MÉTODOS DE ORDENAMIENTO

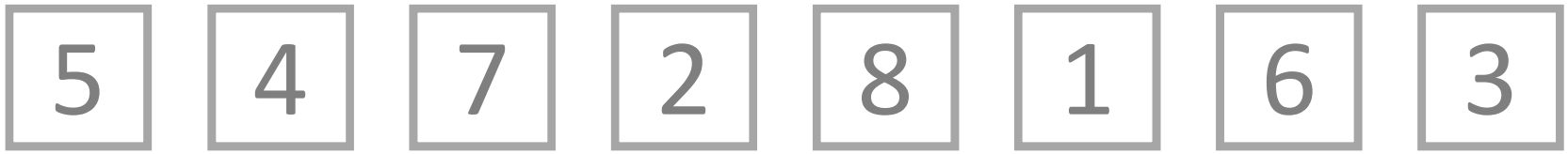
Bubble Sort, Selection Sort, Insertion Sort

Elaborado por: Prof. Kiara A. Ottogalli F.

BUBBLE SORT

- Este algoritmo va moviendo los elementos mayores al final del arreglo.
- Para realizar sus movimientos se enfoca únicamente en pares de elementos adyacentes.
- Los elementos mas pequeños “burbujean” hacia el principio del arreglo.

BUBBLE SORT



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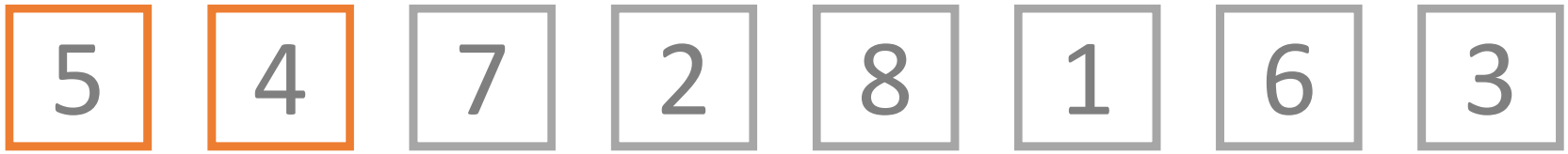

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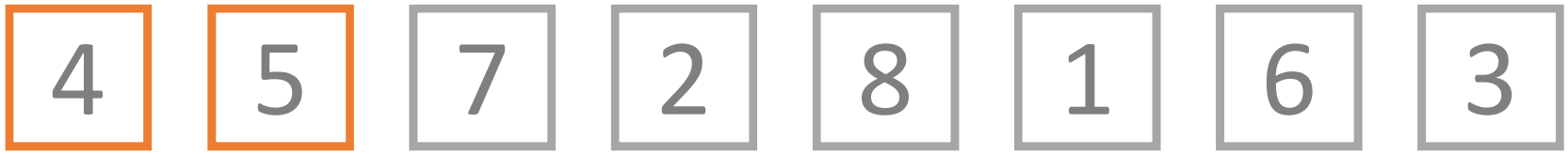

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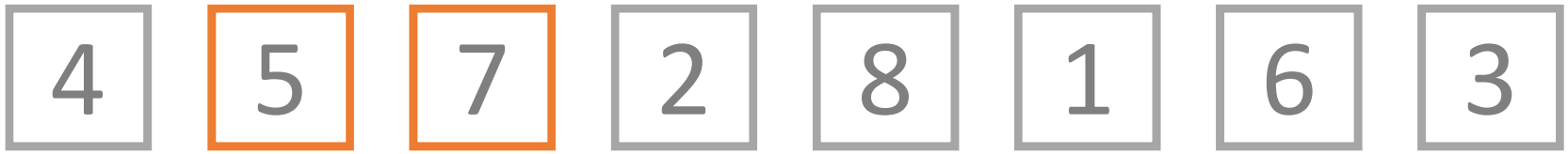

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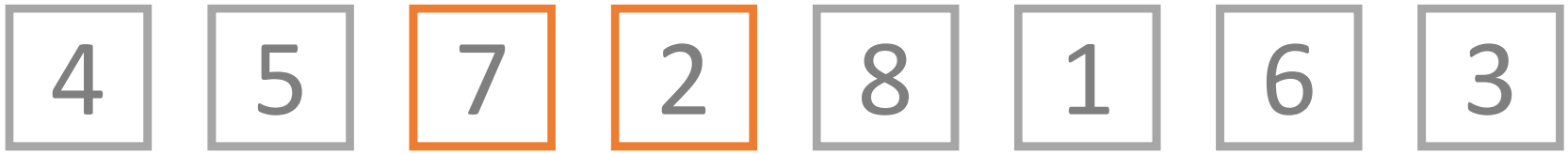

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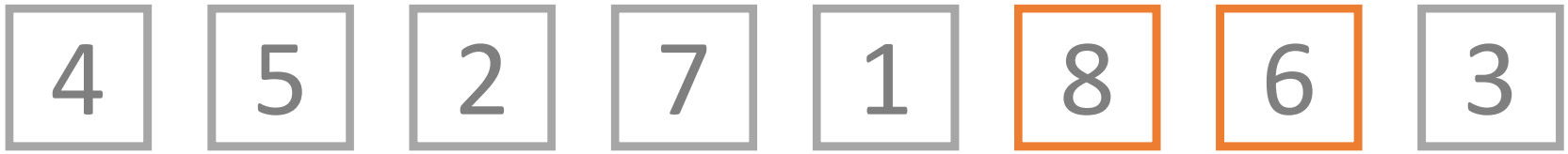

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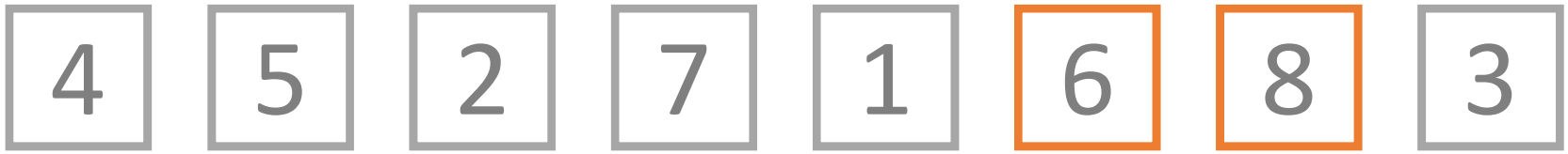

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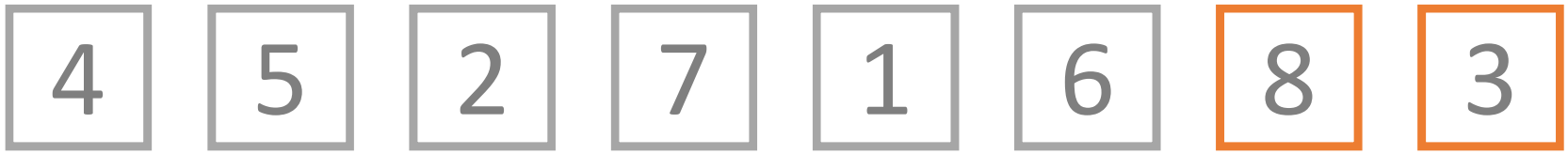

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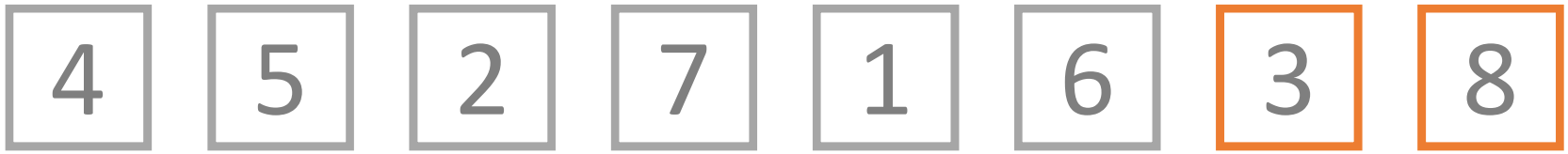

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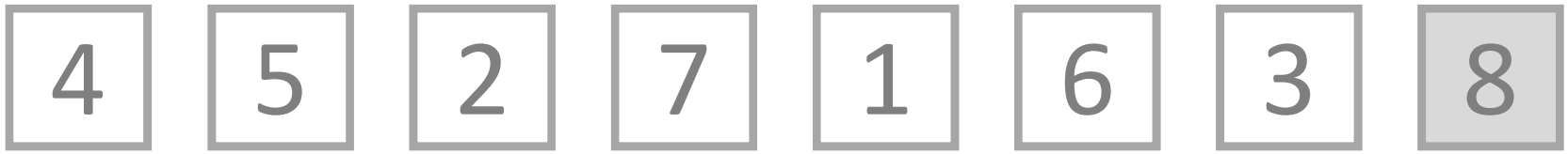

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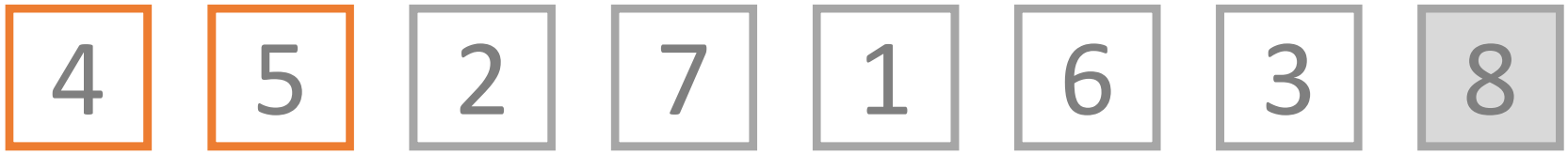

