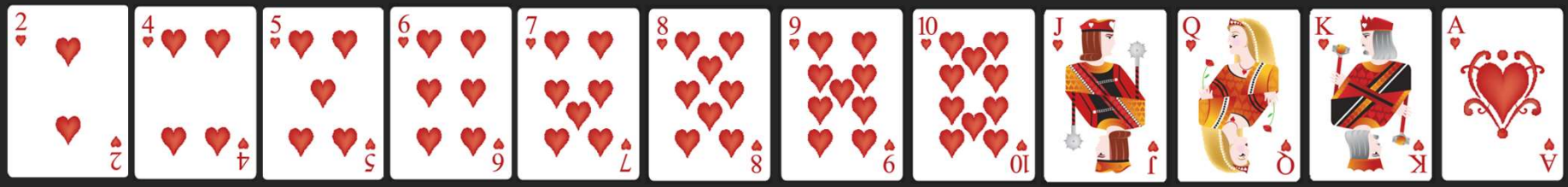

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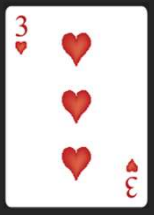

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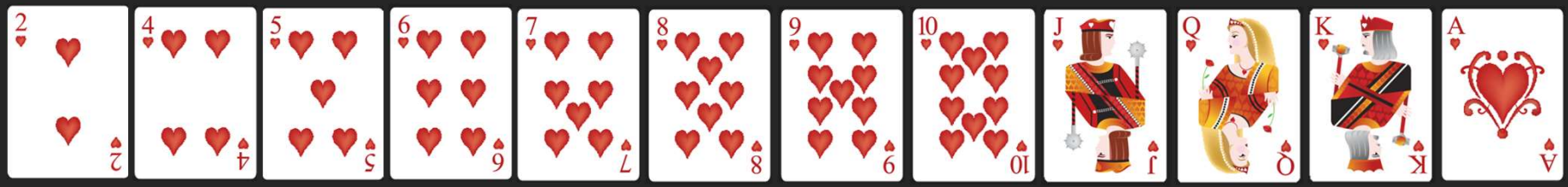

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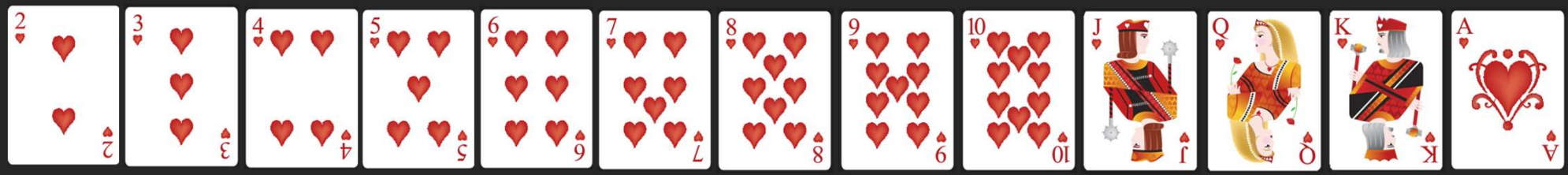

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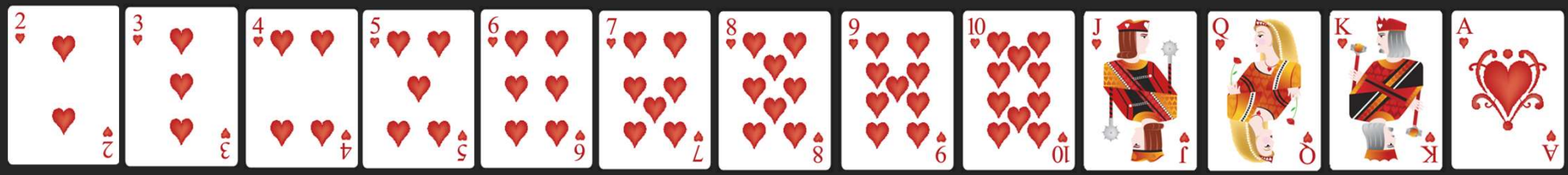

Sorted List

الف مبروك ترتيب الكروت

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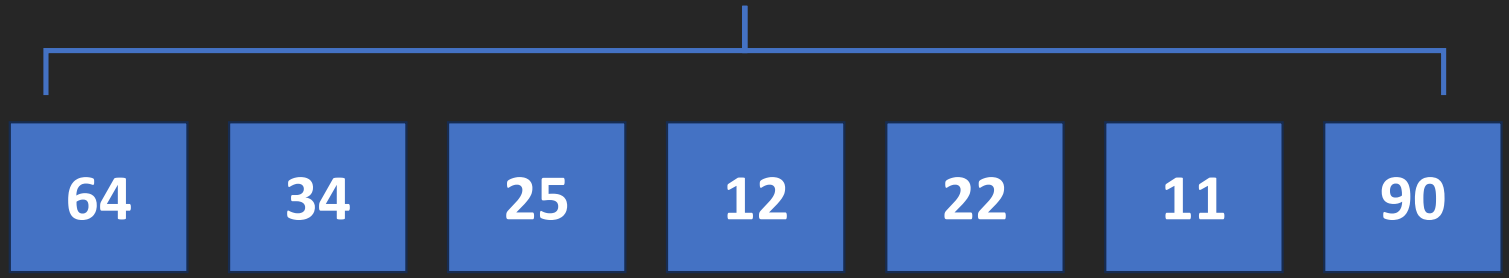
How it works? Example



Unsorted Segment

Sorted Segment

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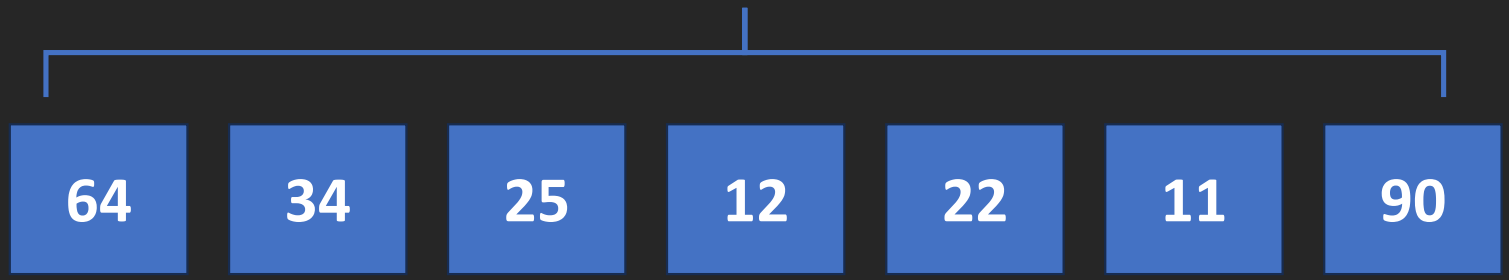

We put the first element as the
only element in the sorted Segment

Unsorted Segment

Sorted Segment

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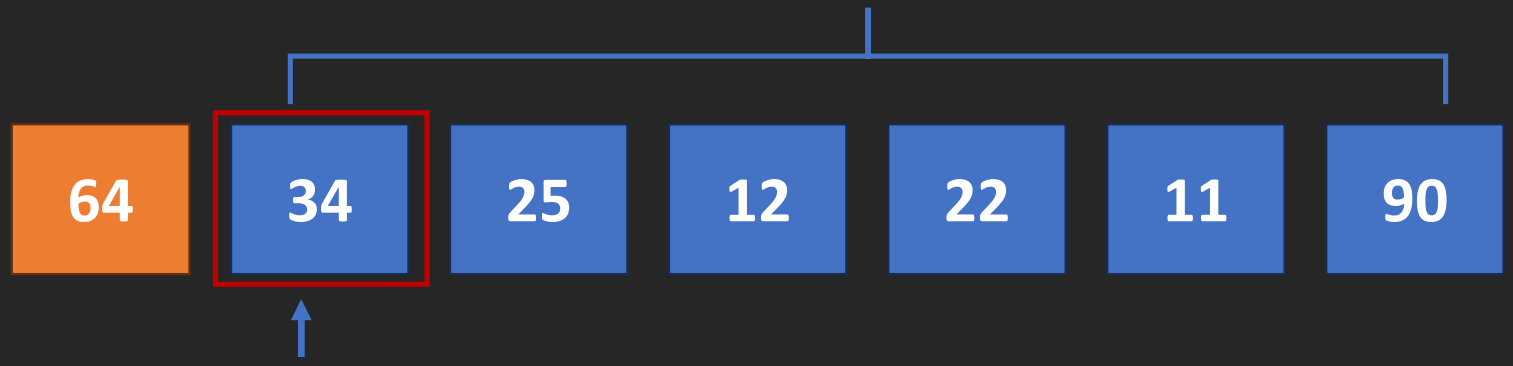

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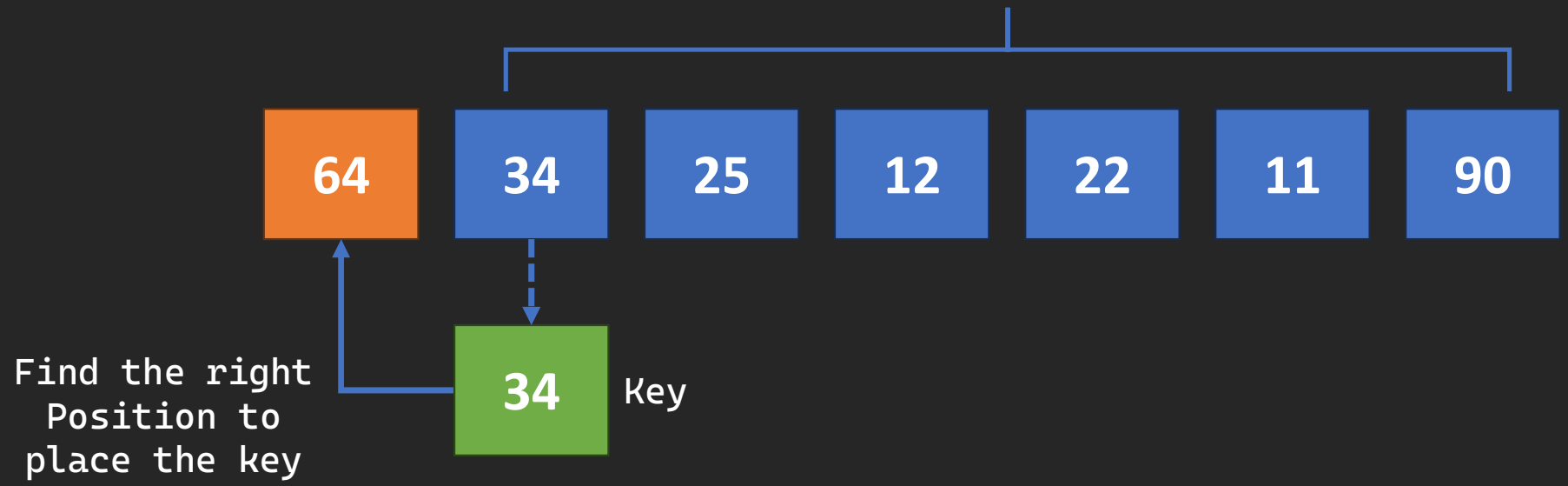

