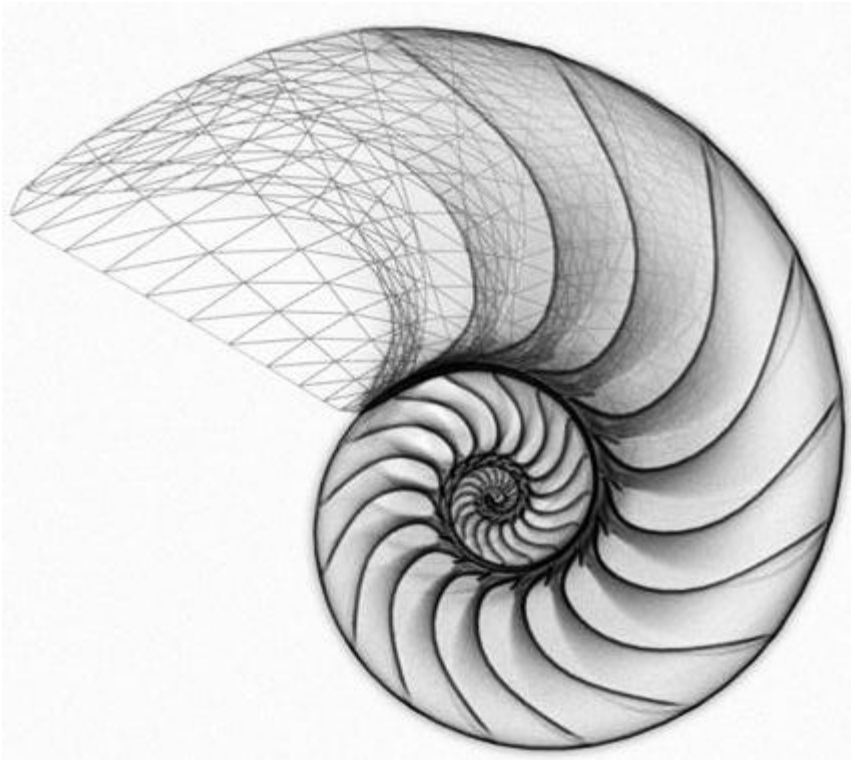


Lecture 09

Insertion Sort

- **Insertion sort is a simple sorting algorithm that works similar to the way you sort playing cards in your hands.**

- **The array is virtually split into a sorted and an unsorted part.**

- **Values from the unsorted part are picked and placed at the correct position in the sorted part.**

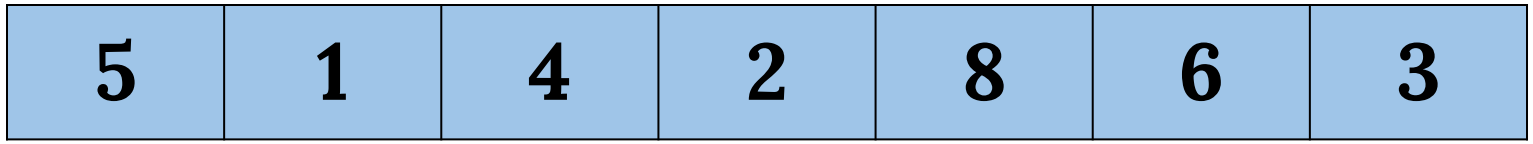
0 1 2 3 4

Insertion Sort

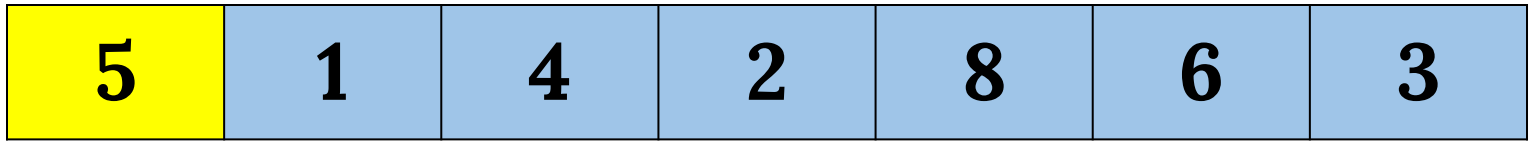
Characteristics of Insertion Sort:

- **This algorithm is one of the simplest algorithm with simple implementation**
- **Basically, Insertion sort is efficient for small data values**
- **Insertion sort is adaptive in nature, i.e. it is appropriate for data sets which are already partially sorted**

Insertion Sort



Insertion Sort



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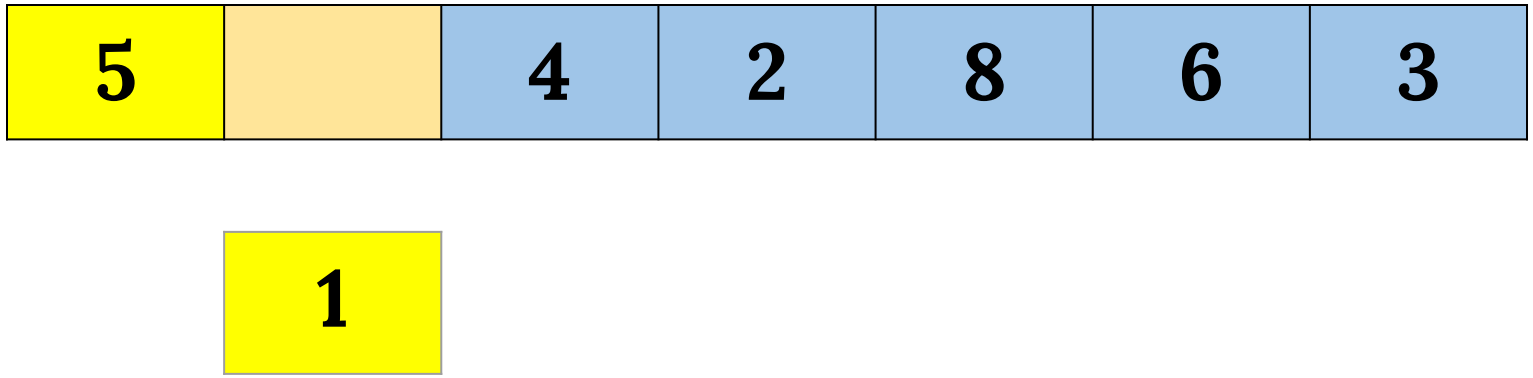
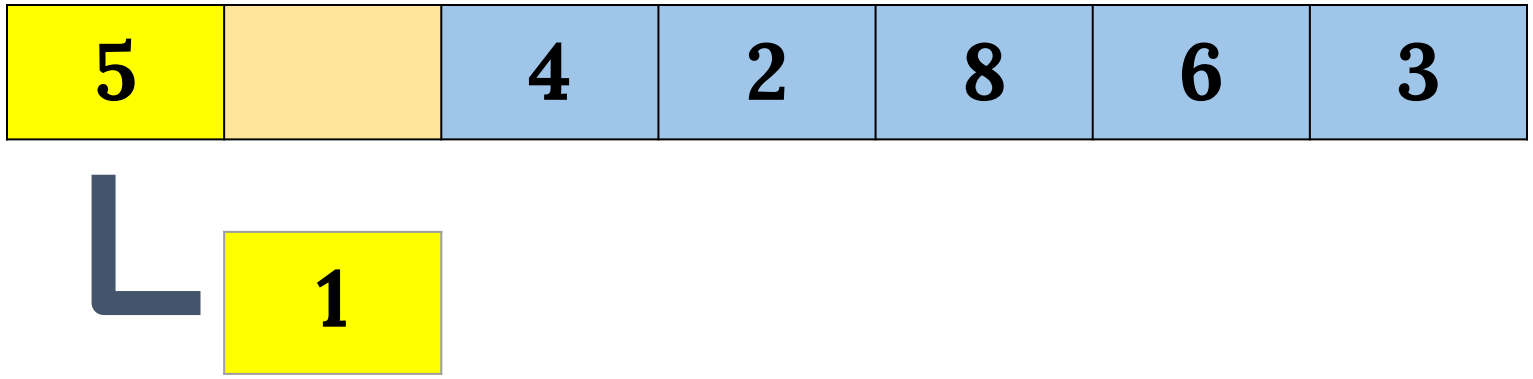