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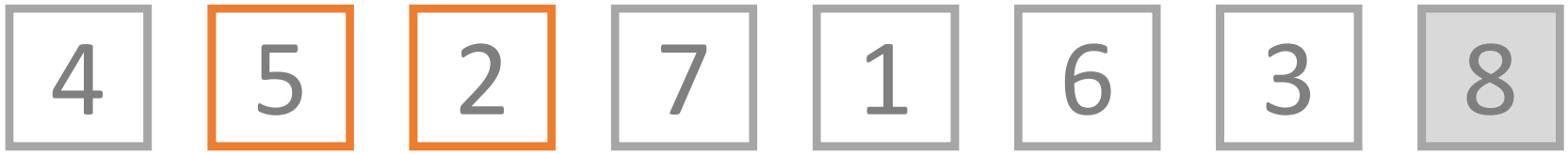

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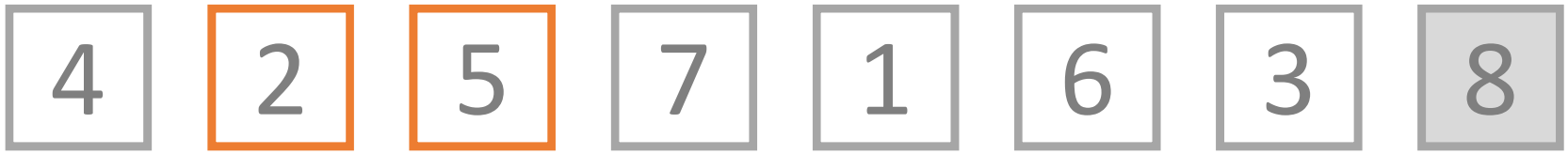

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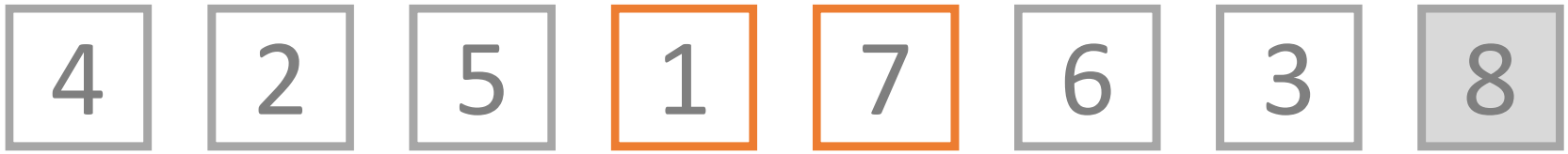

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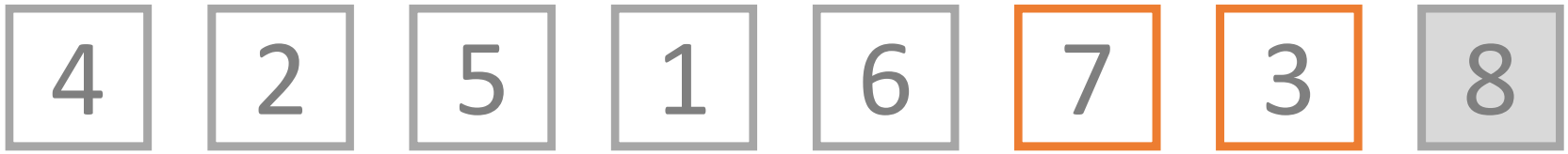

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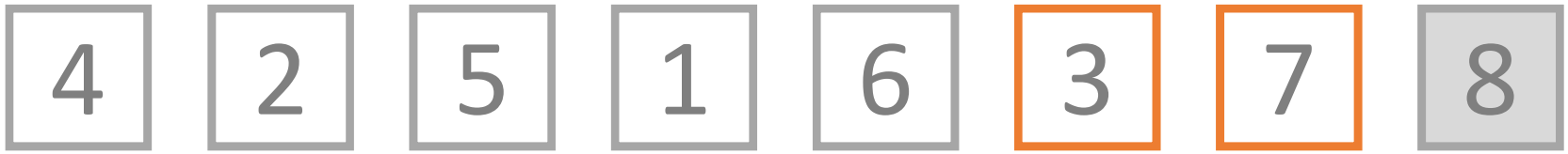

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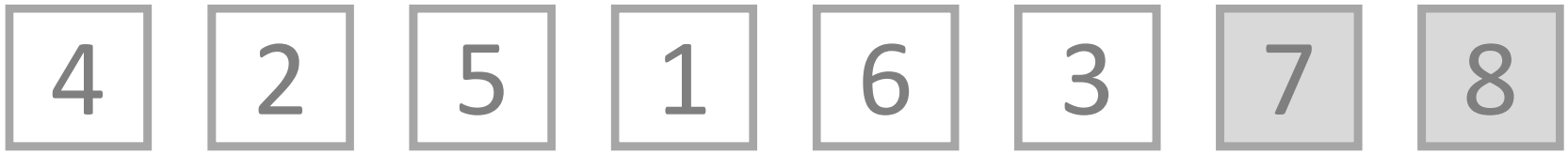

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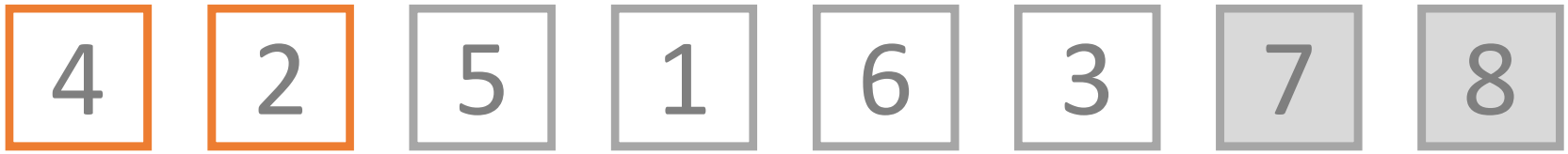

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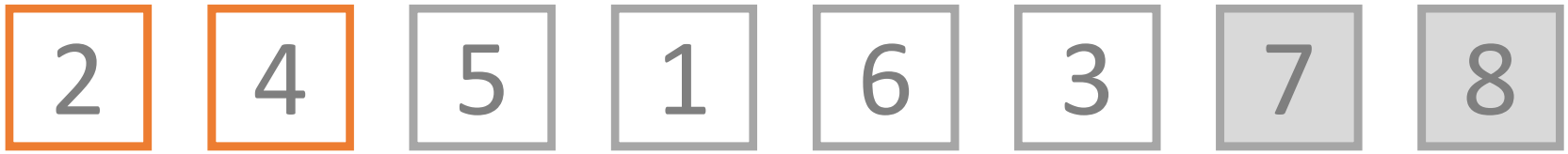

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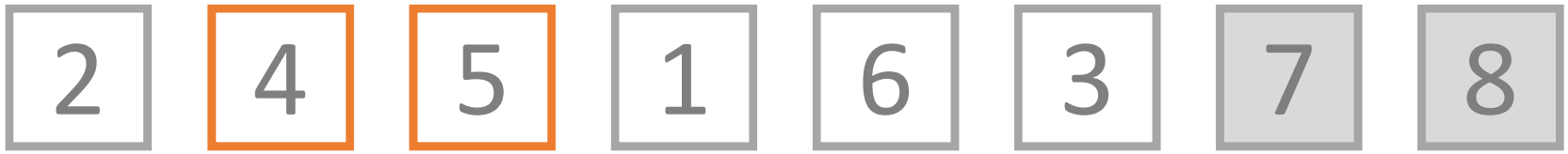

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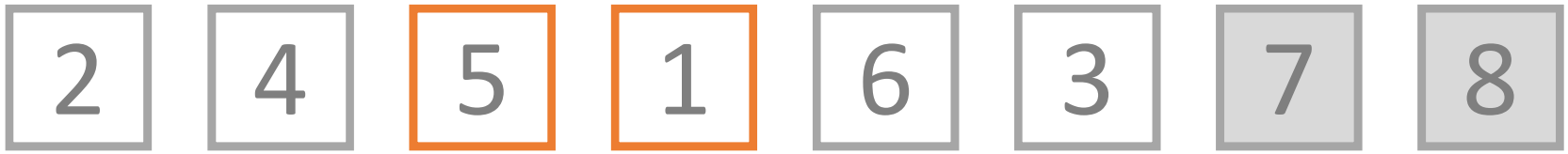

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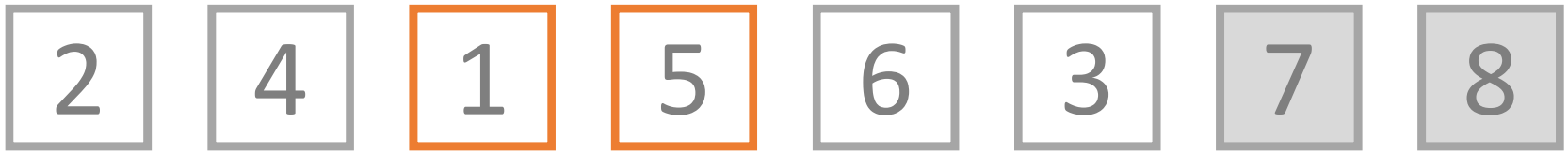