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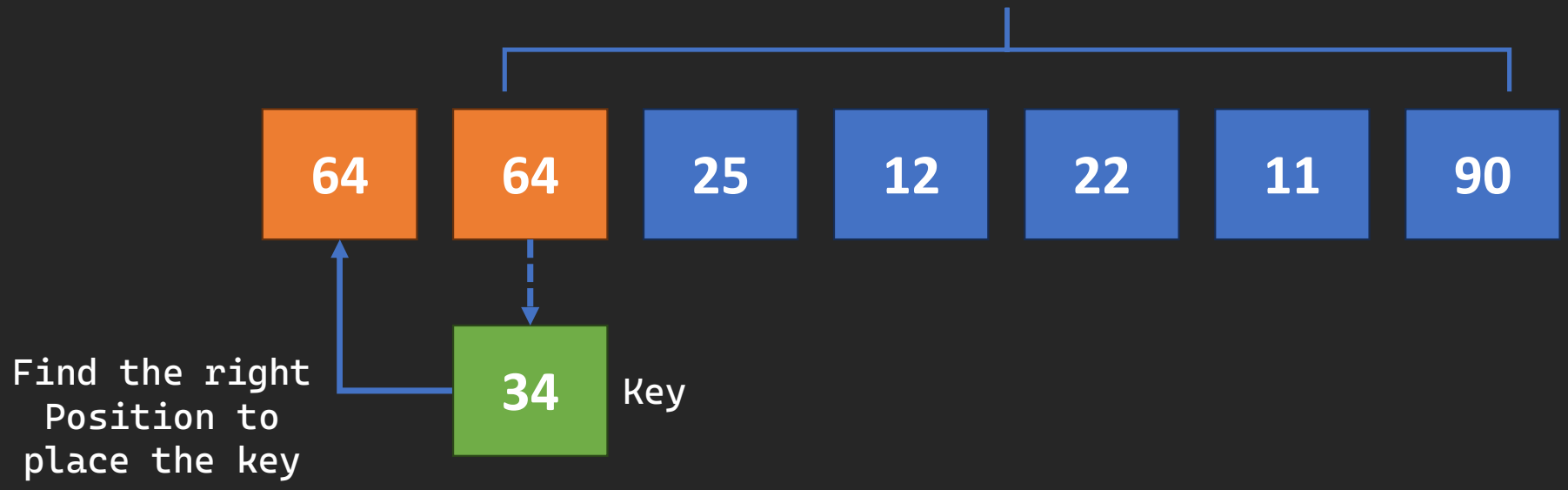

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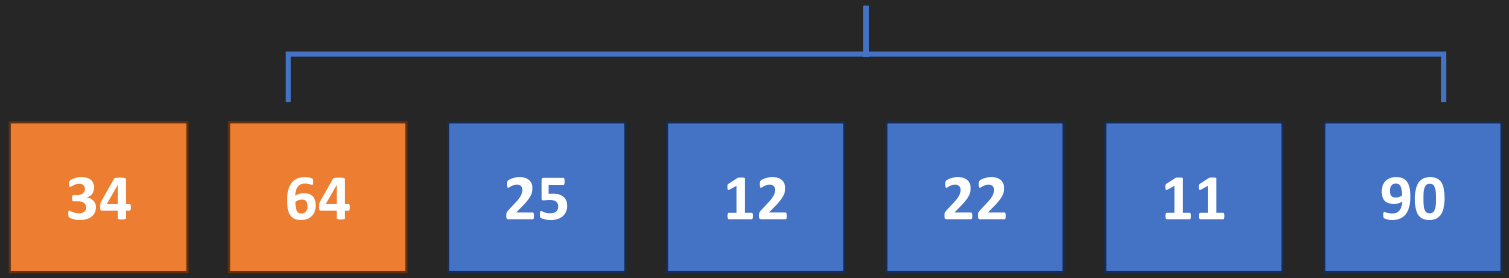

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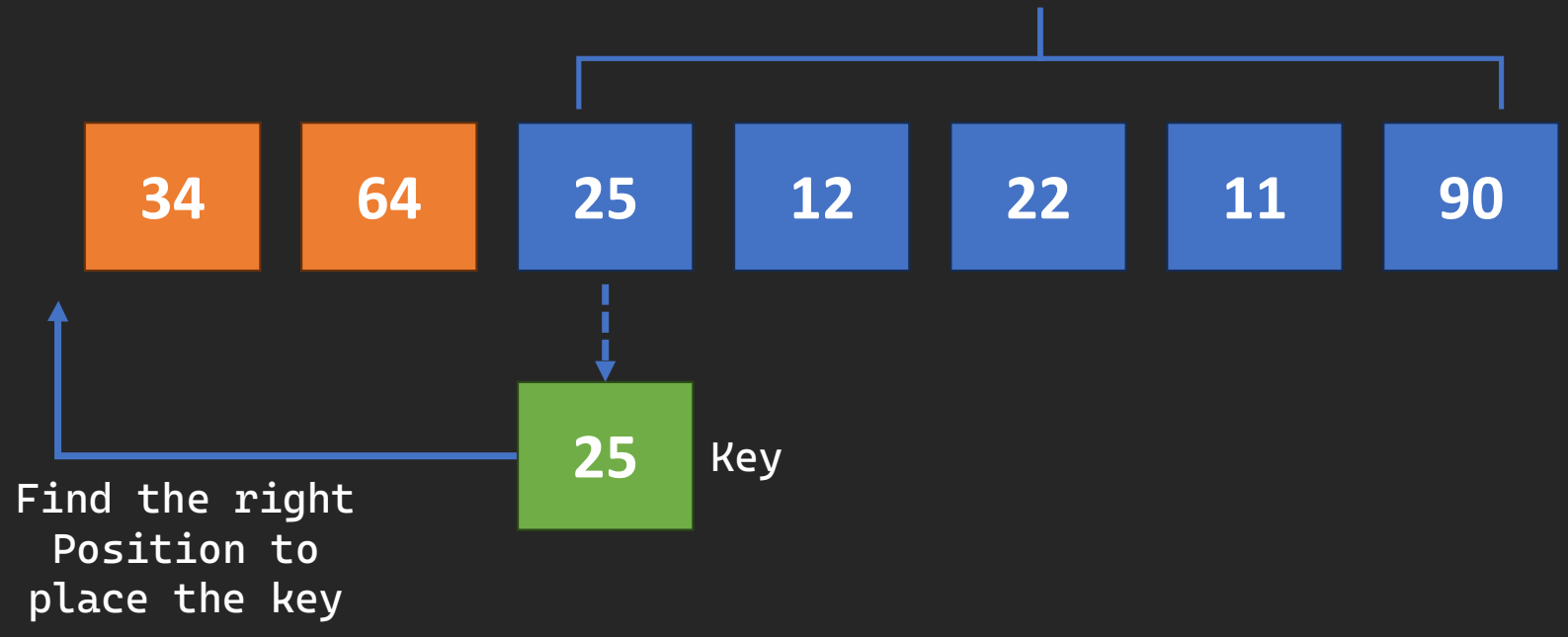

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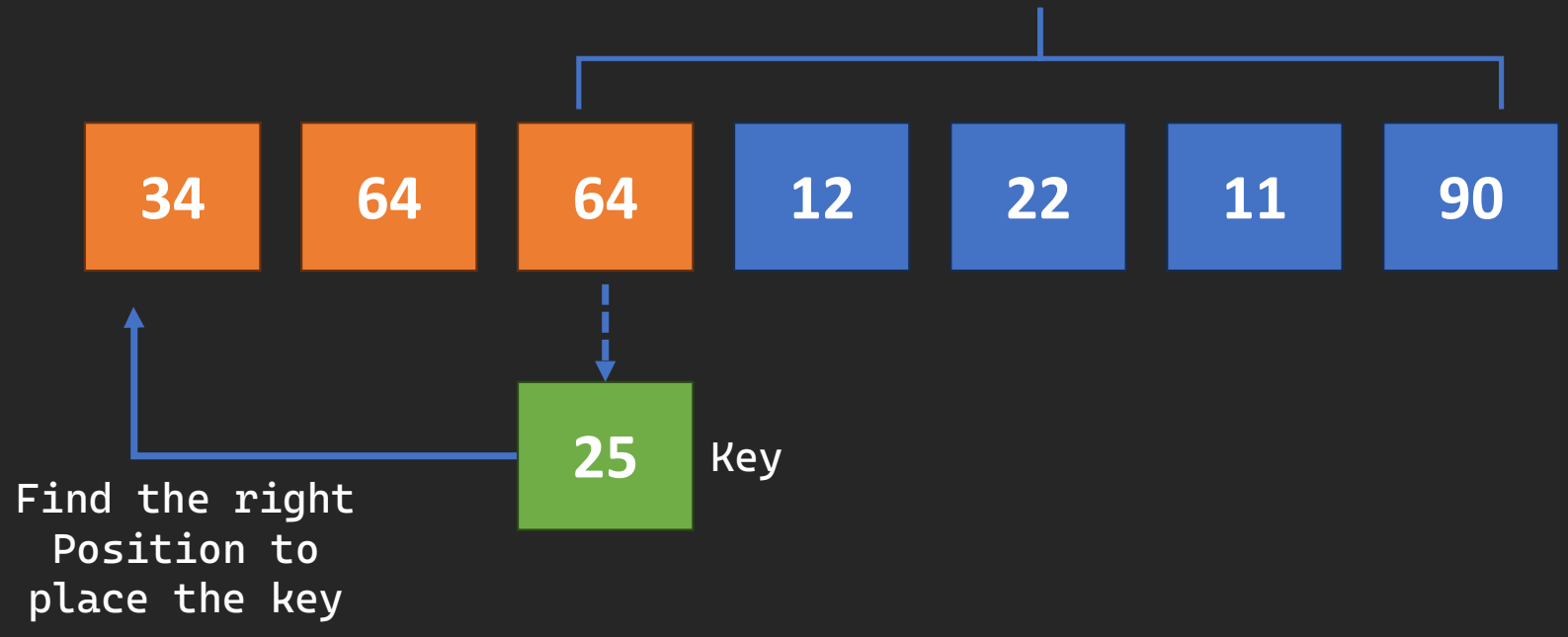