Insertion Sort



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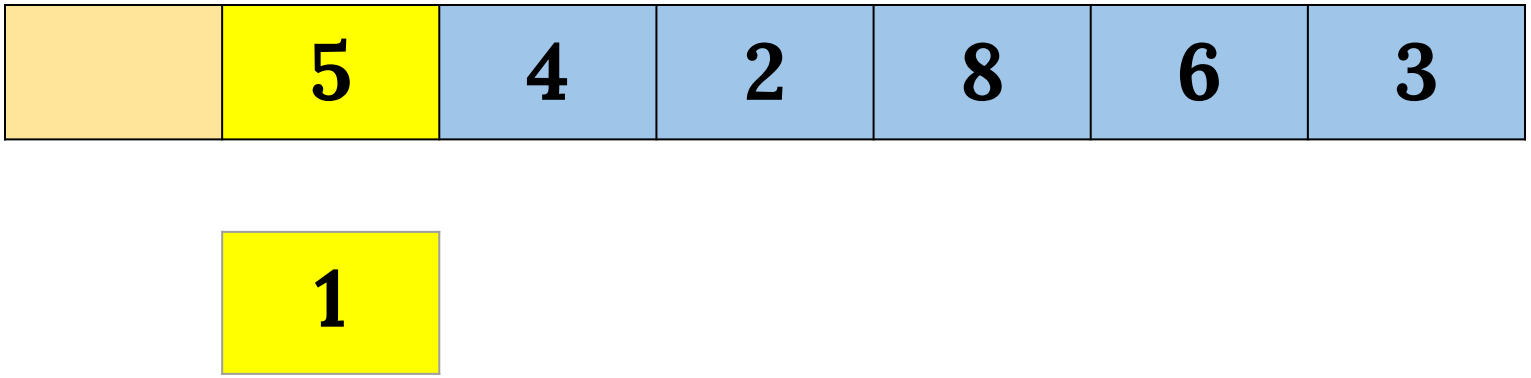
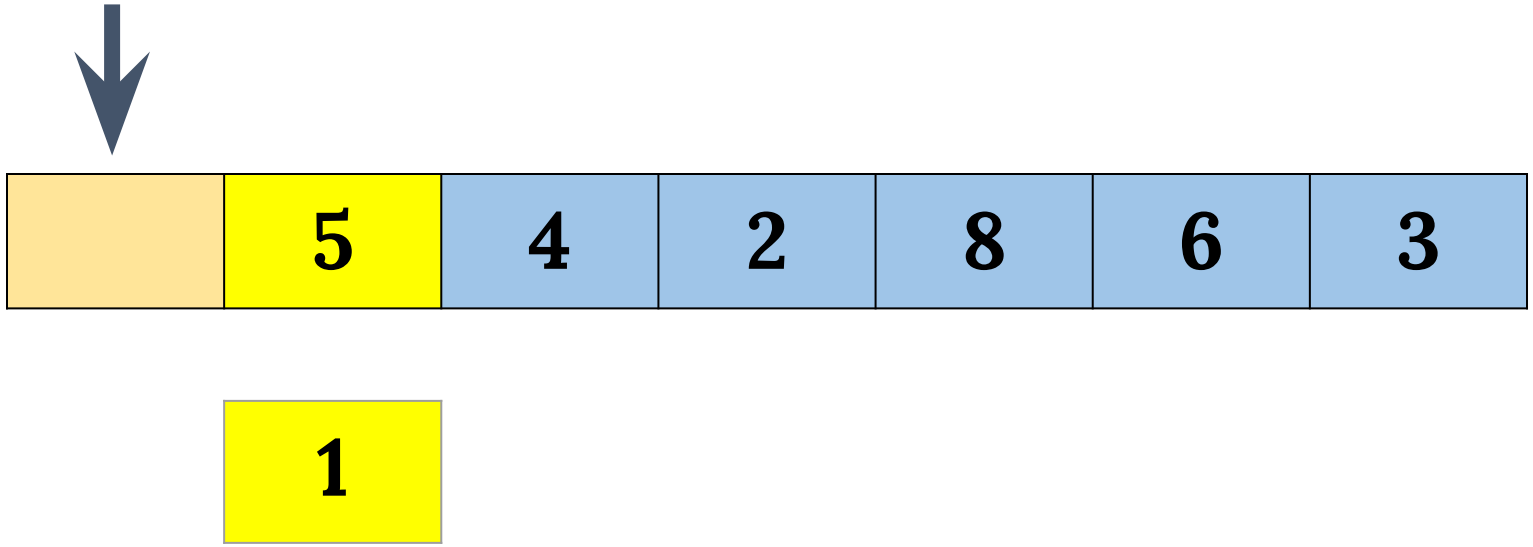


Insertion Sort



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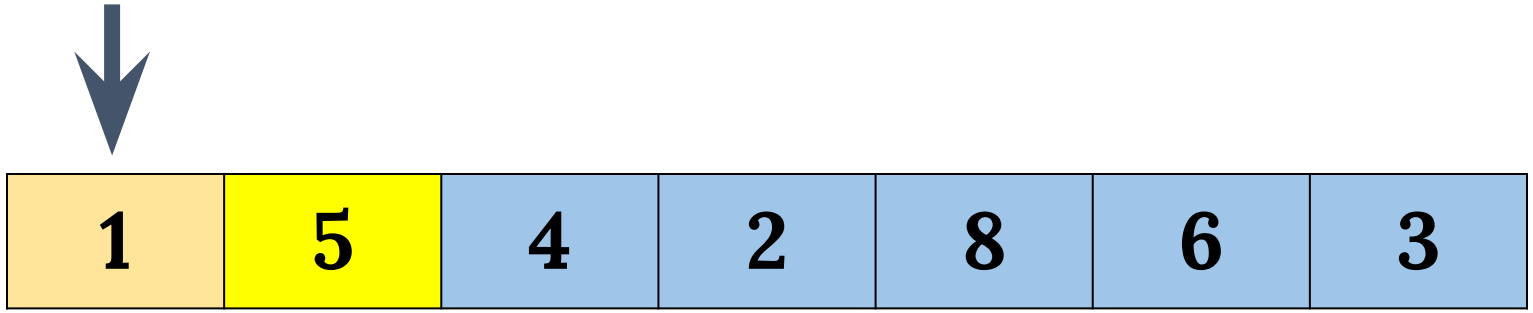

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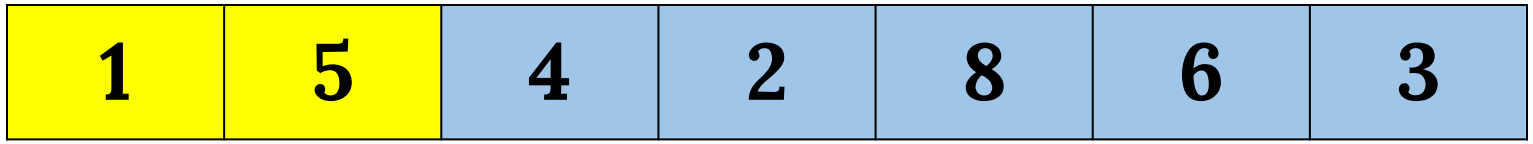

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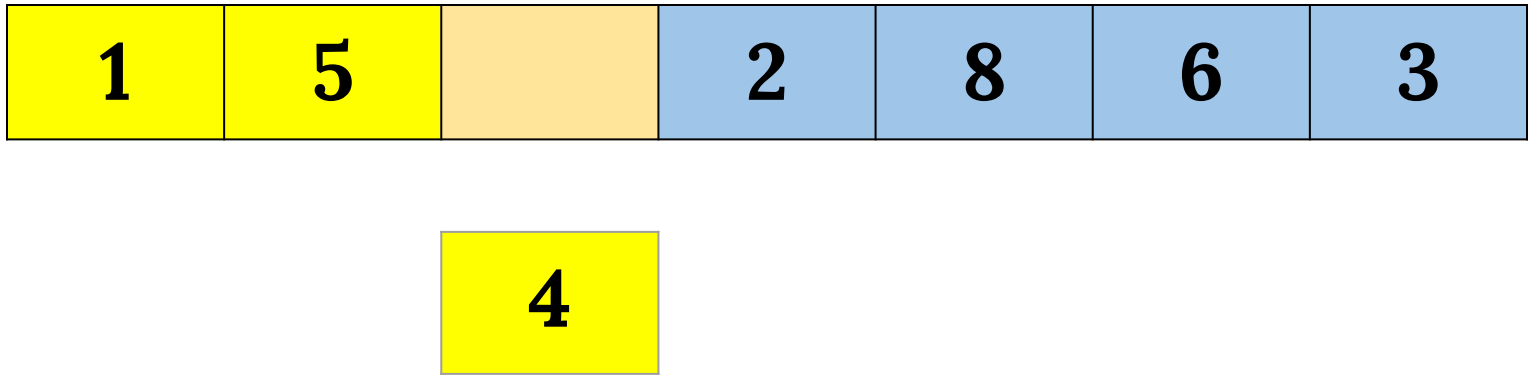