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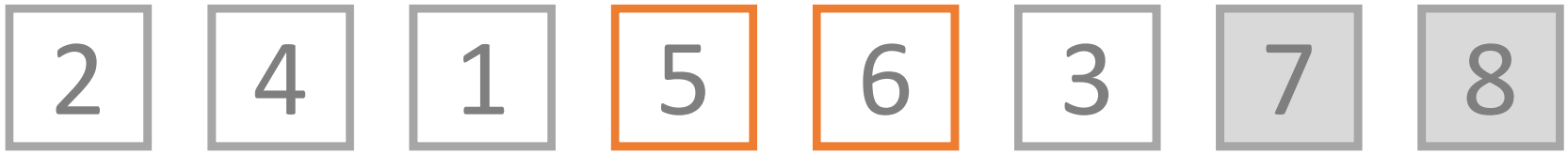

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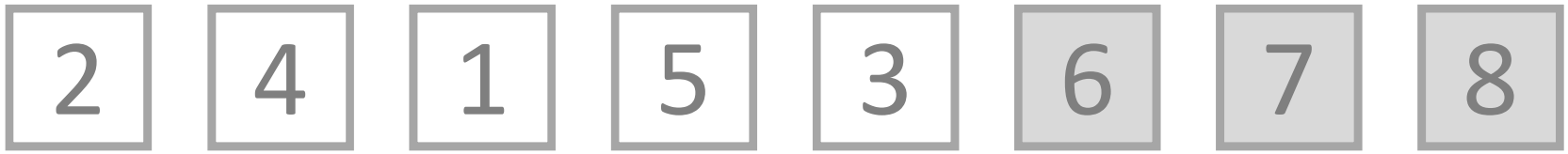

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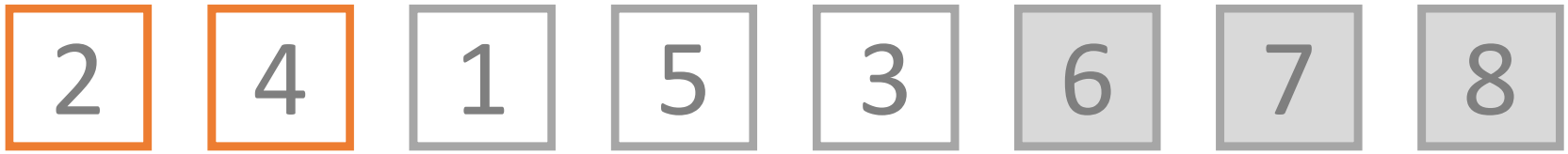

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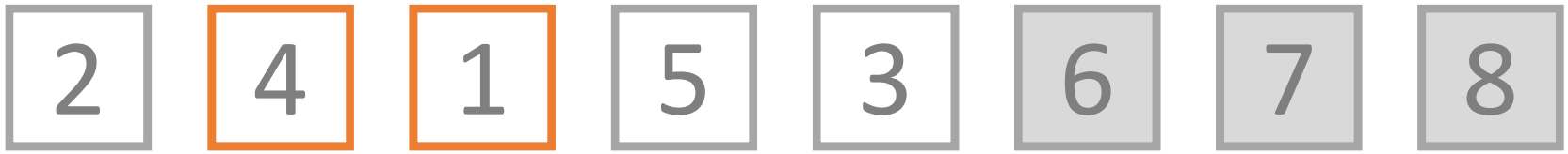

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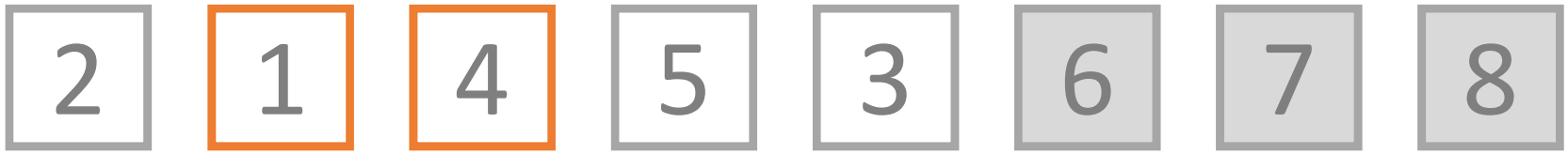

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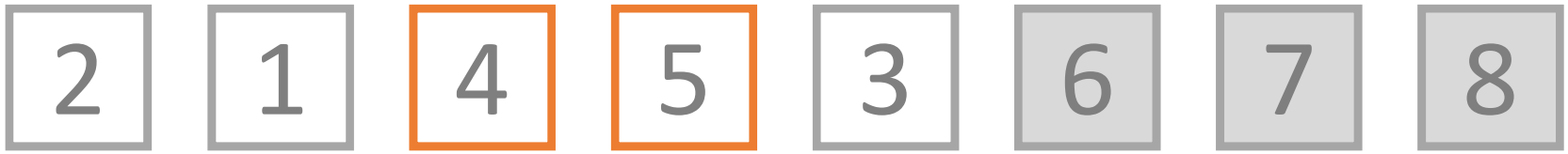

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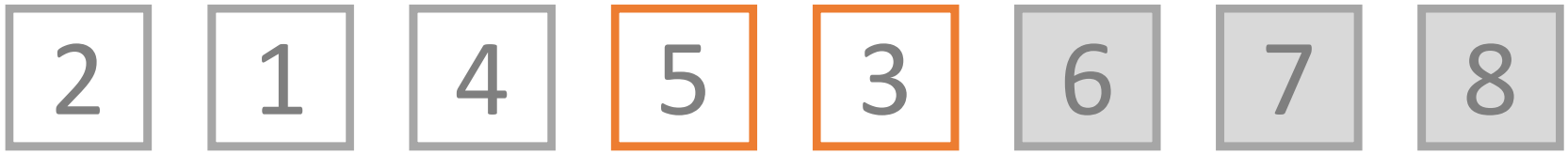

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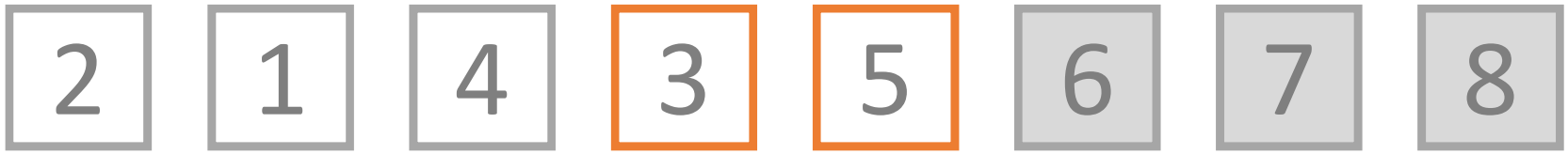

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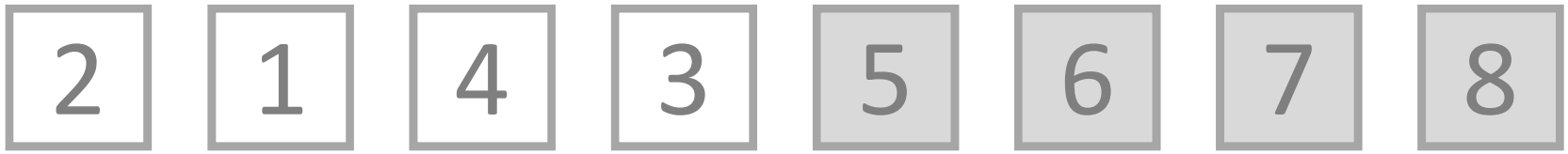

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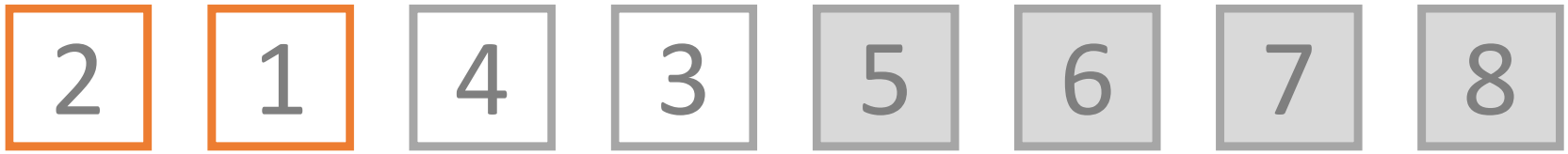

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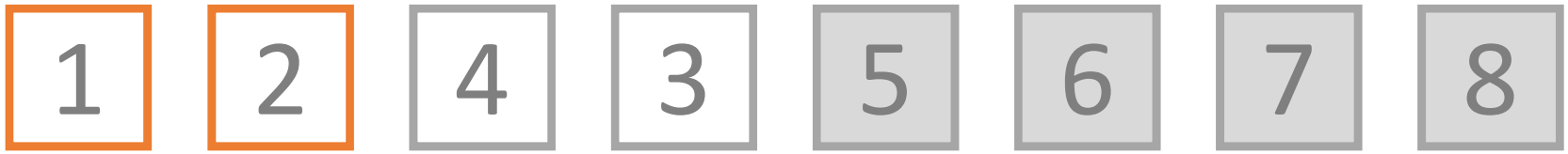