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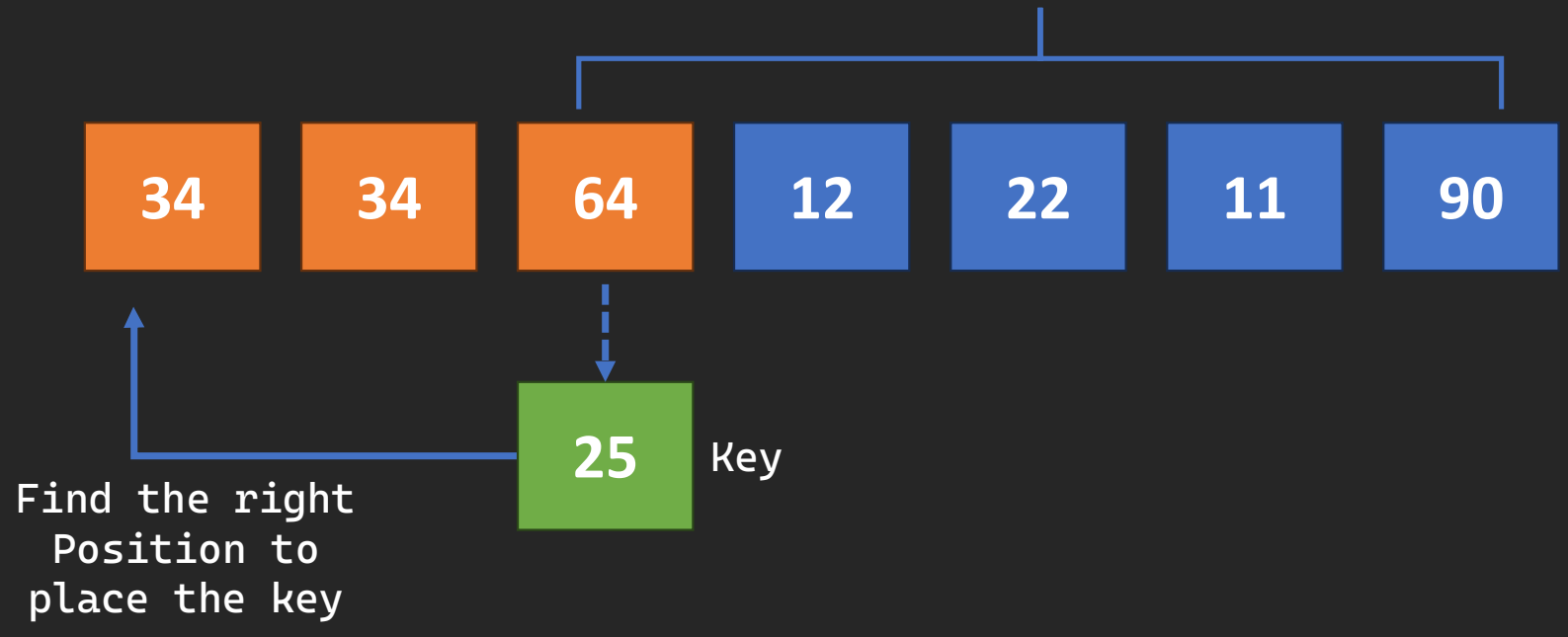

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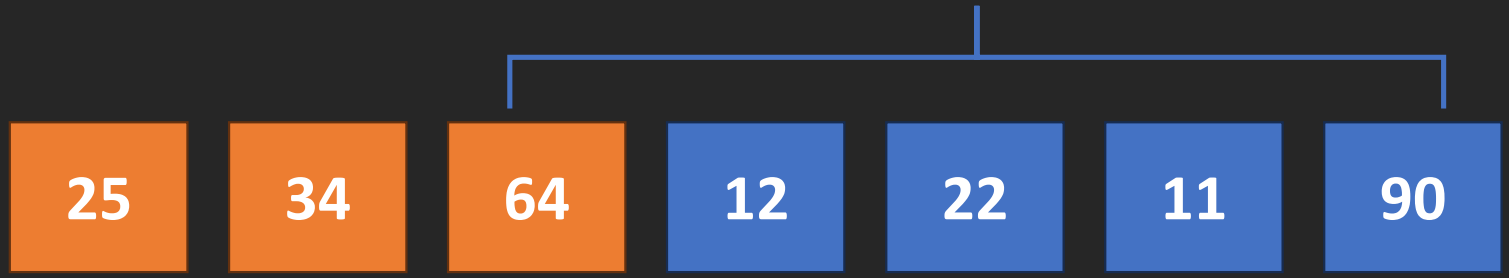

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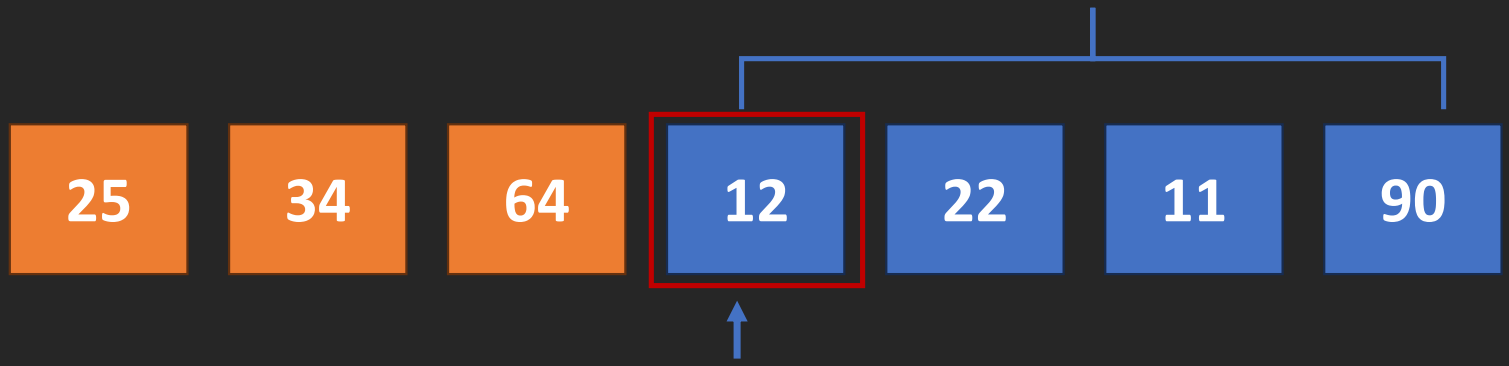

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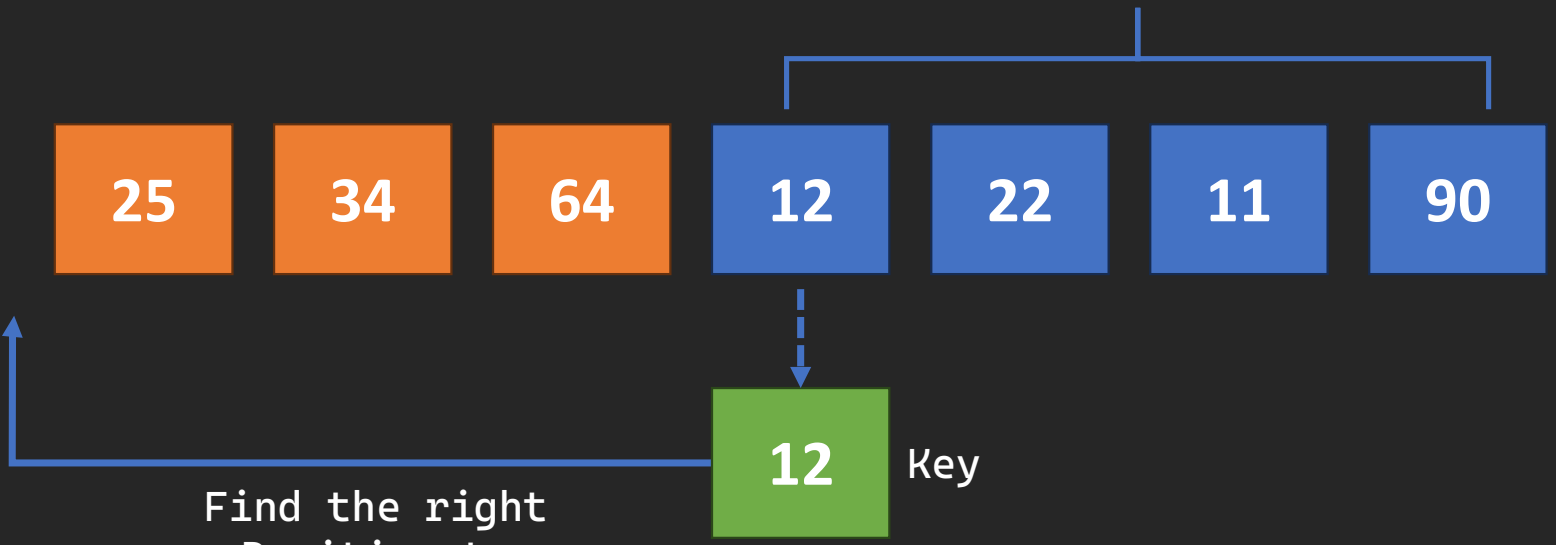