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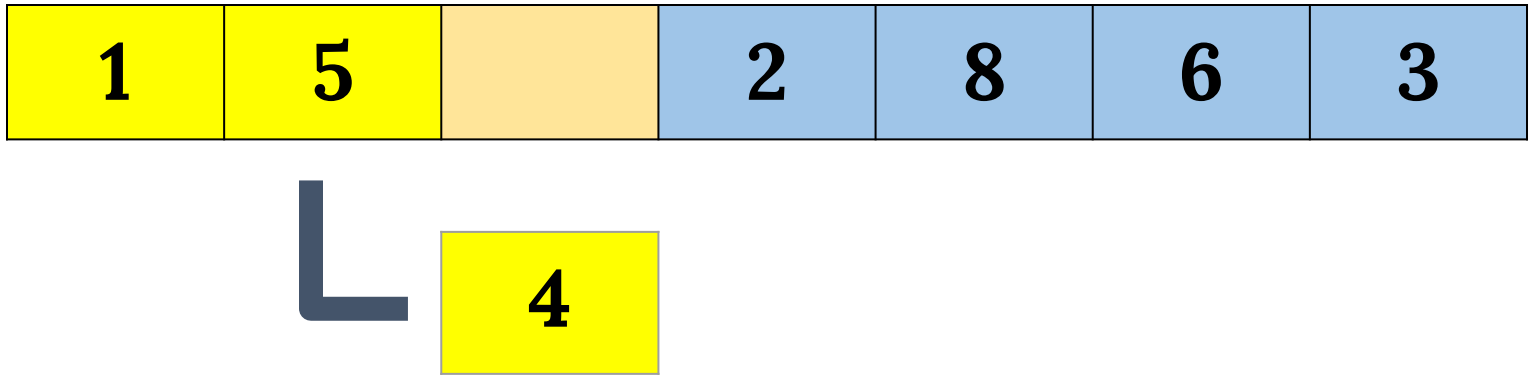

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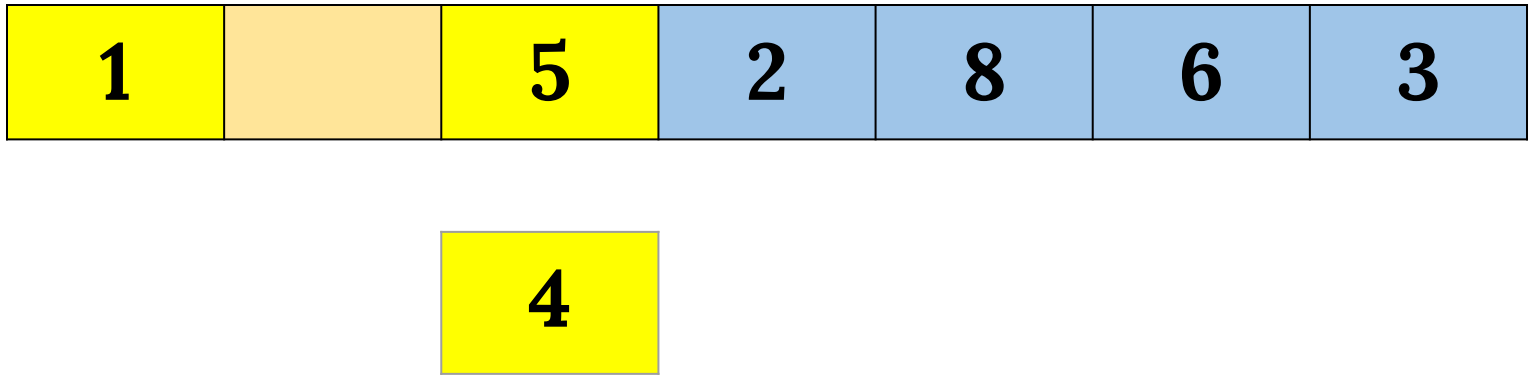

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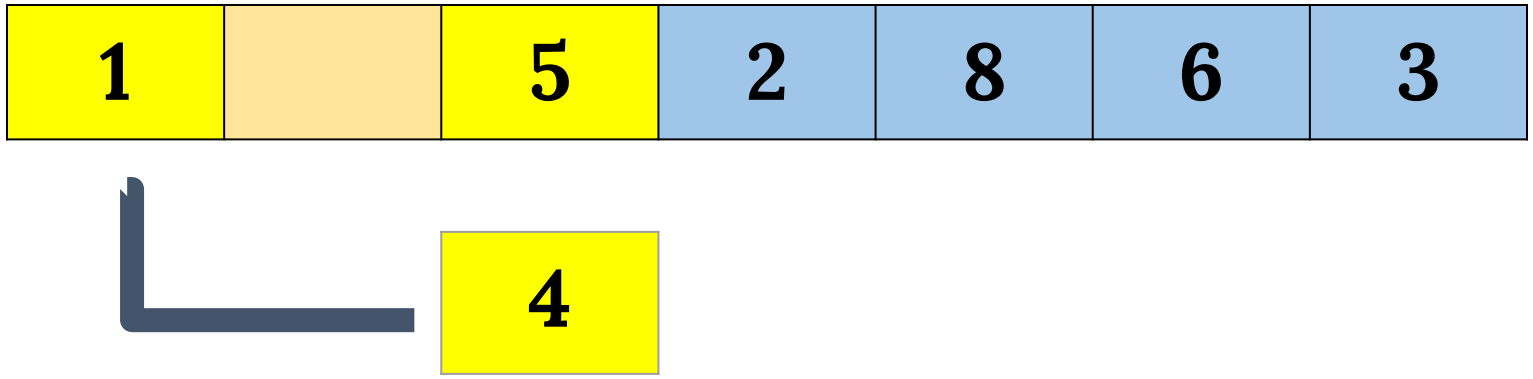

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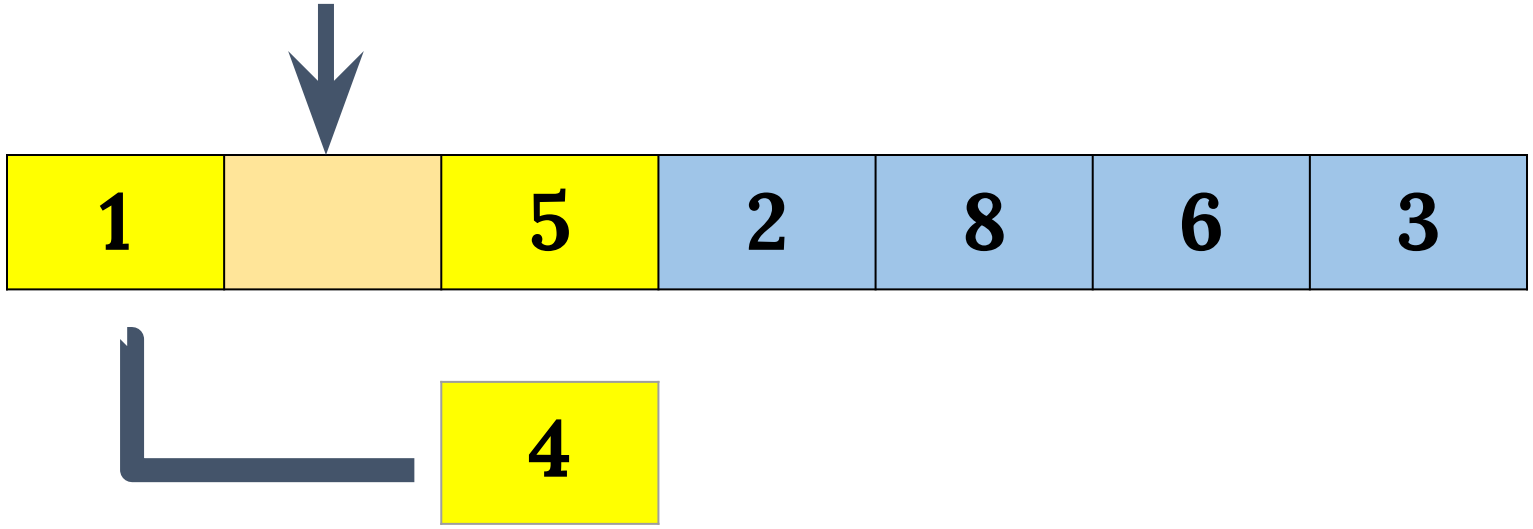

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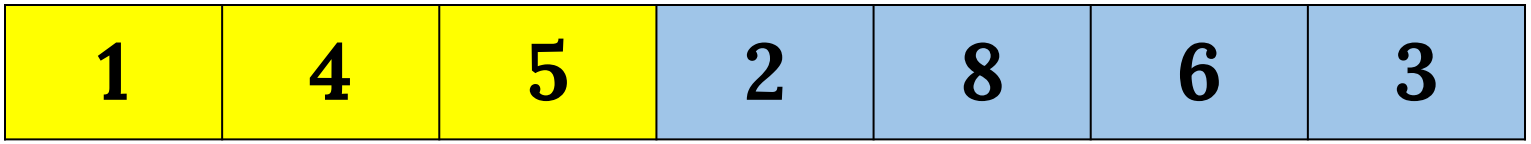