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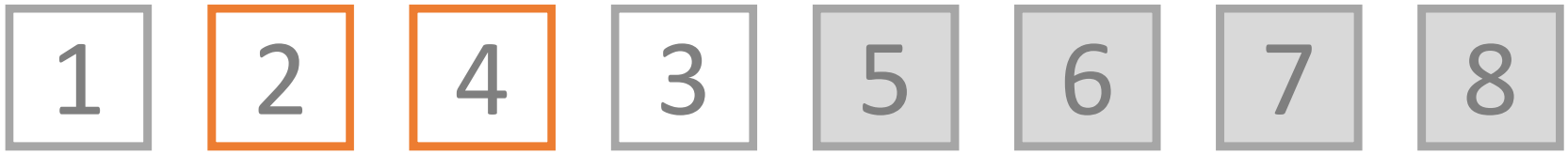

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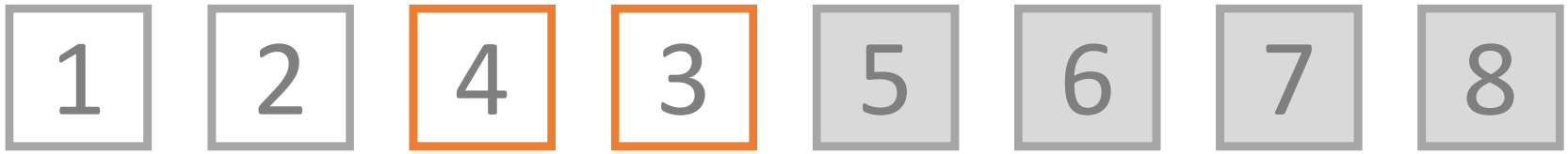

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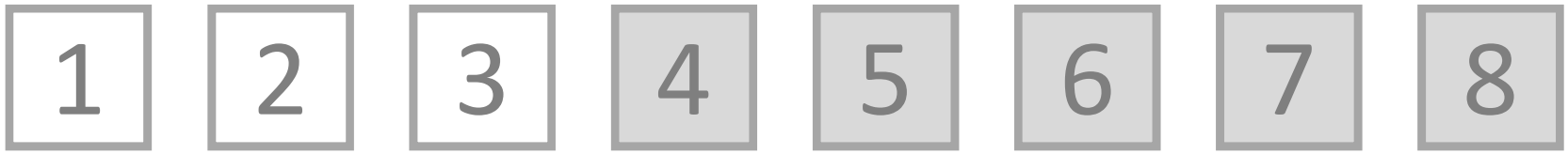

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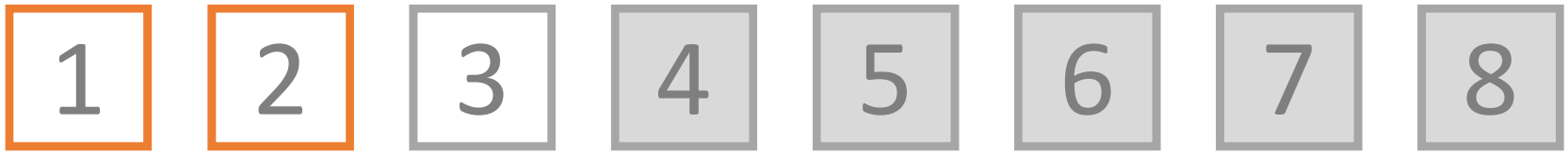

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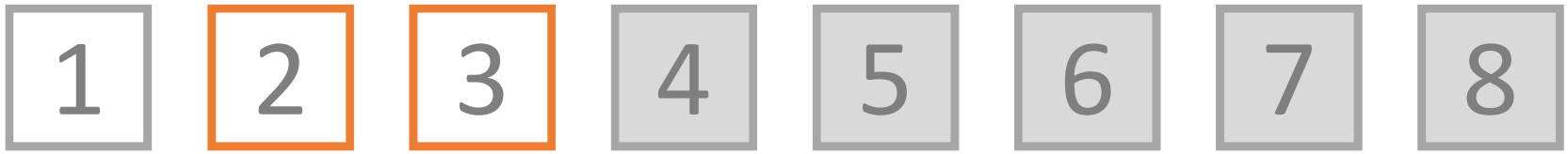

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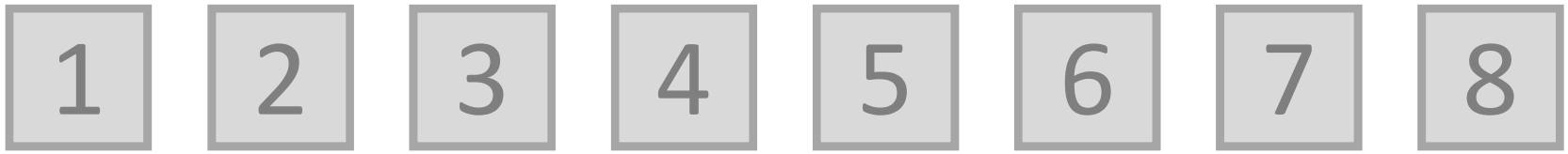


BUBBLE SORT

Optimización:

Nótese que si en la última pasada el algoritmo no hizo ningún intercambio, los elementos ya se encuentran ordenados y por lo tanto puede parar.

BUBBLE SORT

```
void bubblesort(int v[N], int n)
{
        int i, j, band;
        i = n - 1;
        band = 1;
        while(i > 0 && band)
        {
                band = 0;
                for(j = 0; j < i; j++)
                {
                        if(v[j] > v[j+1])
                        {
                                intercambio(&v[j], &v[j+1]);
                                band = 1;
                        }
                }
                i--;
        }
}
```

BUBBLE SORT

Peor Caso

$O(n^2)$

Cuando el arreglo está ordenado de manera inversa.

Mejor Caso

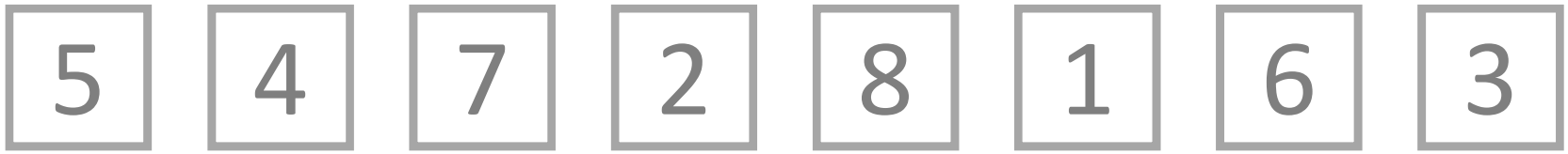
$\Omega(n)$

Cuando el arreglo ya se encuentra ordenado correctamente.

SELECTION SORT

- Este algoritmo encuentra el elemento mas pequeño del arreglo y lo intercambia con el elemento en la primera posición.
- Luego encuentra el segundo elemento mas pequeño y lo intercambia con el elemento en la segunda posición.
- Realiza esto hasta que el arreglo esté ordenado.

SELECTION SORT



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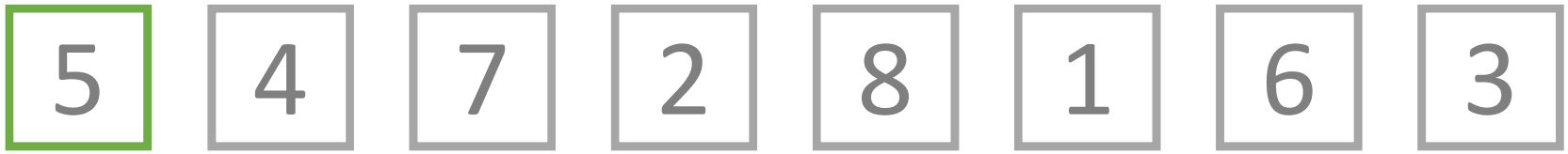
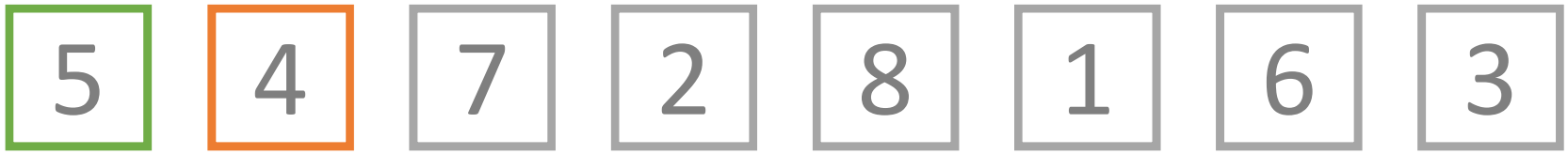


SELECTION SORT



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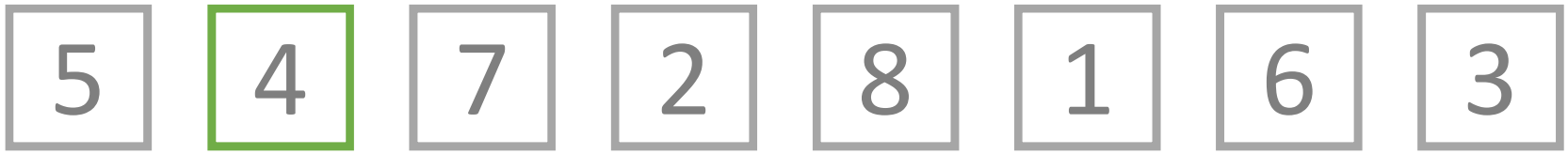