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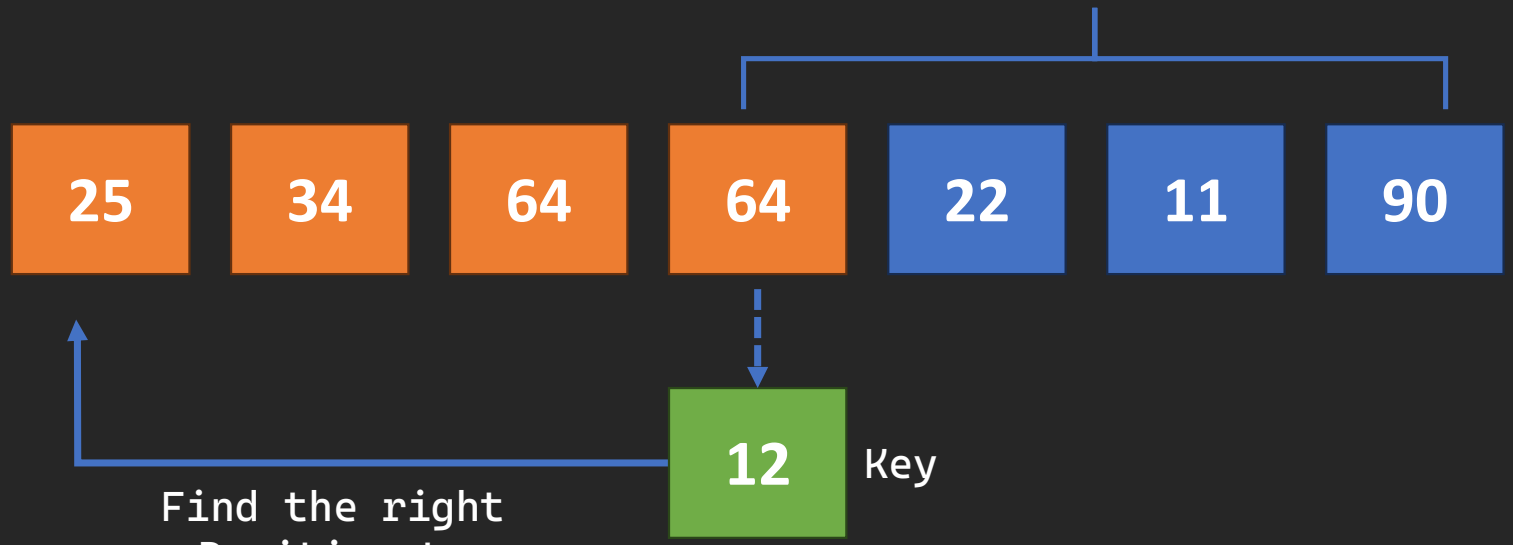
26+ years of experience



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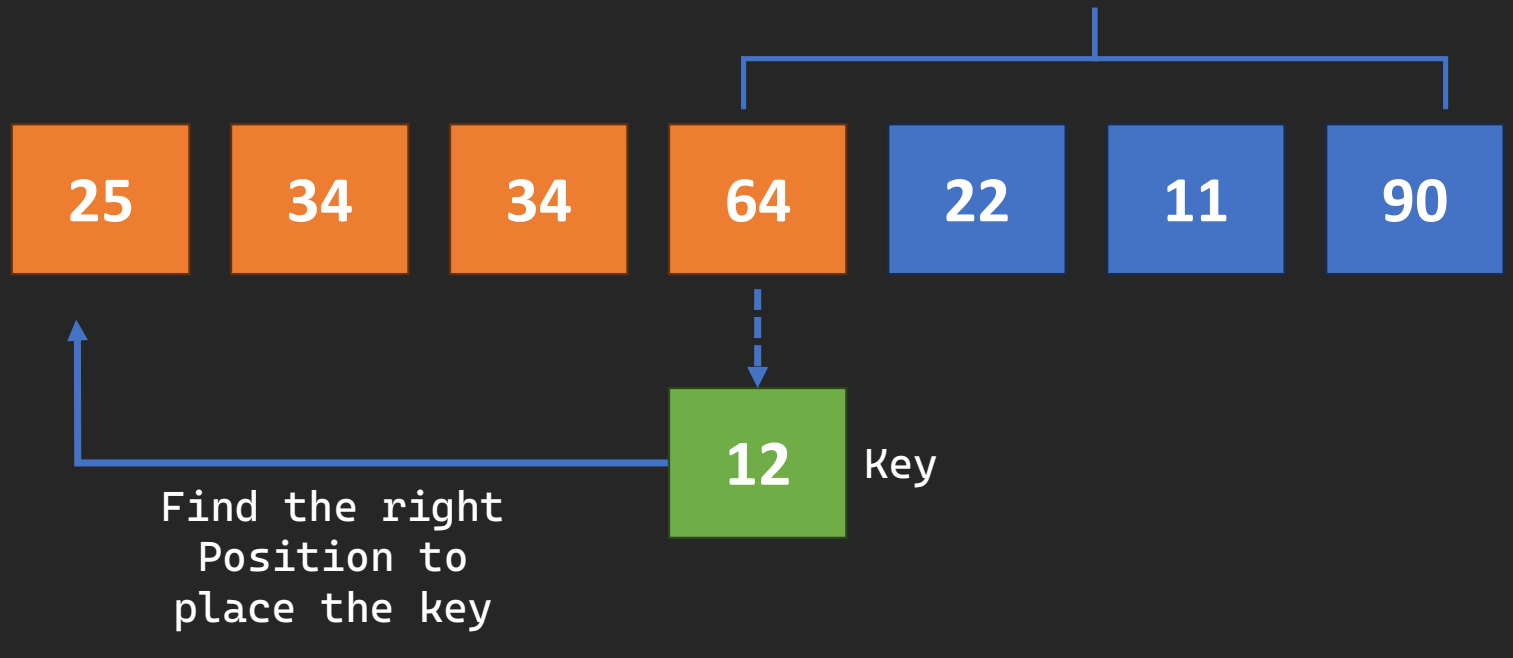

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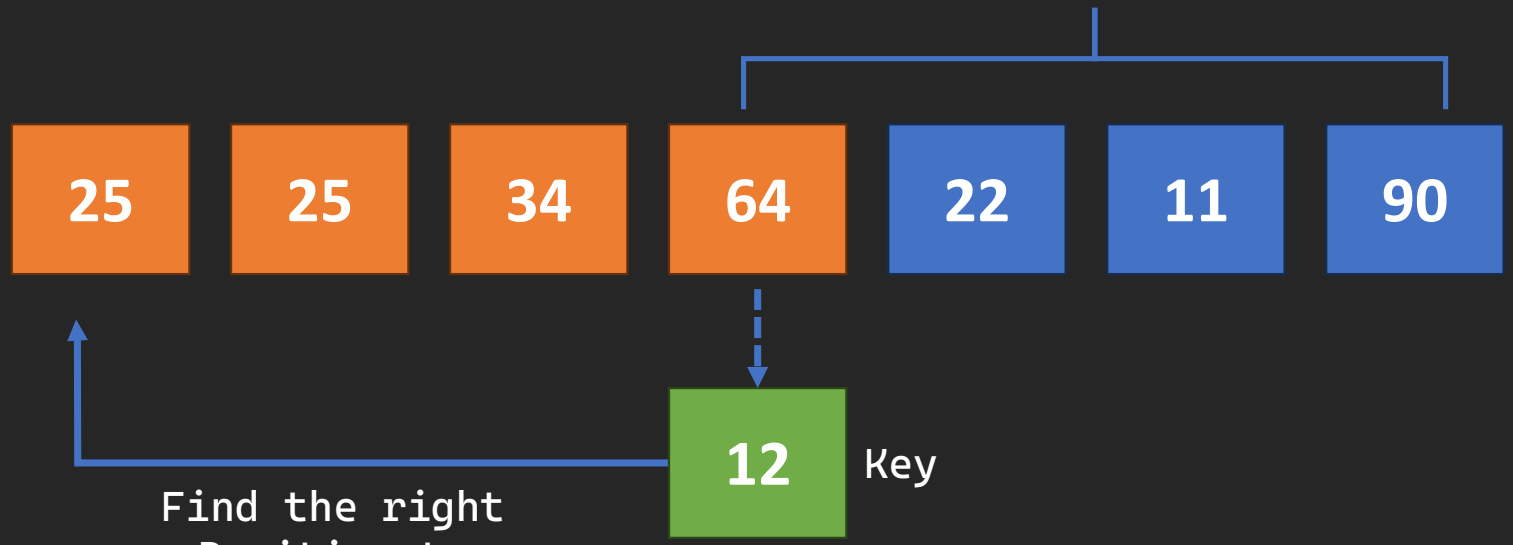

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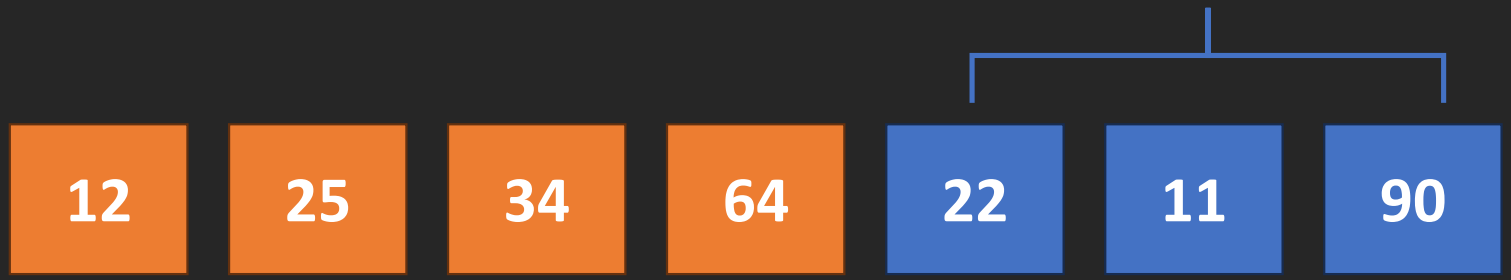

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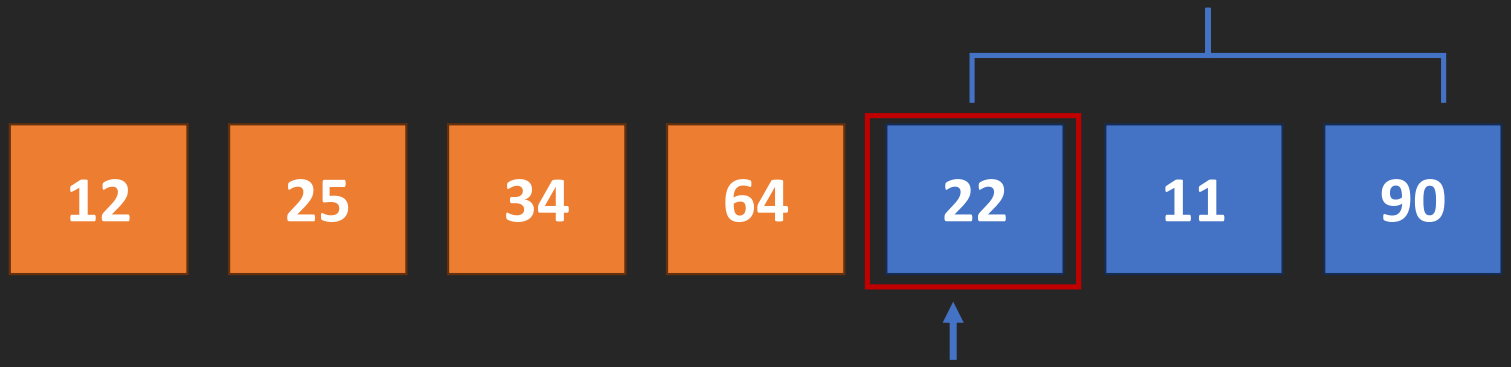