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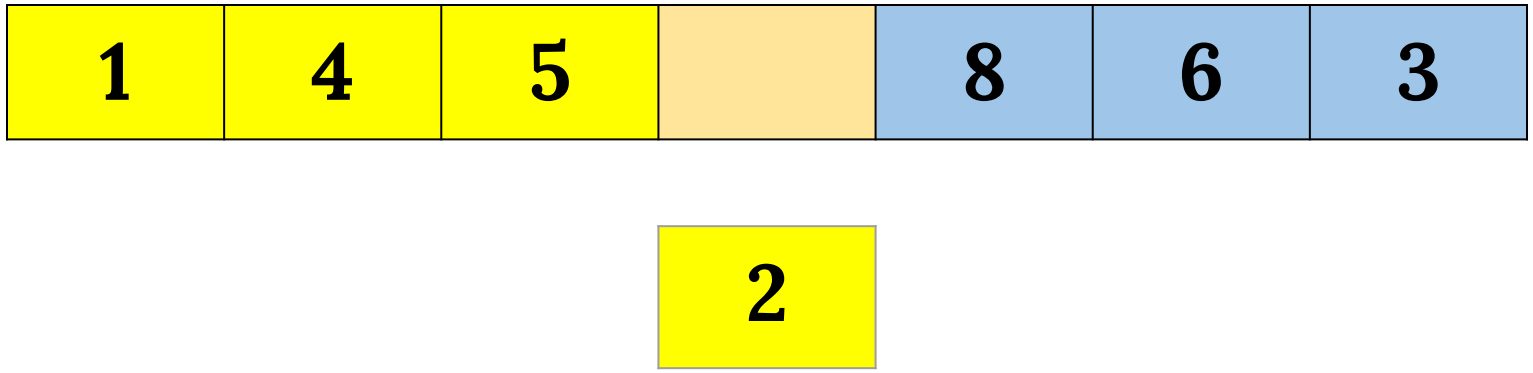

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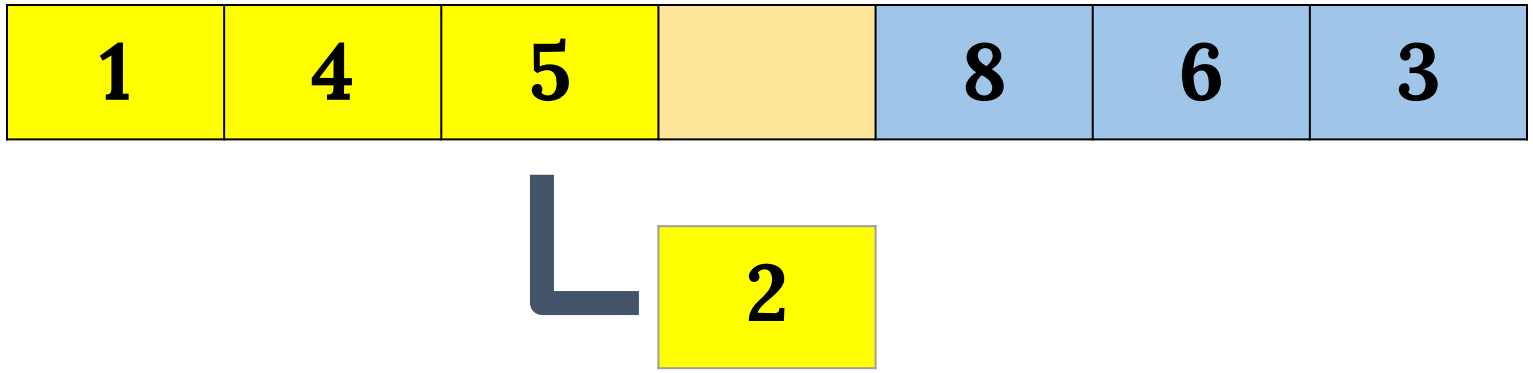

Insertion Sort

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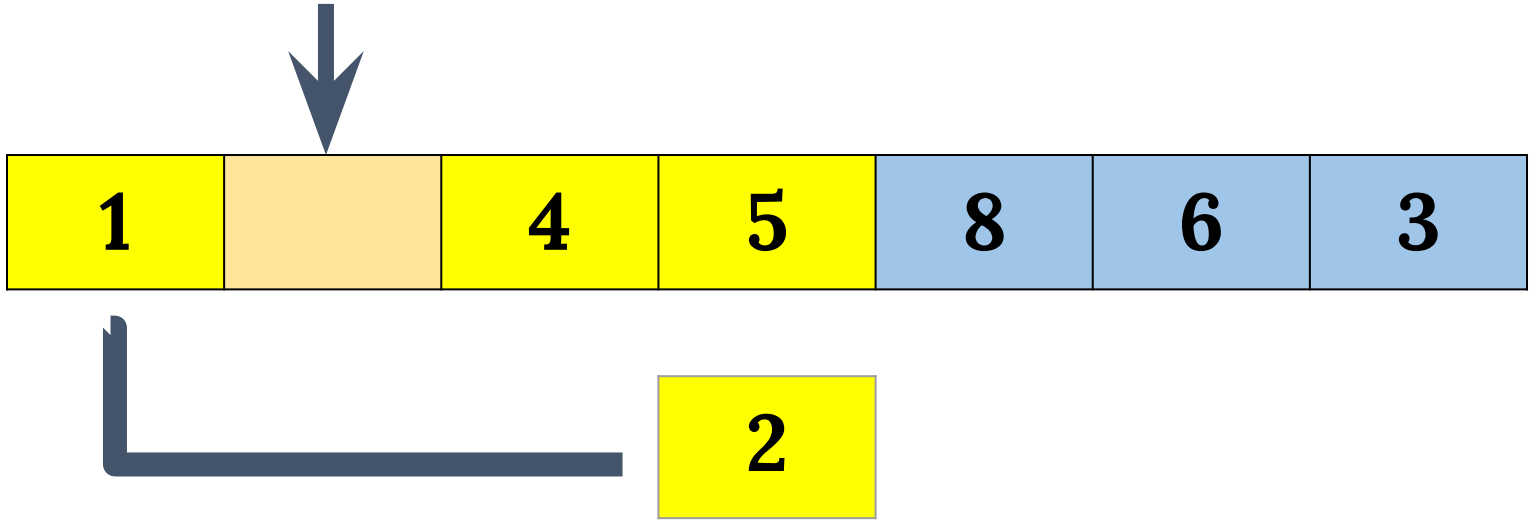

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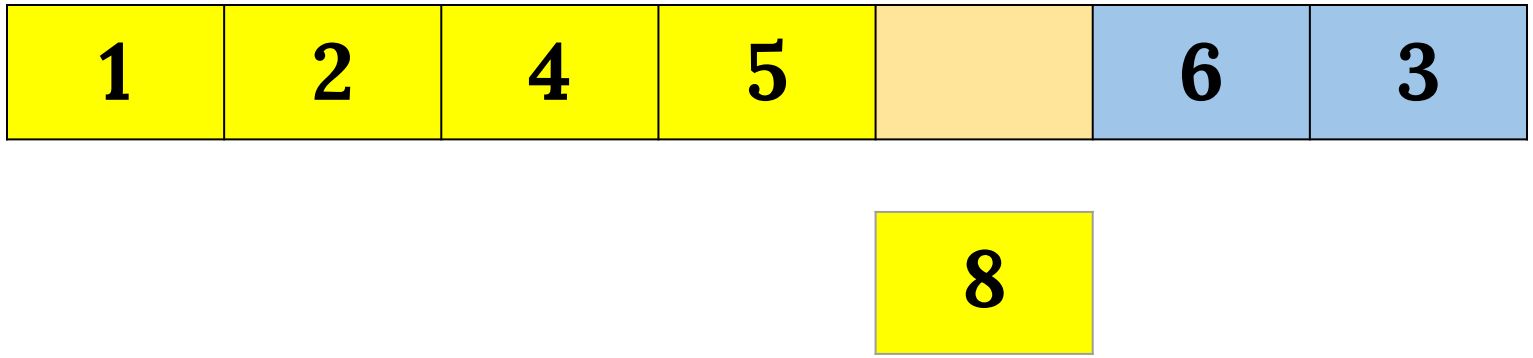