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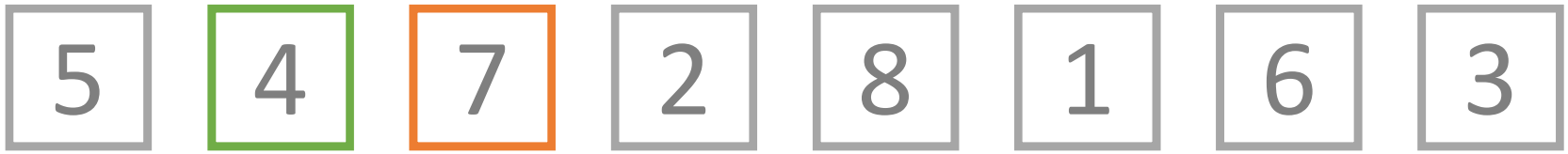

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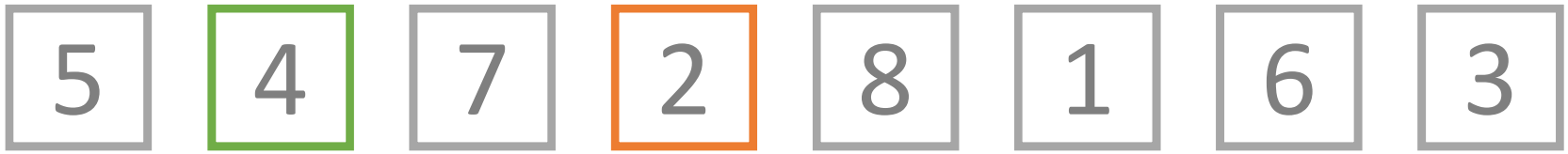

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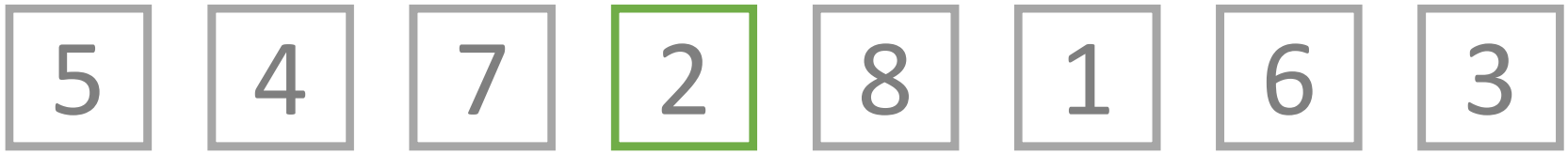

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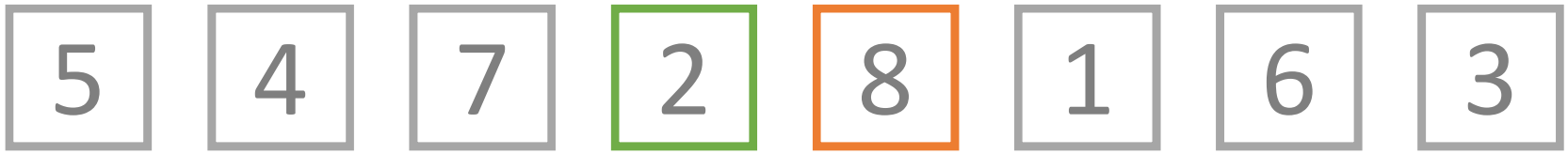

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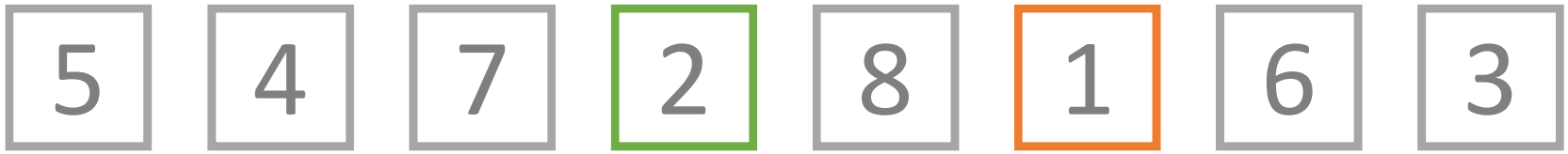

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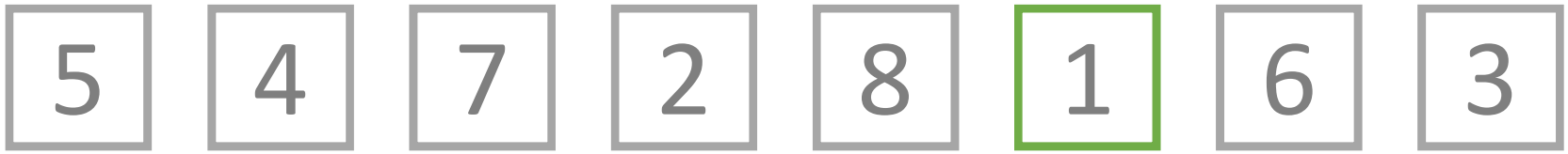

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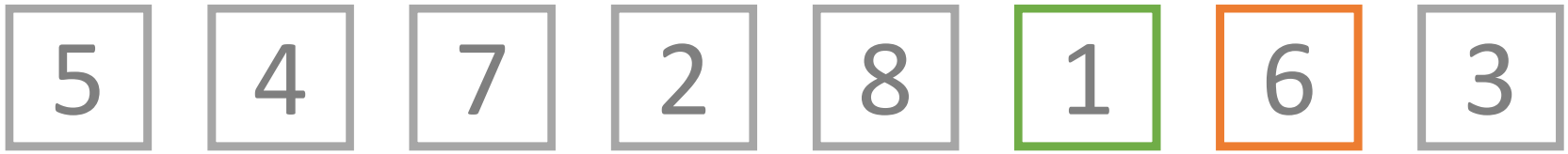

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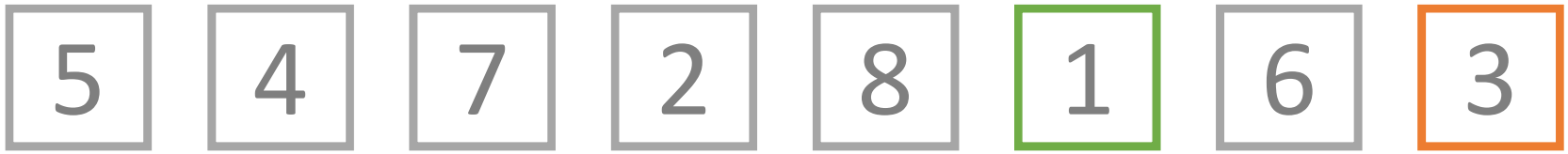

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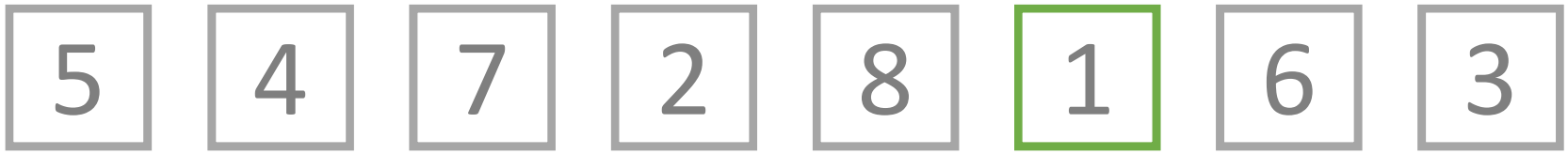
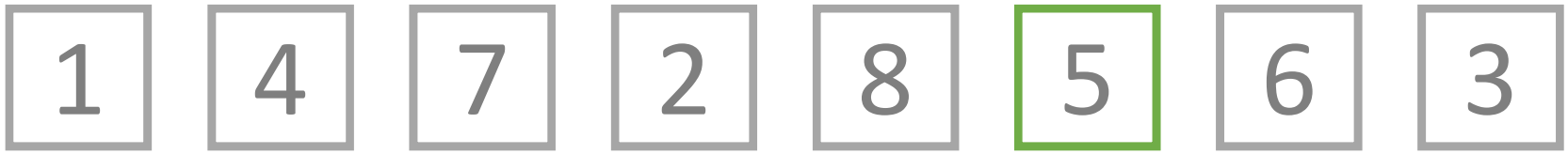


SELECTION SORT



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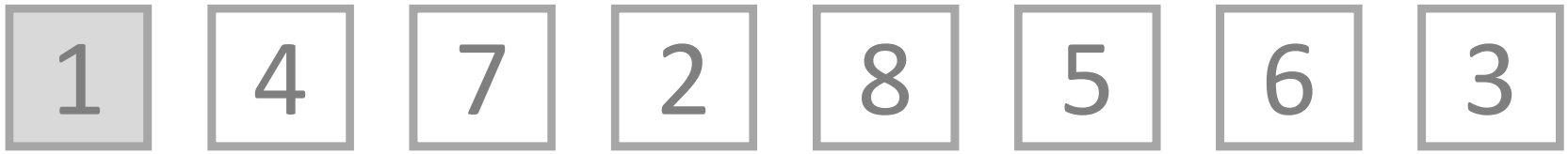