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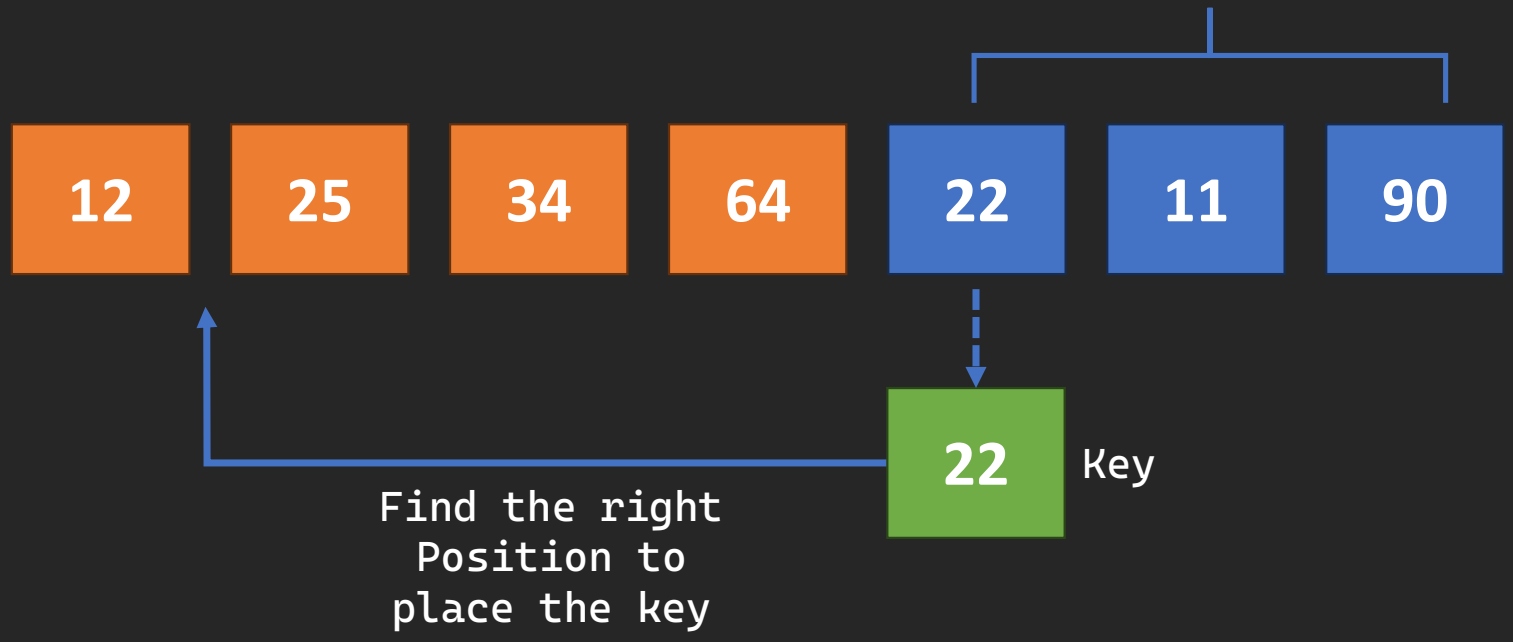

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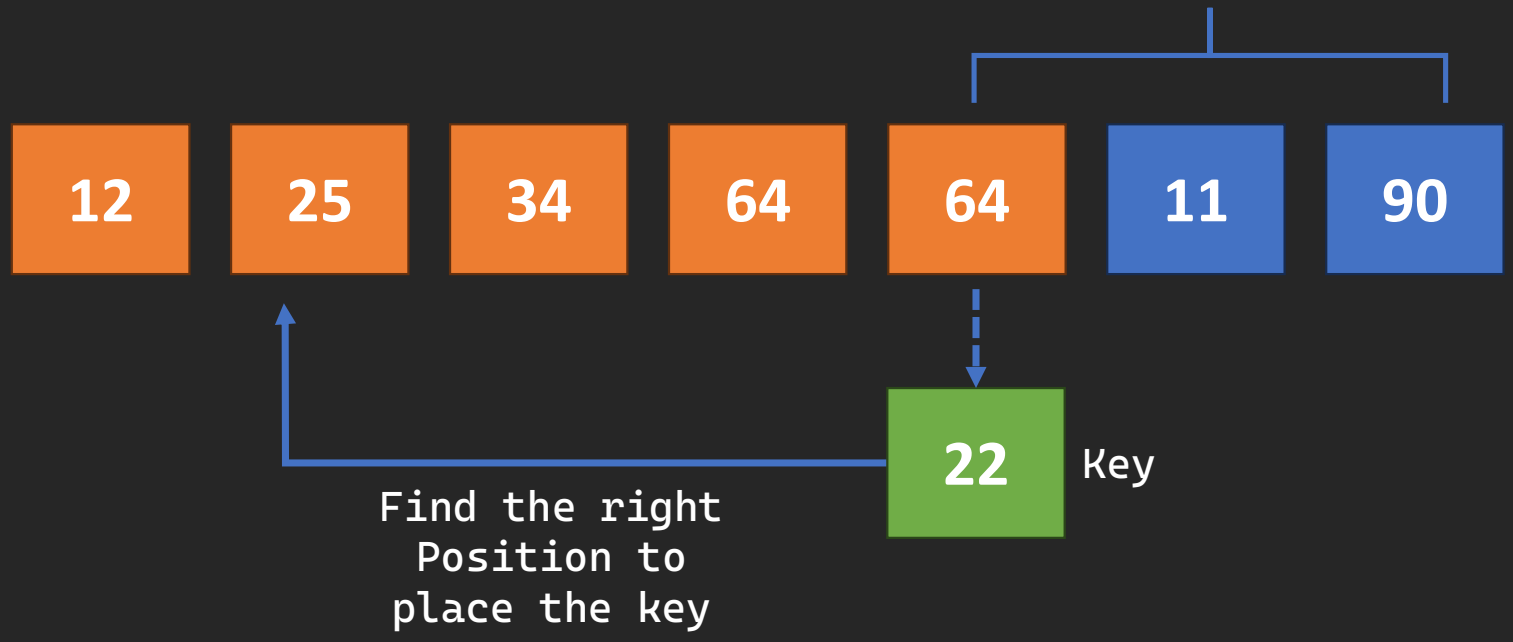

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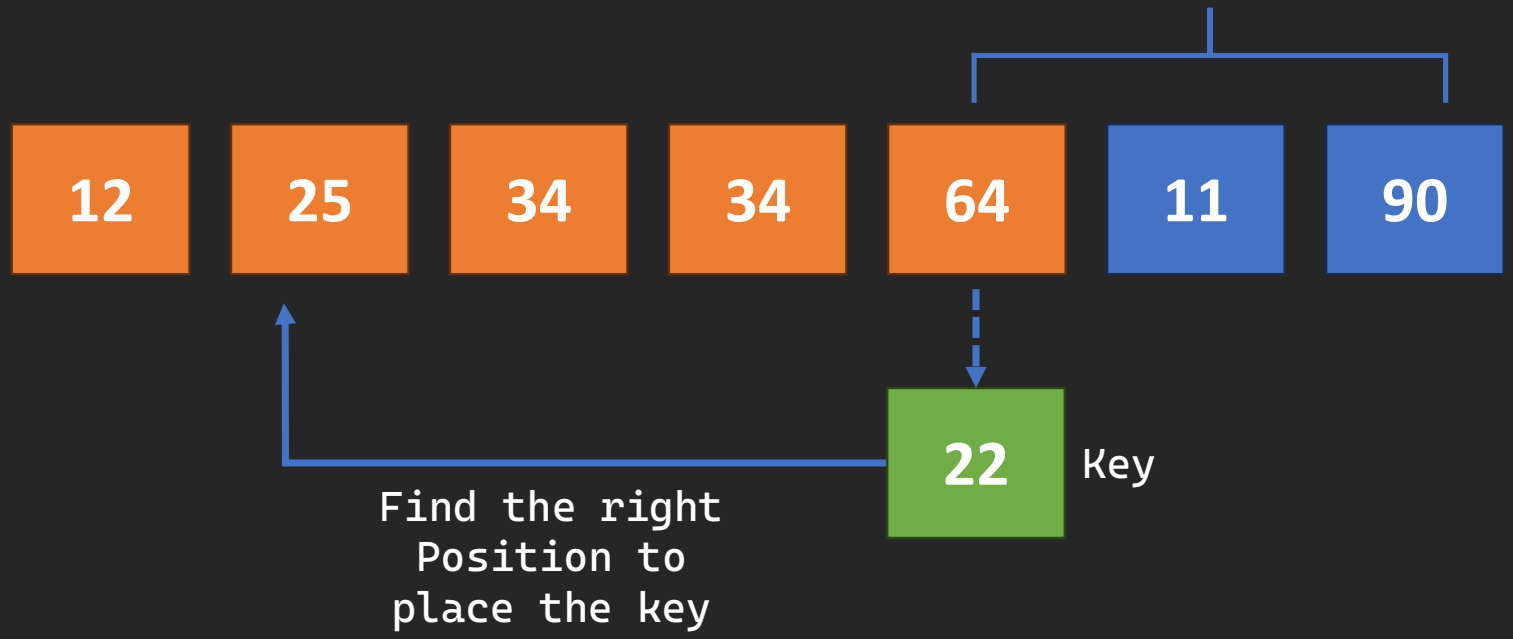