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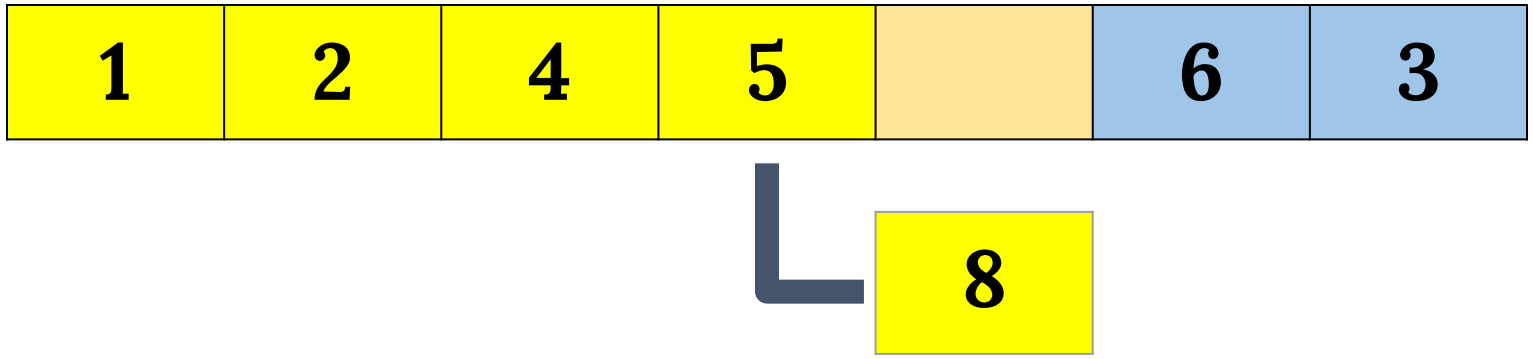

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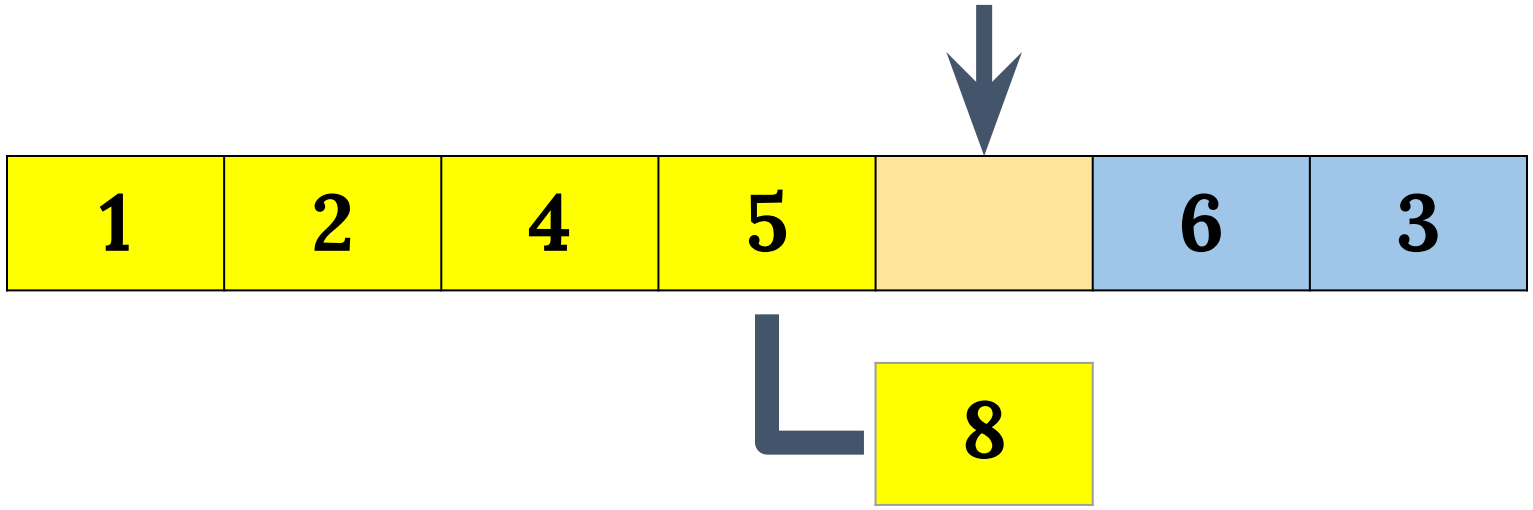

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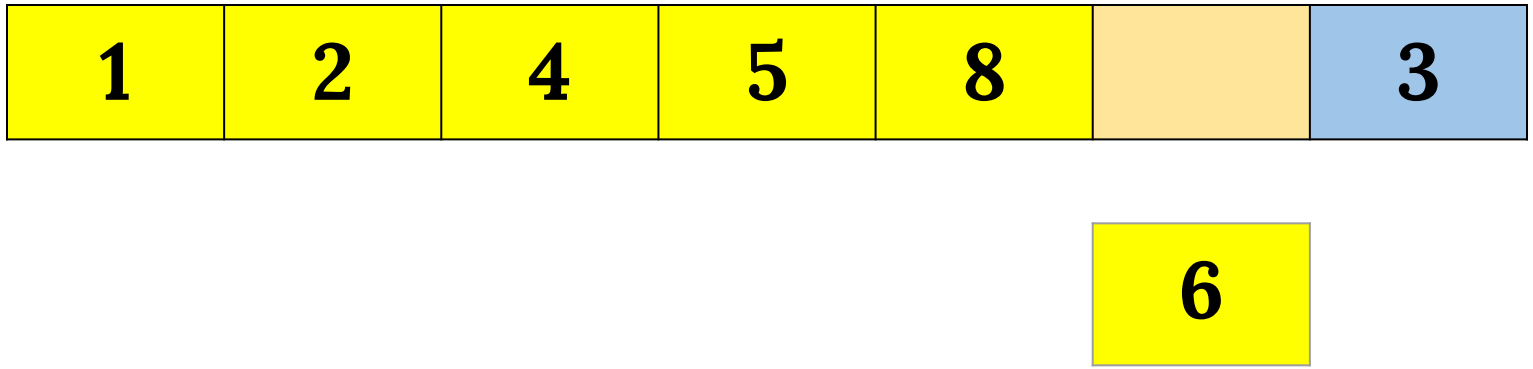

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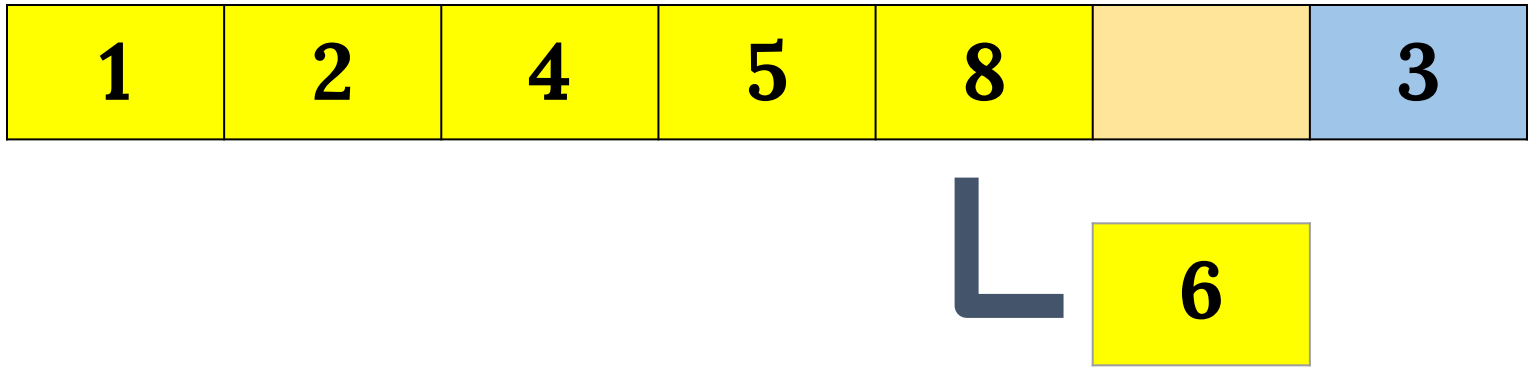

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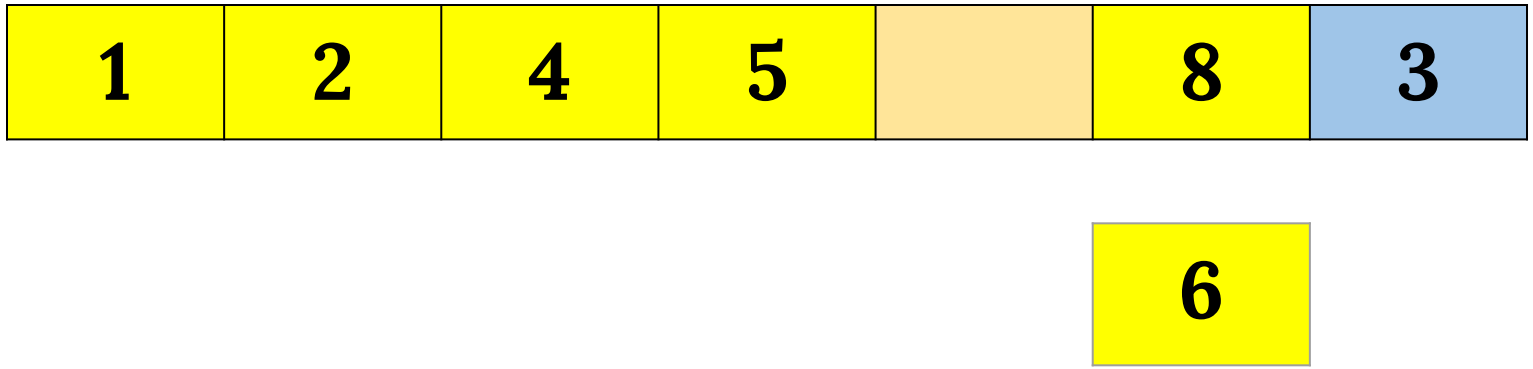