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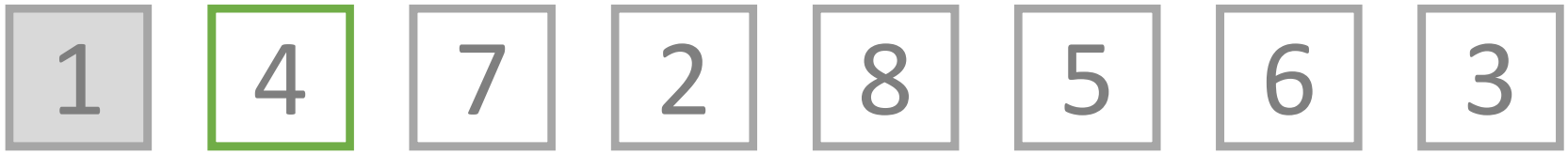

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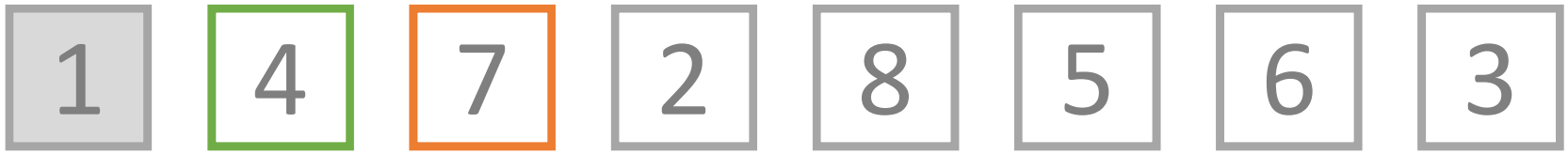

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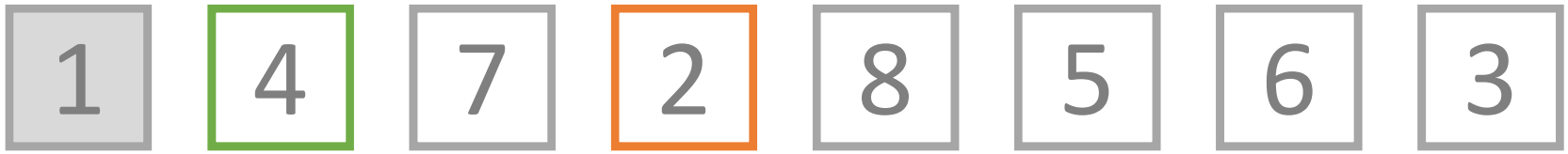

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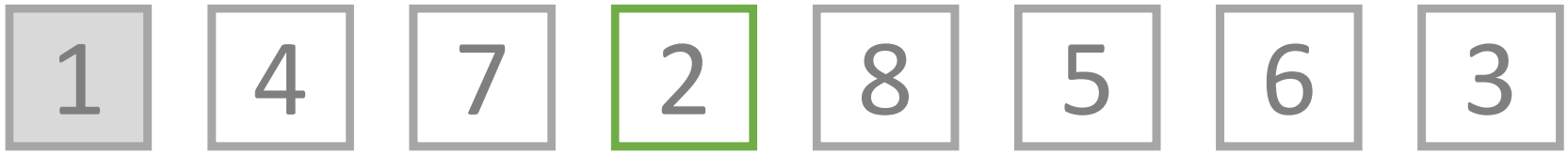

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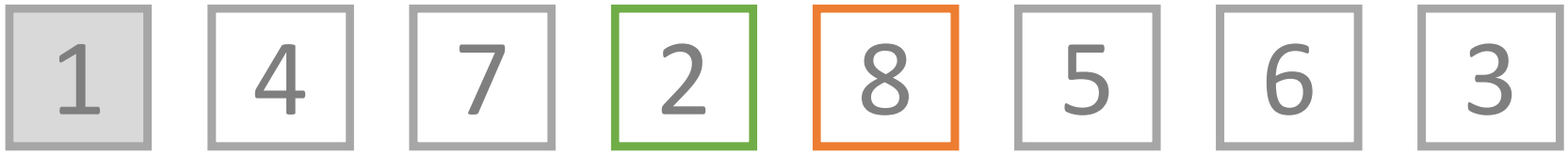

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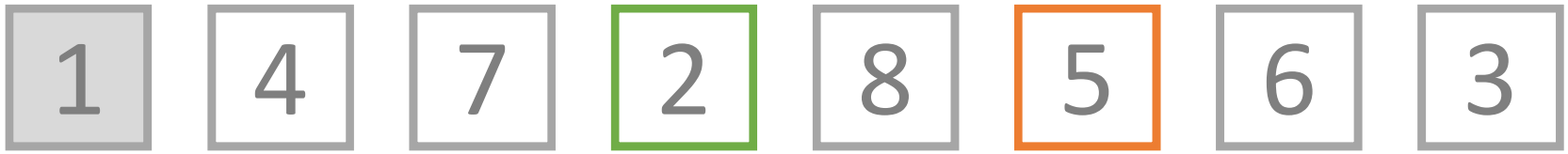

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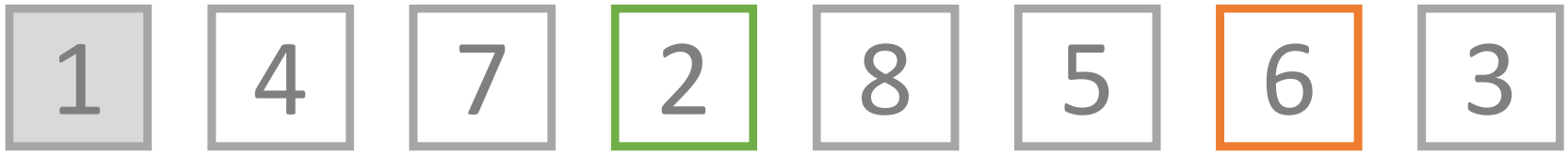

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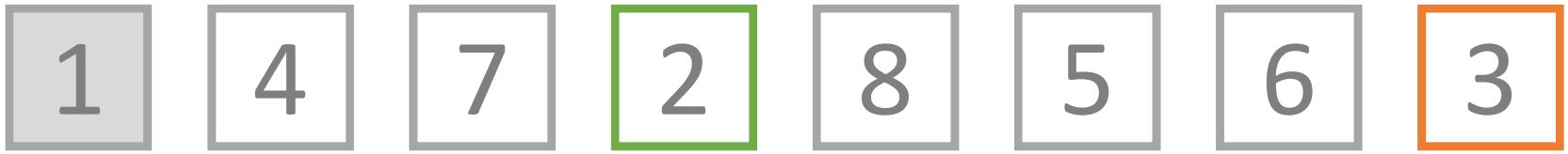

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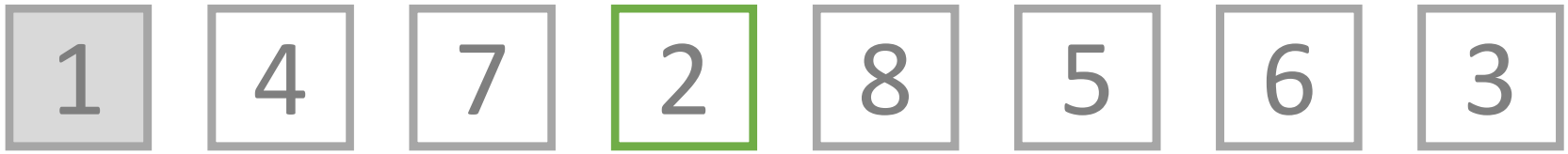

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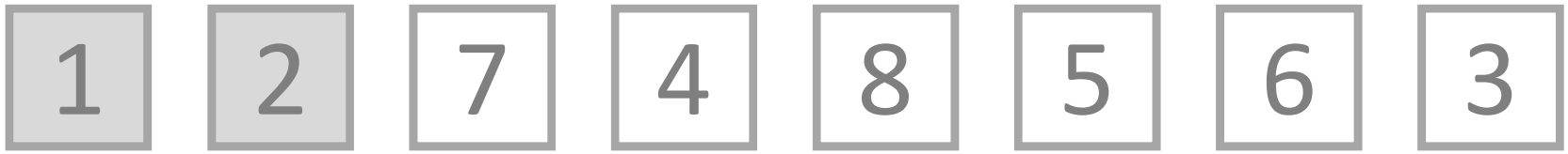

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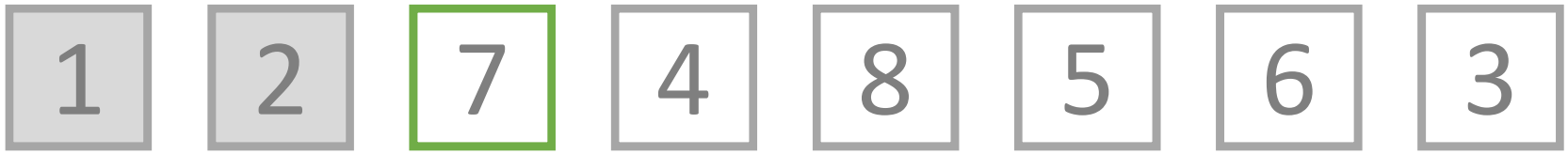