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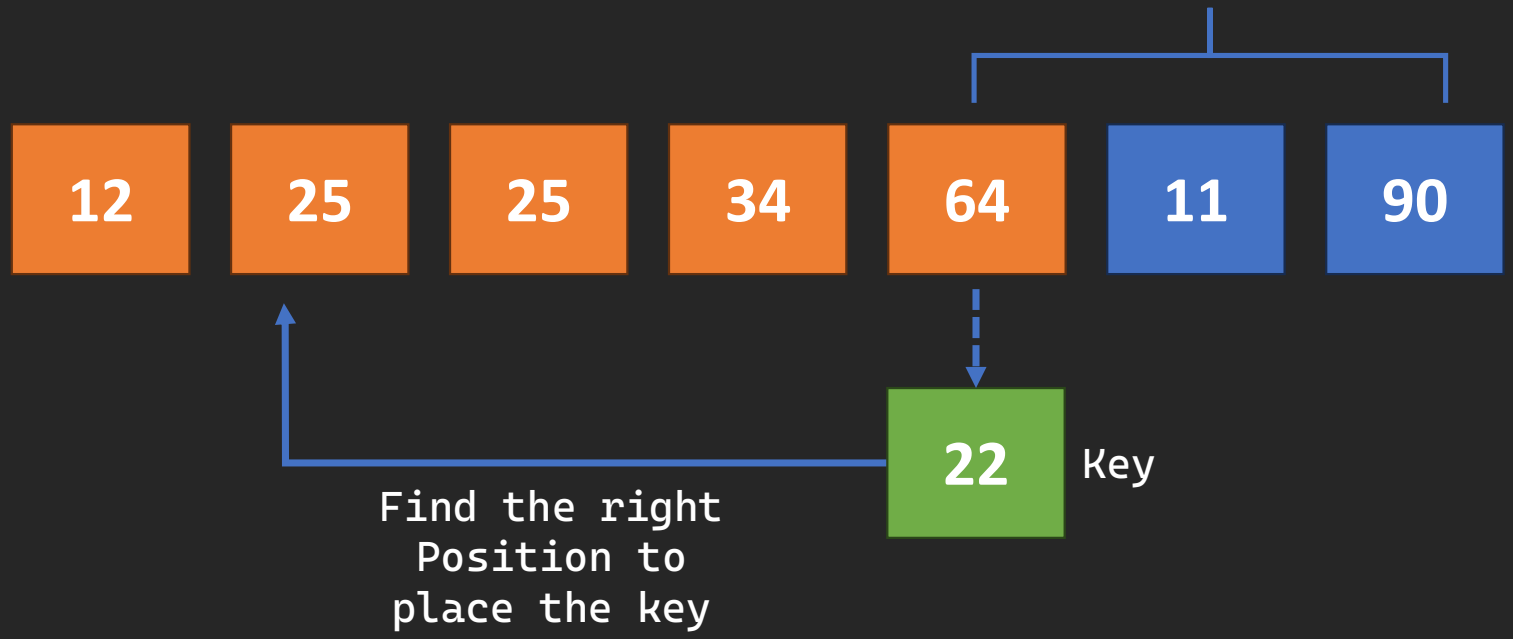

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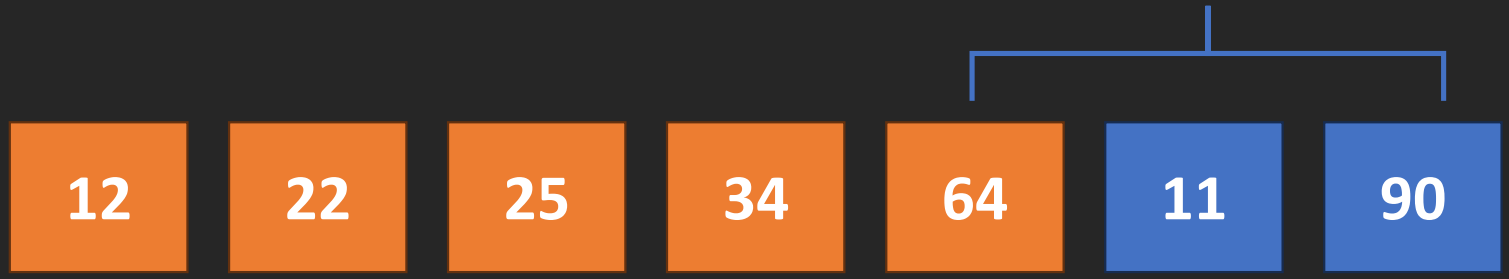

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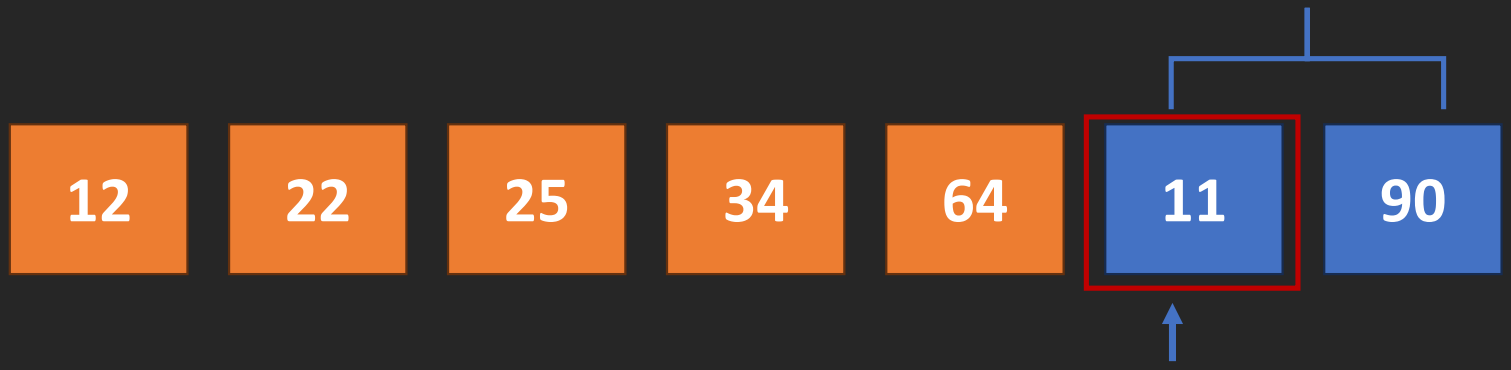

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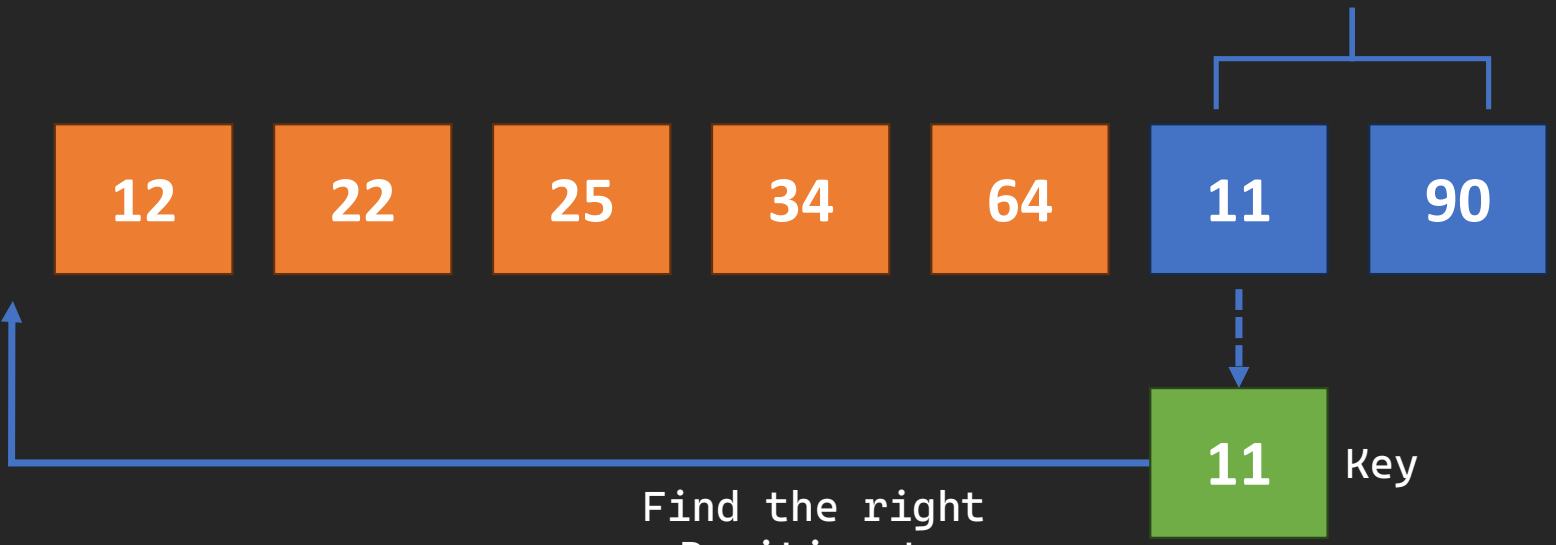

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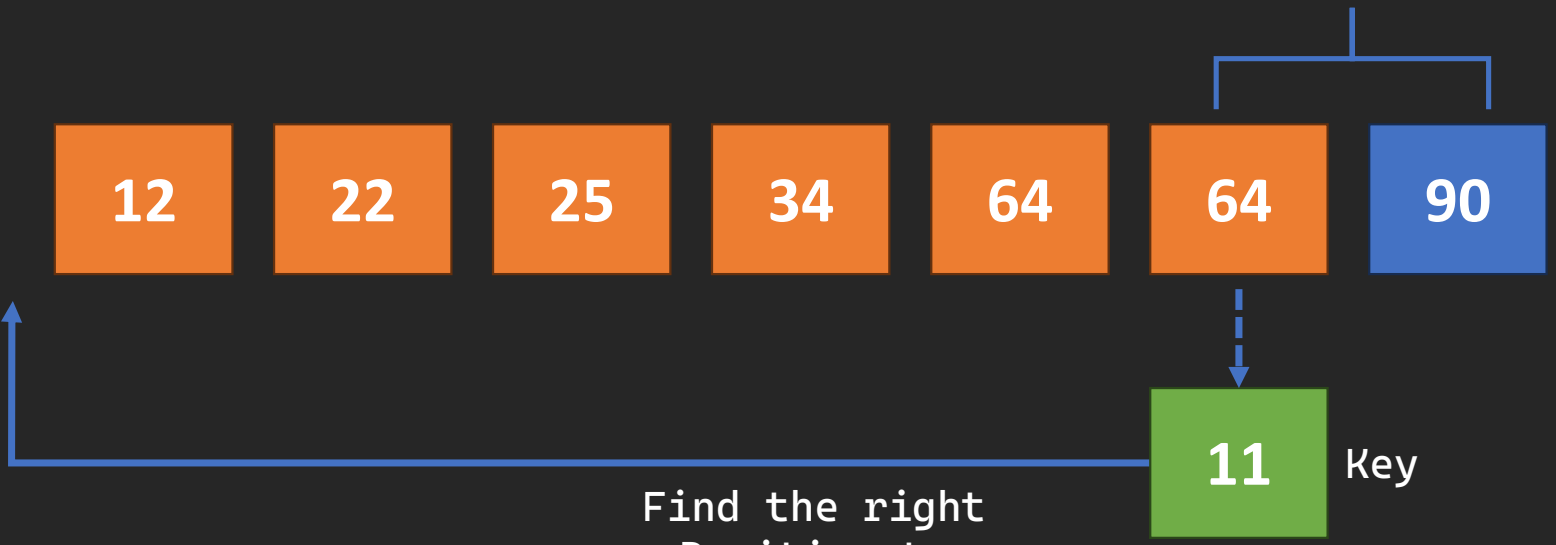