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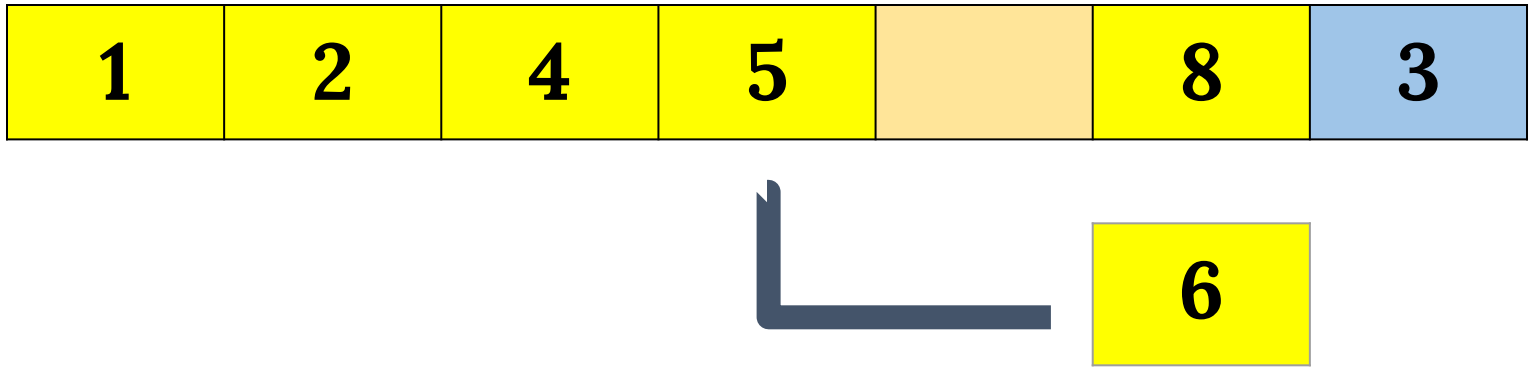

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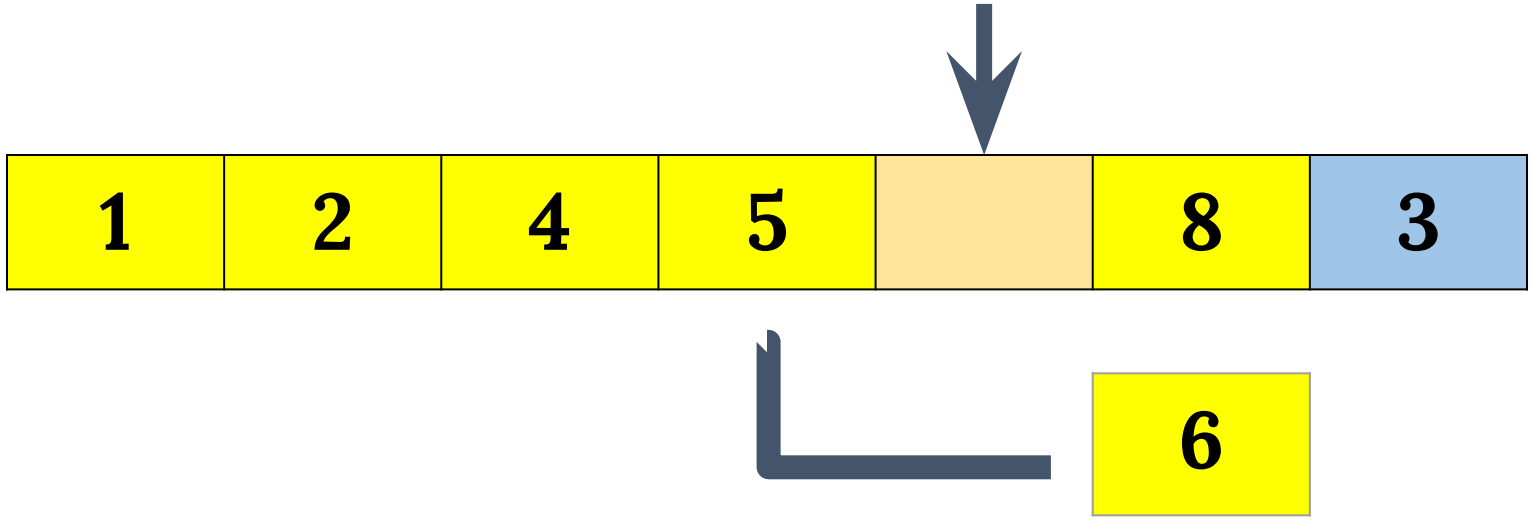

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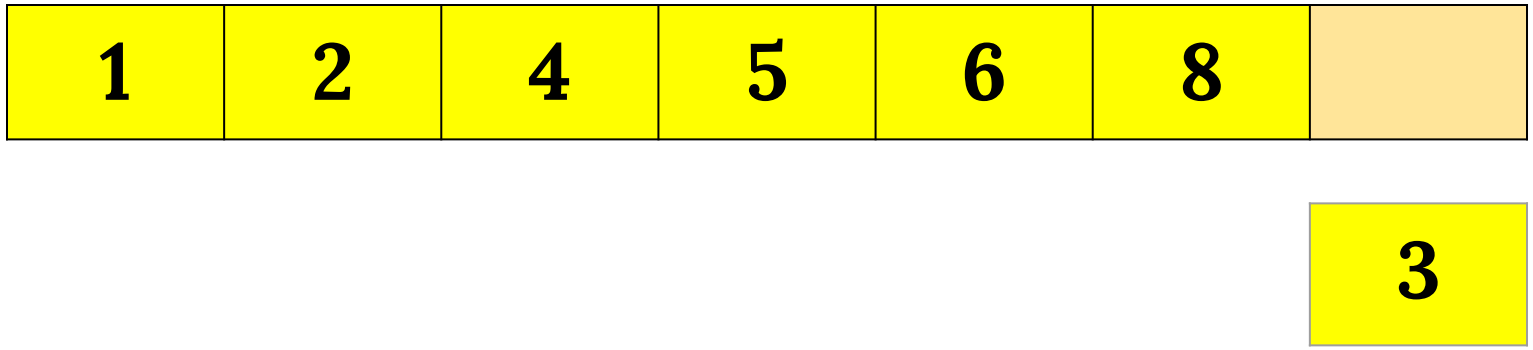

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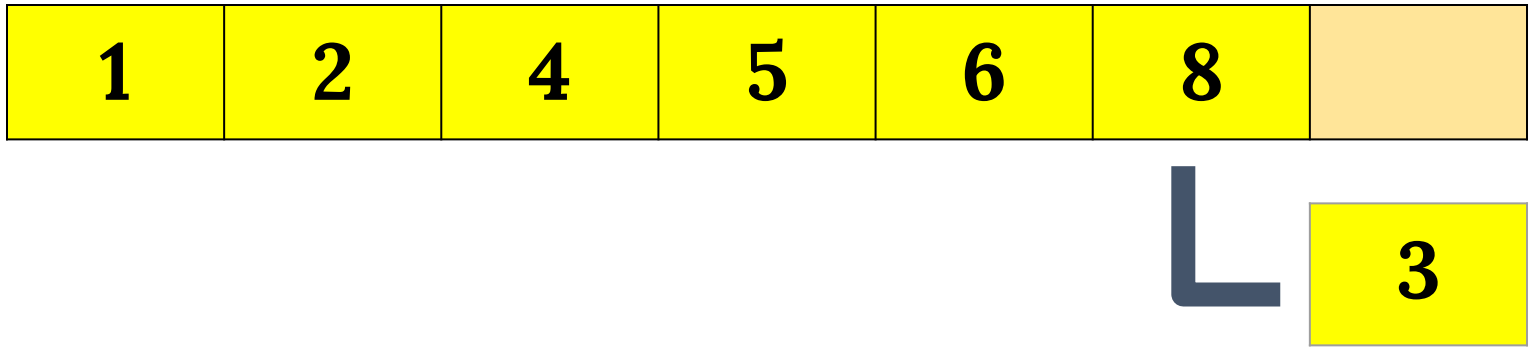