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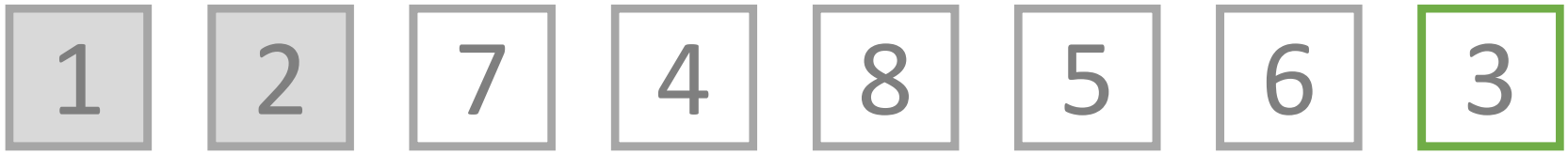

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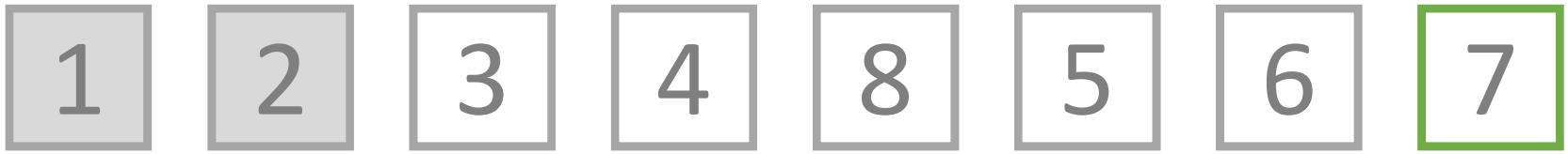

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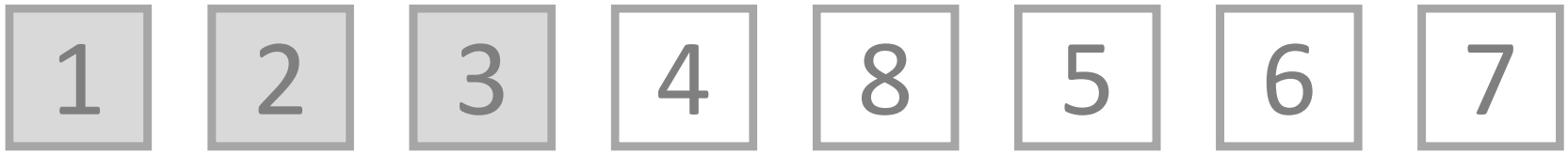

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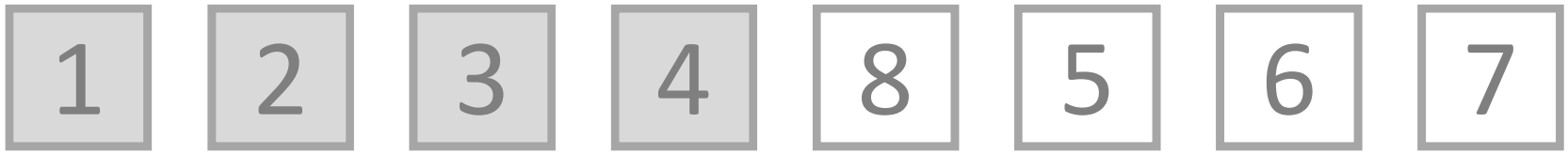

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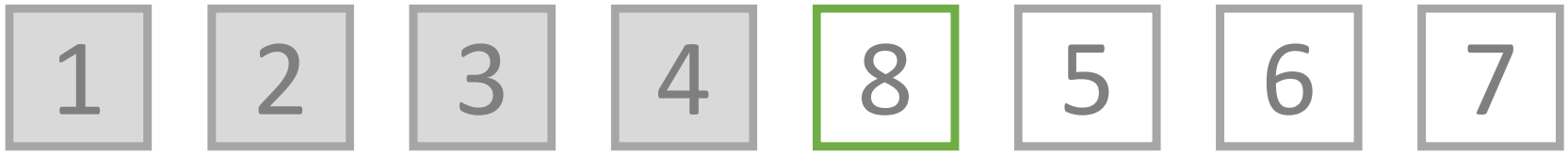

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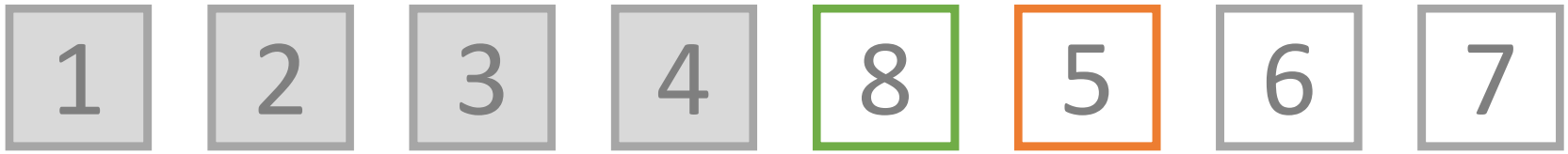

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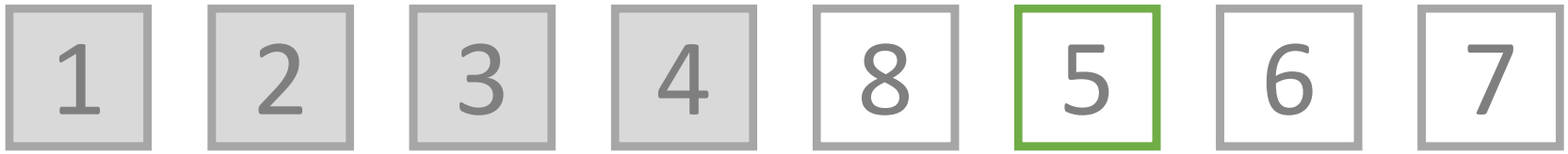

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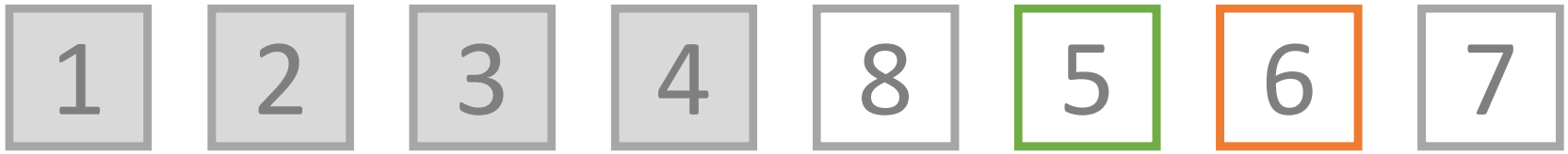

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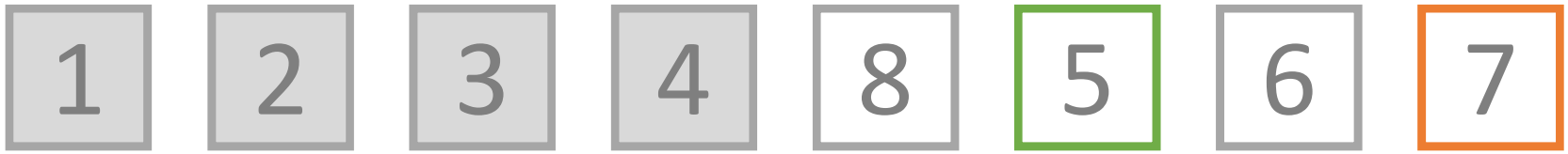

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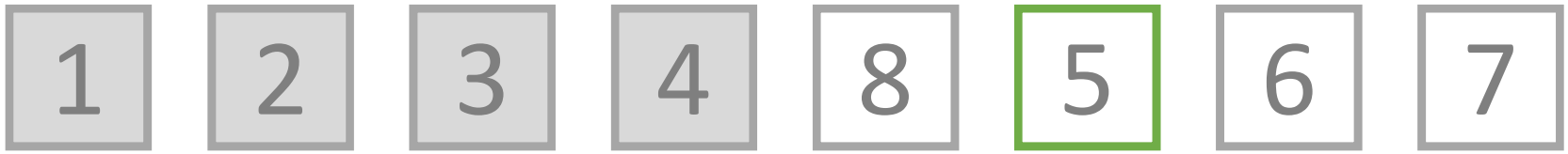

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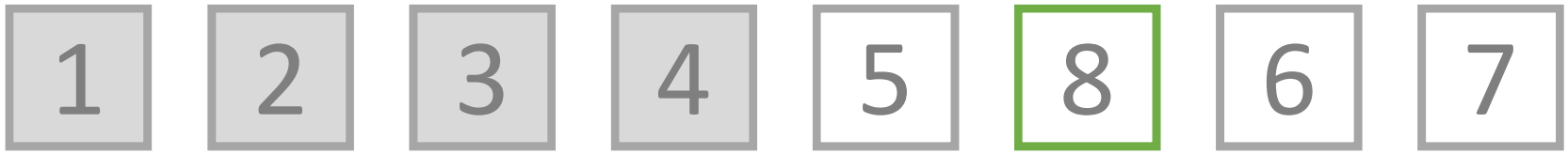