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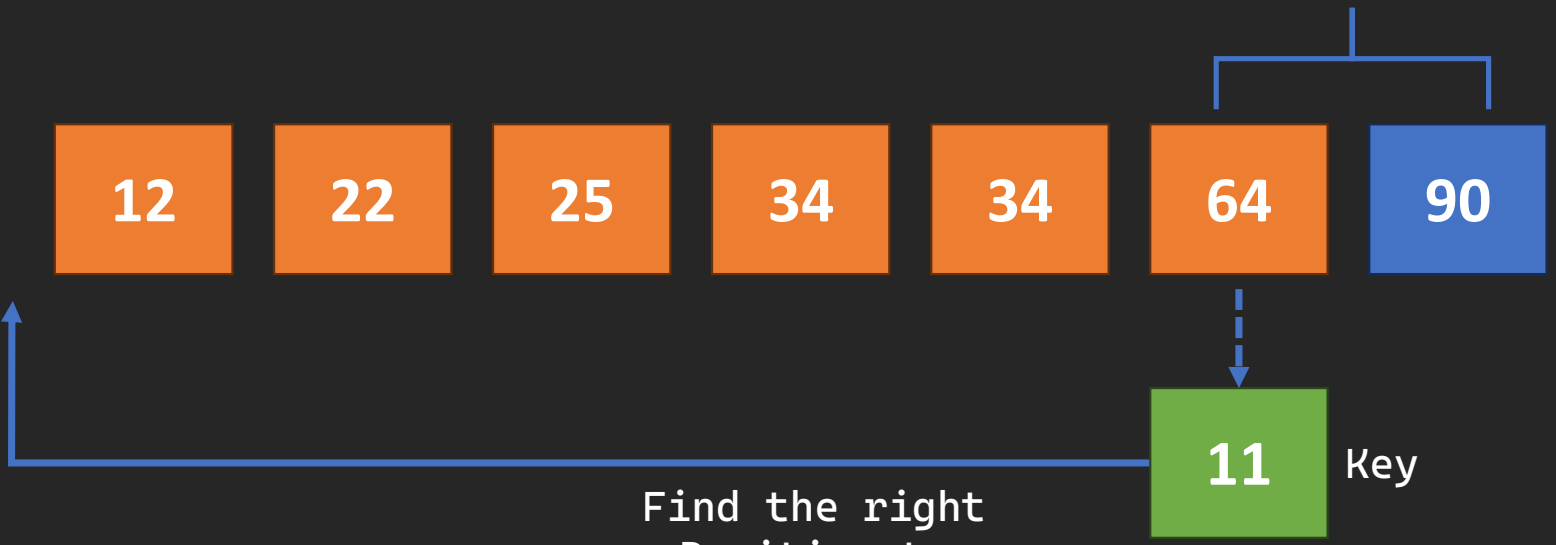

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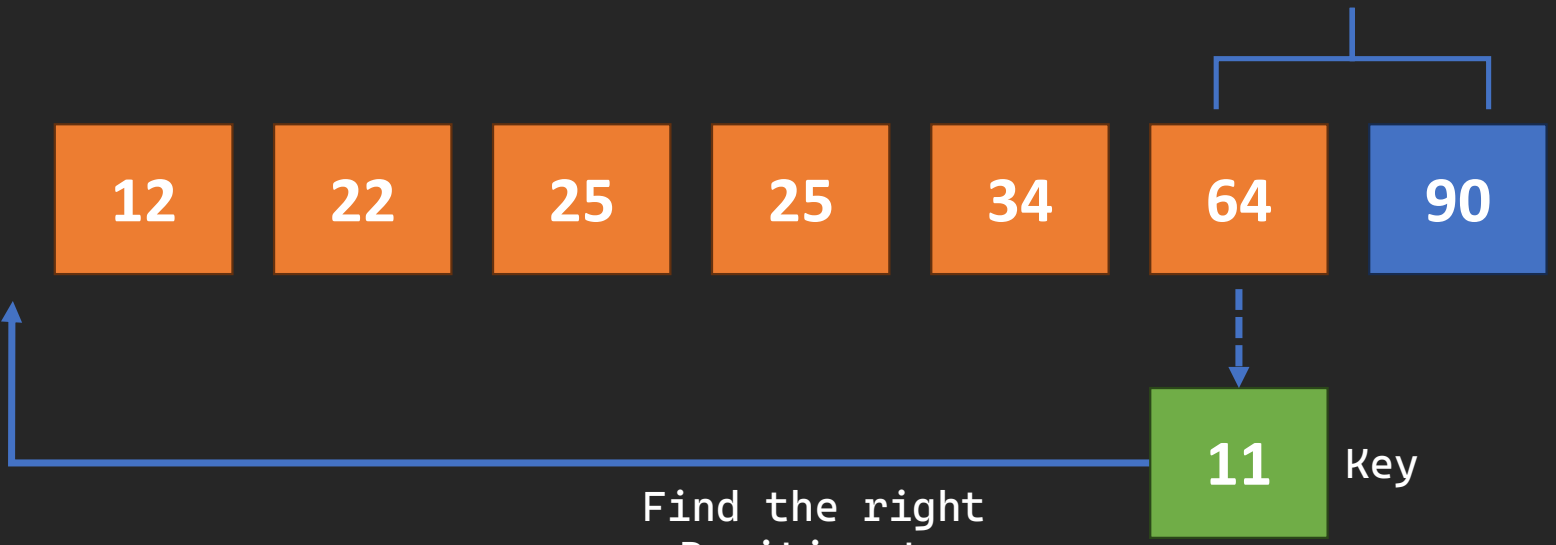

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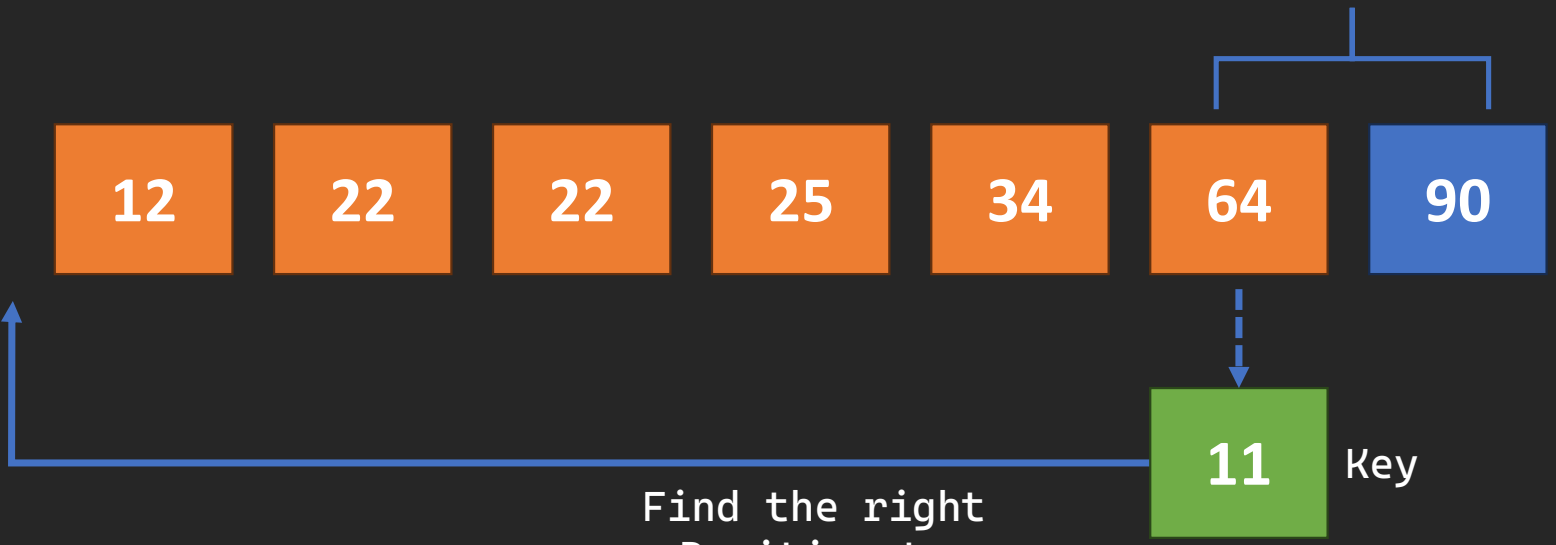

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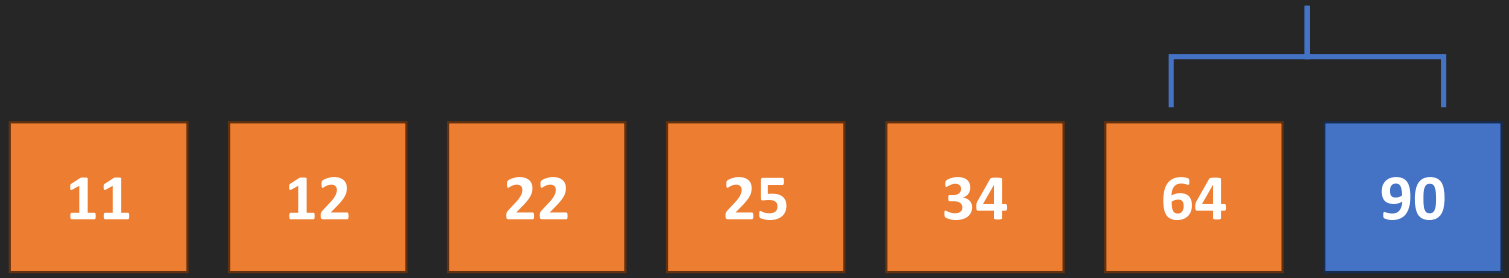