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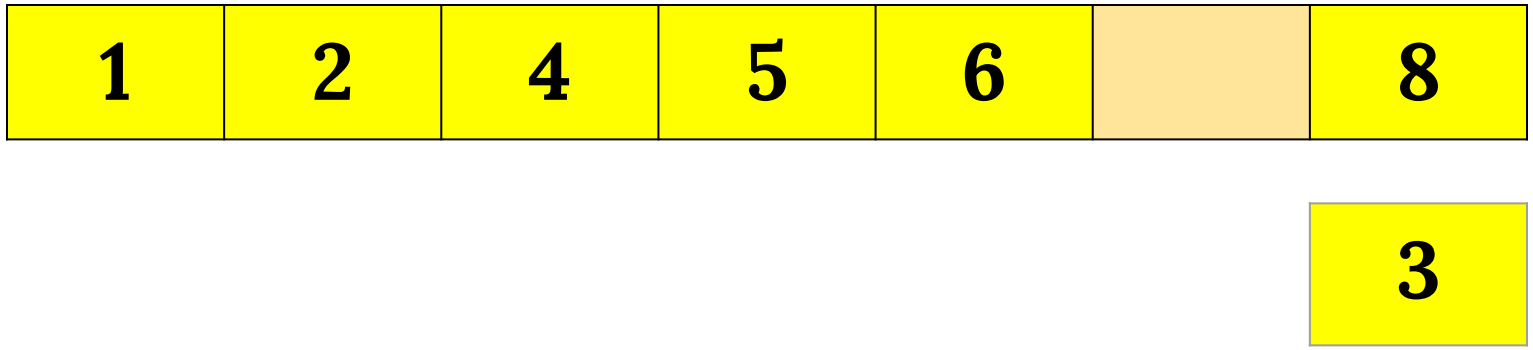

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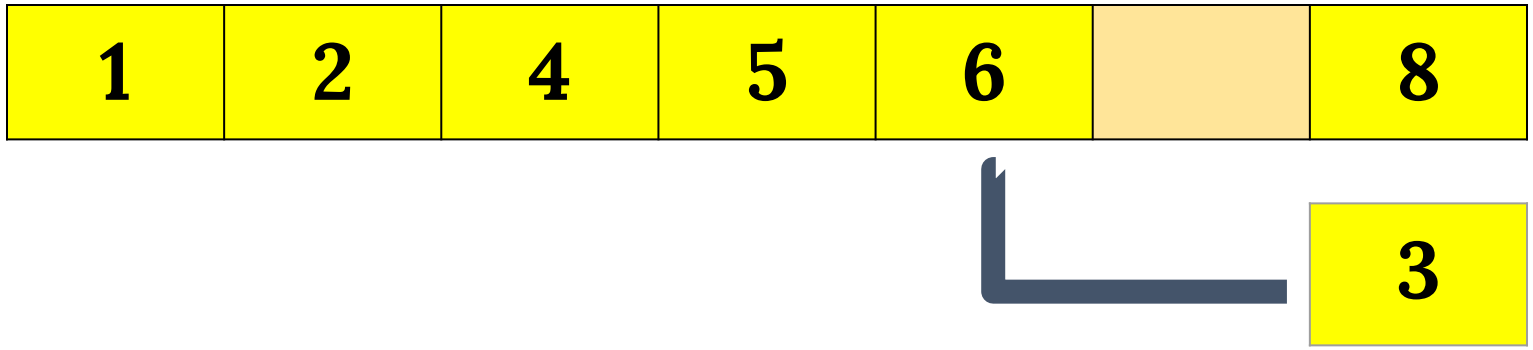

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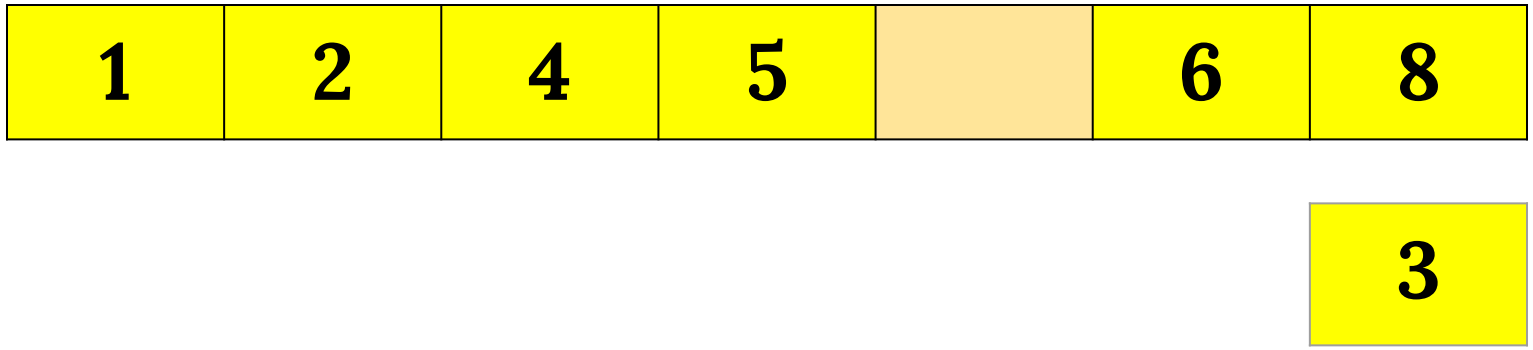

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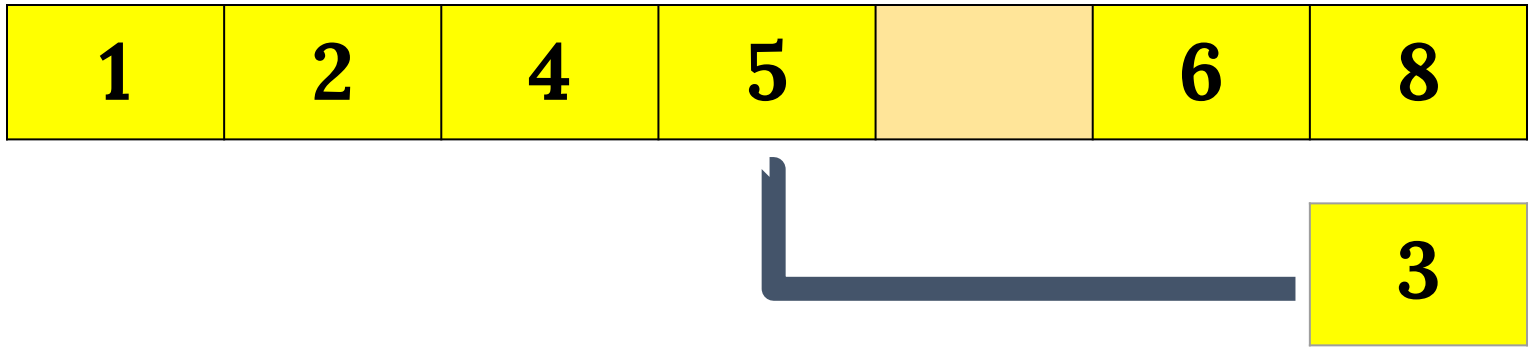

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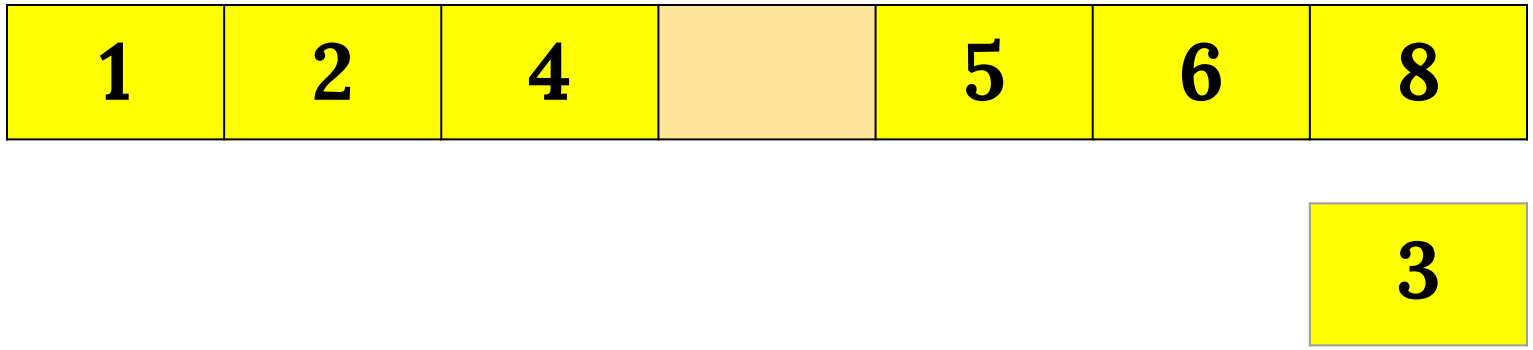