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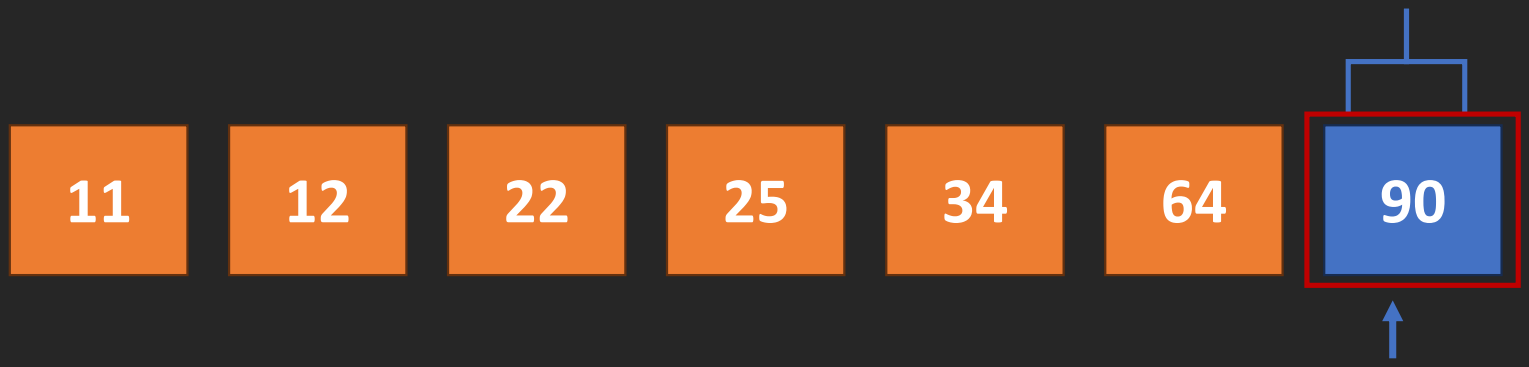

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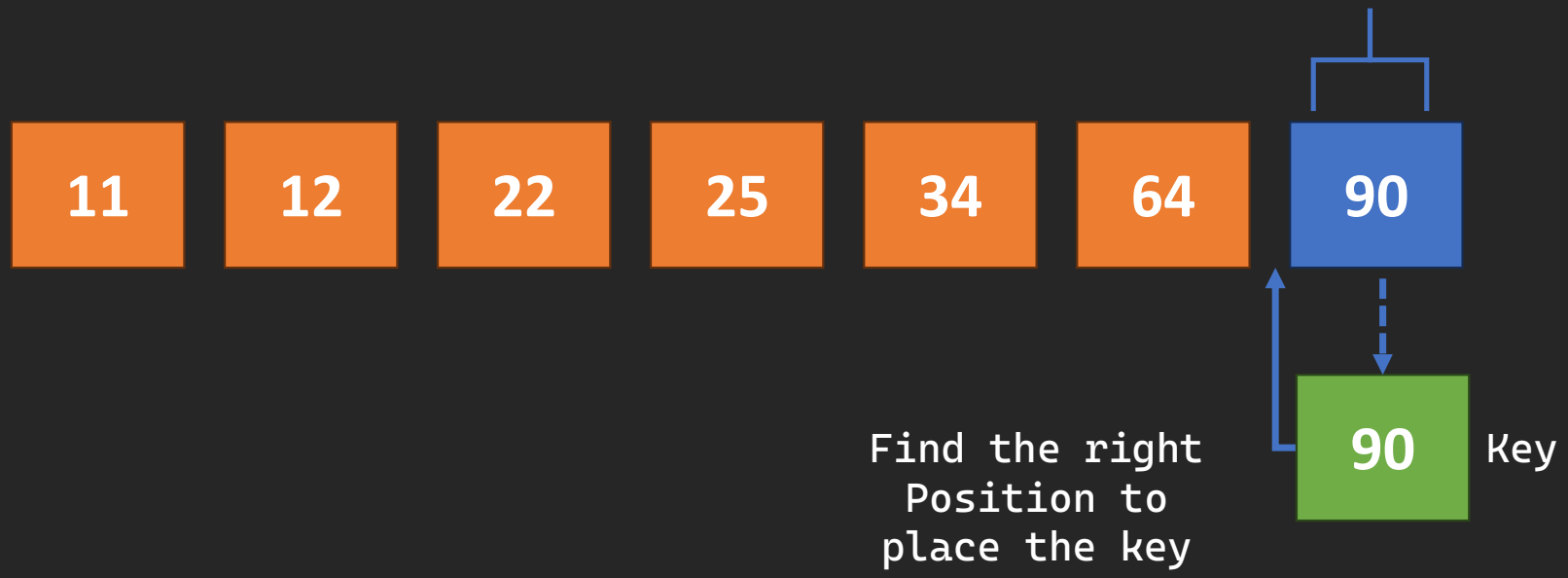

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Done: Array is sorted ☺

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Sorted Segment

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What is Insertion Sort?

- Insertion Sort is a simple and efficient comparison-based sorting algorithm.
- Sorts the array by shifting elements one by one.
- It builds the final sorted array (or list) one item at a time.
- The algorithm iterates through the input elements and removes one element in each iteration, finds the location it belongs to in the already sorted section of the array, and inserts it there. This process repeats until no unsorted elements remain.

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Complexity of Insertion Sort:

- Efficient for smaller dataset, but very inefficient for larger lists
- Better than Bubble and Selection sort.
- Performance: Like bubble sort, the average and worst-case time complexity is also O(n^2)
- However, in the best case (when the array is already sorted), its time complexity is O(n).

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Why Insertion Sort Can Be More Efficient:

- **Fewer Swaps**: Insertion sort generally performs fewer swaps compared to bubble sort, especially if the elements are nearly sorted. Each insertion operation can move an element directly to its position, whereas bubble sort swaps adjacent elements, which can be less efficient.
- **Adaptive**: Insertion sort is adaptive, meaning its efficiency increases if the input list is partially or nearly sorted. It can achieve linear time complexity on an almost sorted list.
- **Better Best Case**: The best-case time complexity of insertion sort is O(n), which is significantly better than the best case of bubble sort, which is also O(n^2) in its traditional implementation.

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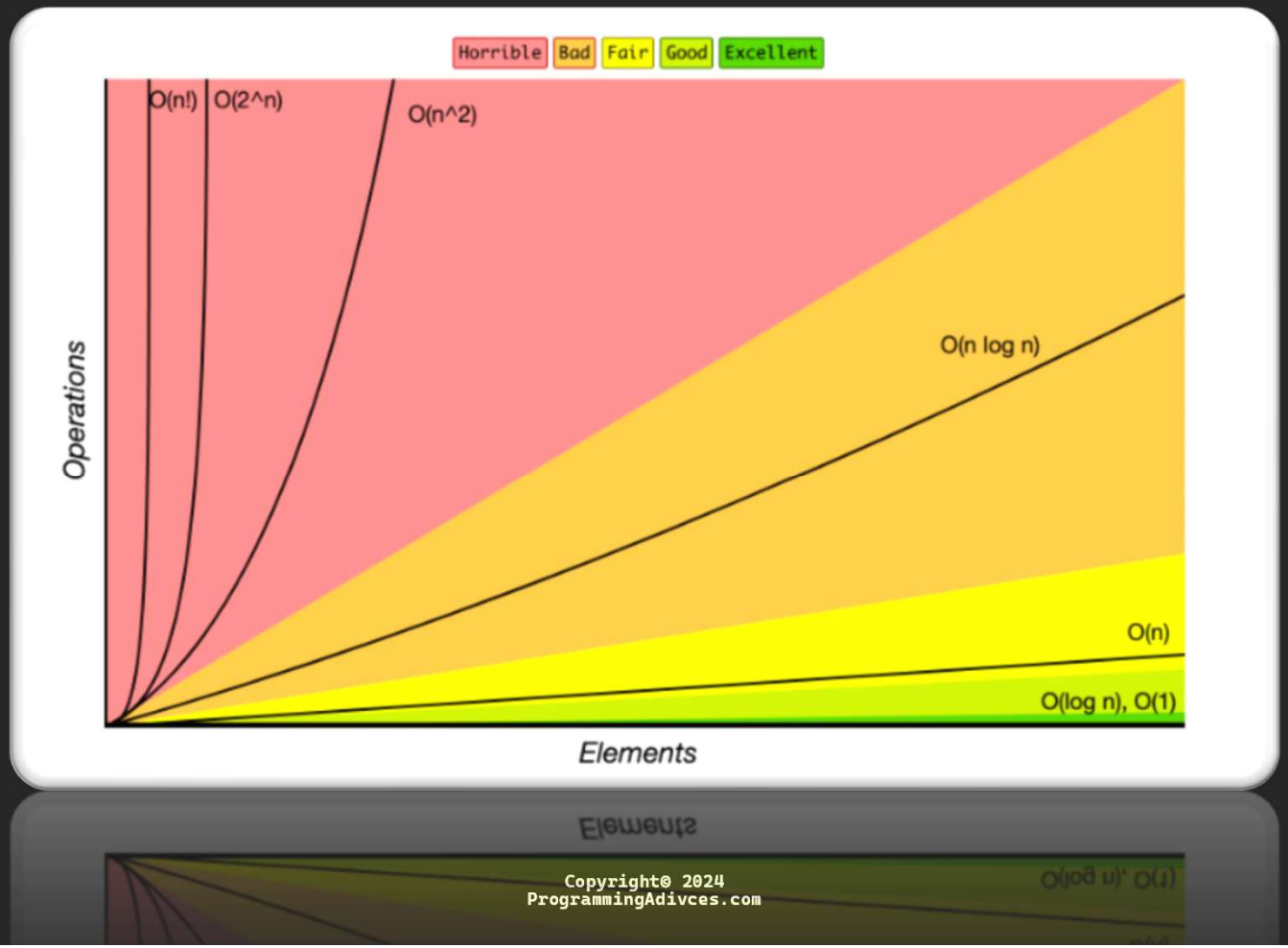
Insertion Sort is O(N^2)



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