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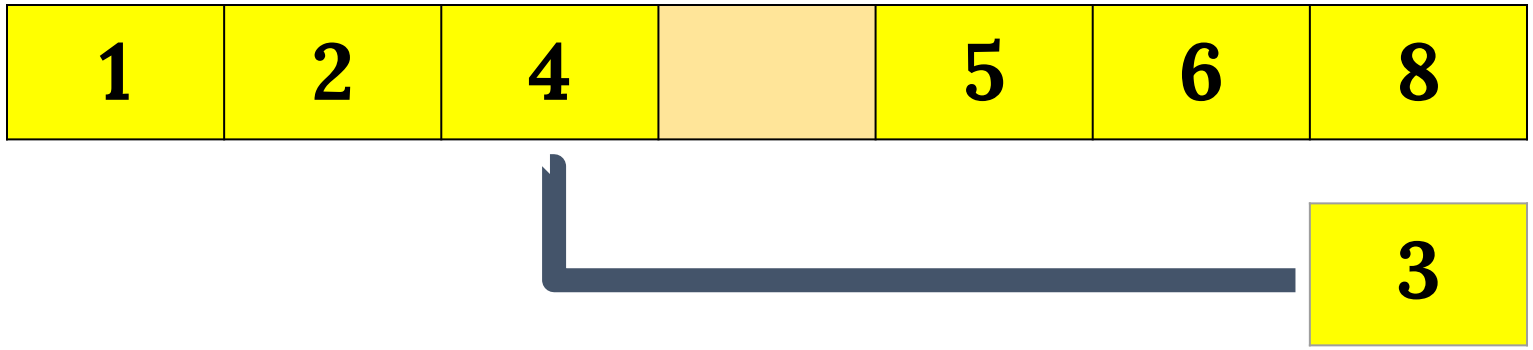

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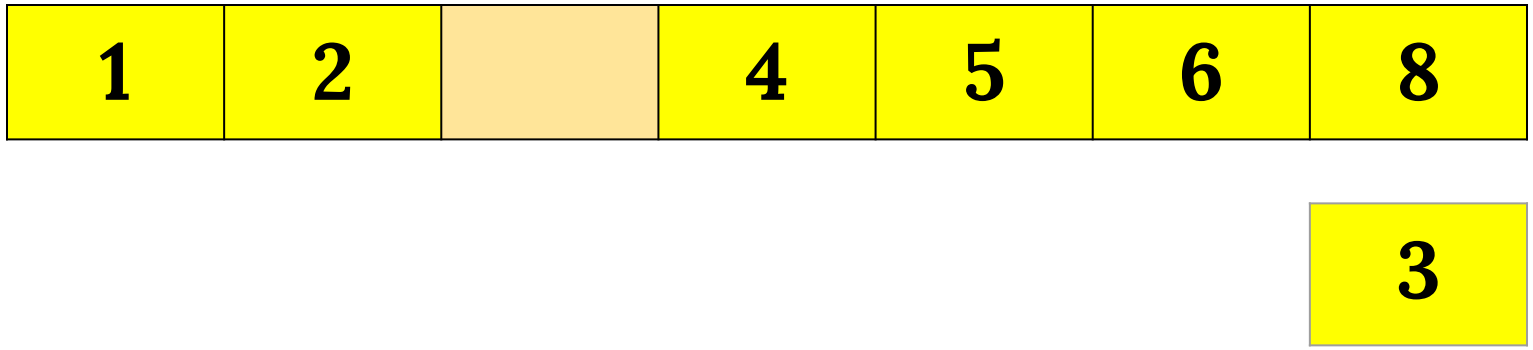

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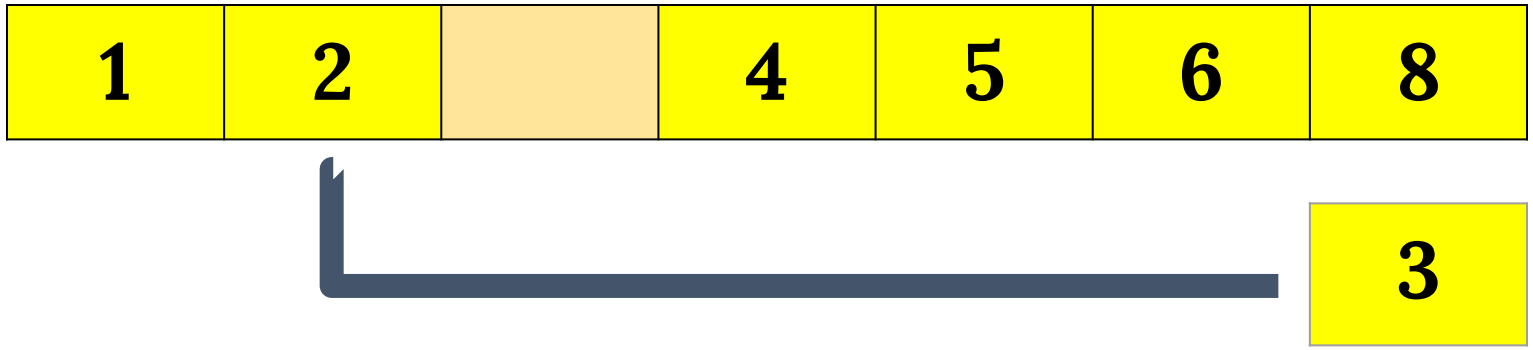

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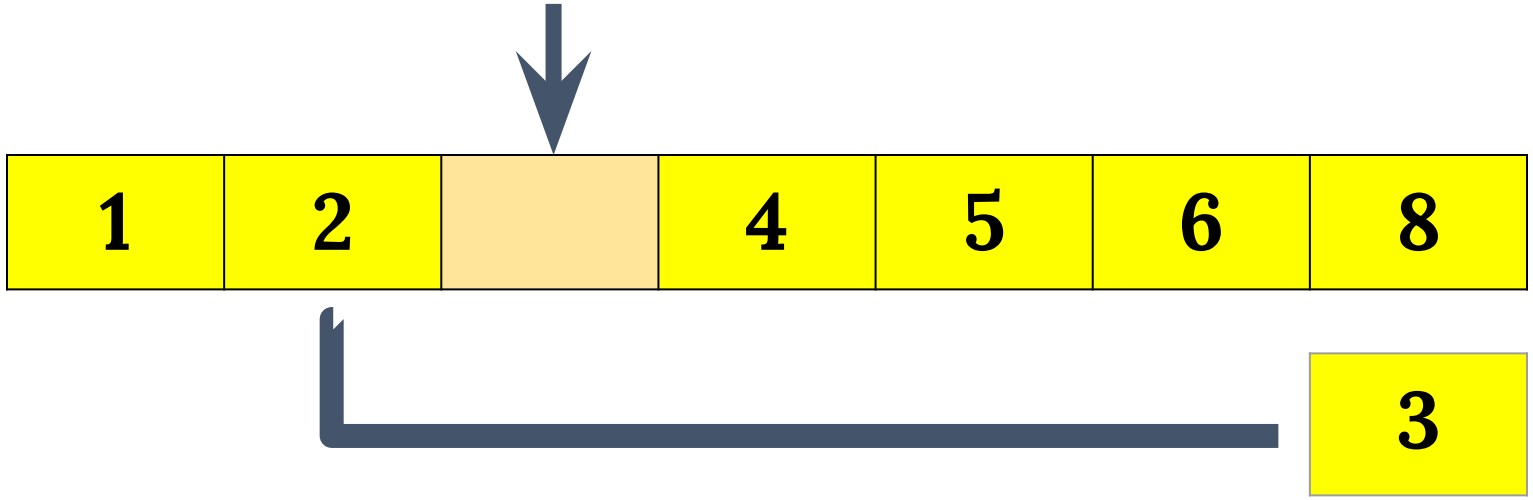

Insertion Sort

Insertion Sort

```
void insertionSort(int array[], int size) {

      for (int step = 1; step < size; step++) {
            int key = array[step];
            int j = step - 1;

            while (key < array[j] && j >= 0) {
                  array[j + 1] = array[j];
                  --j;
            }

            array[j + 1] = key;
      }
 }
```

Insertion Sort

```
void insertionSort(int array[], int size) {
     for (int step = 1; step < size; step++) {
          int key = array[step];
          int j = step - 1;
          while (key < array[j] && j >= 0) {
               array[j + 1] = array[j];
               --j;
          }
          array[j + 1] = key;
     }
}


int main() {
     int data[] = {9, 5, 1, 4, 3};
     int size = sizeof(data) / sizeof(data[0]);
     insertionSort(data, size);
}
```