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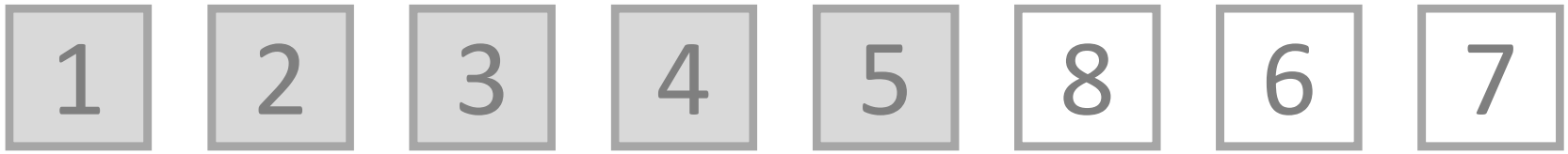

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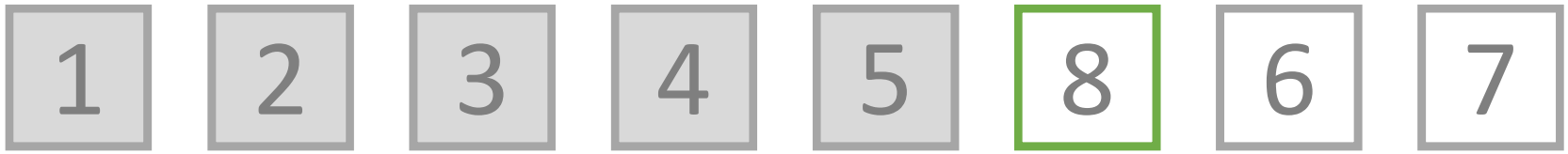

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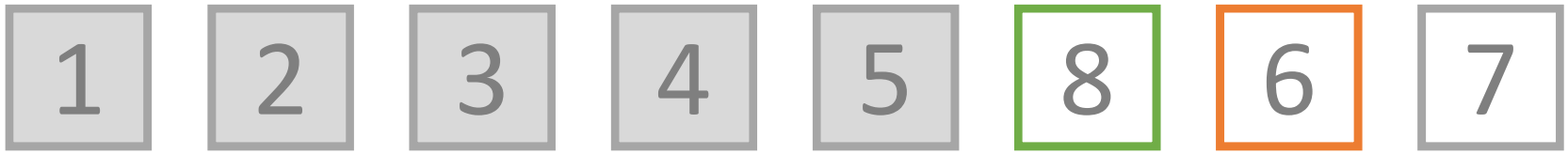

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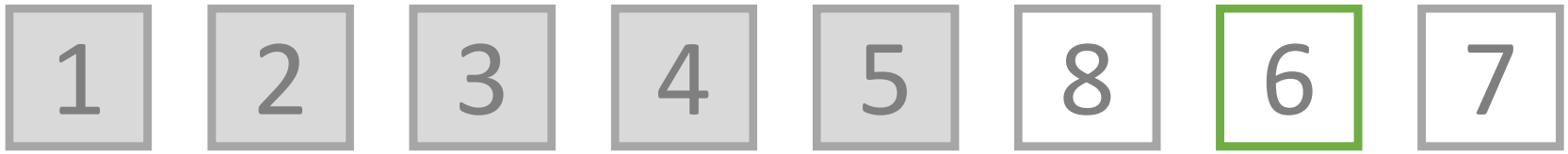

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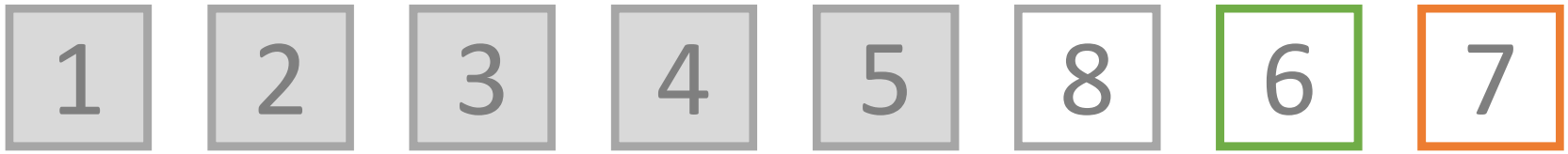

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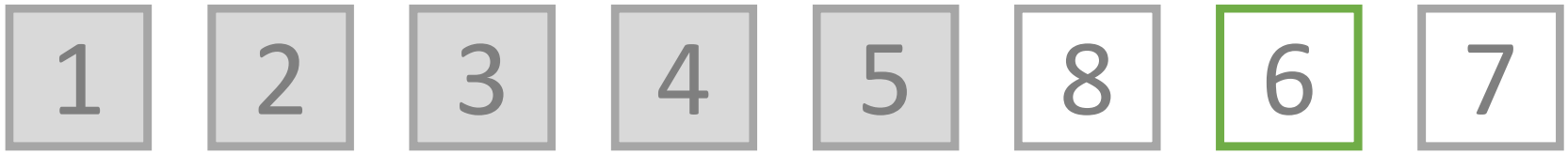

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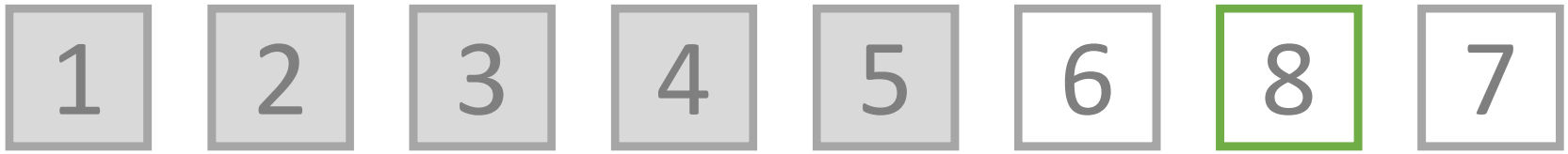

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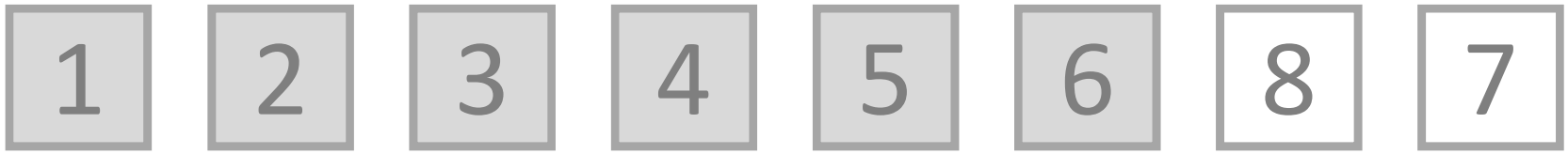

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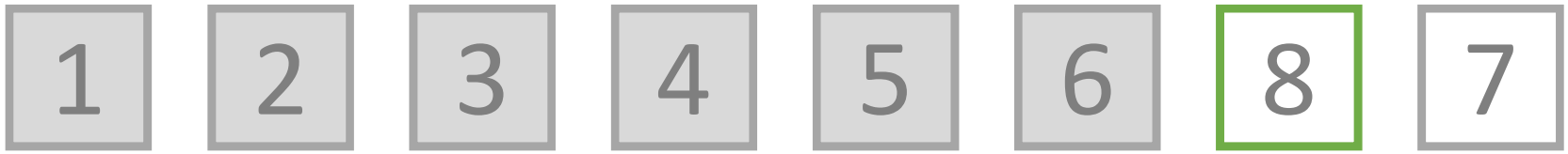

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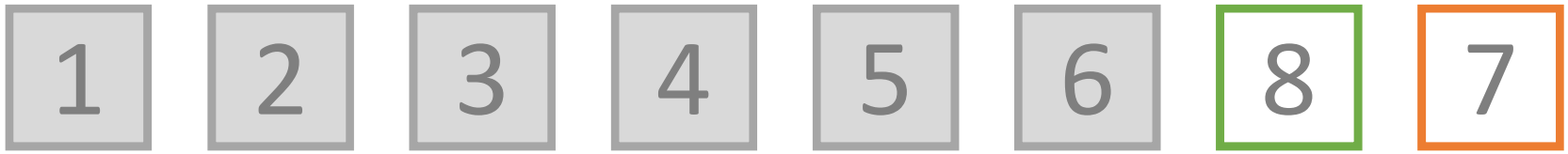

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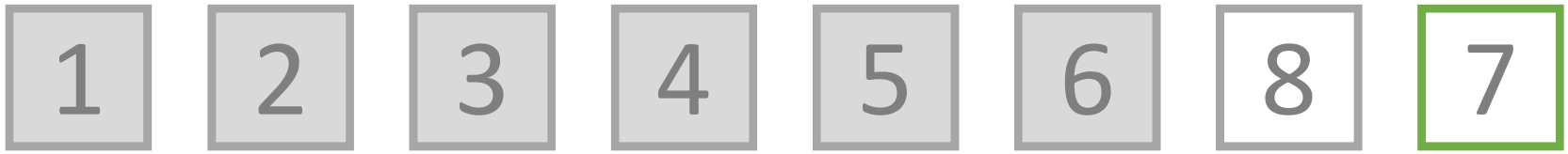

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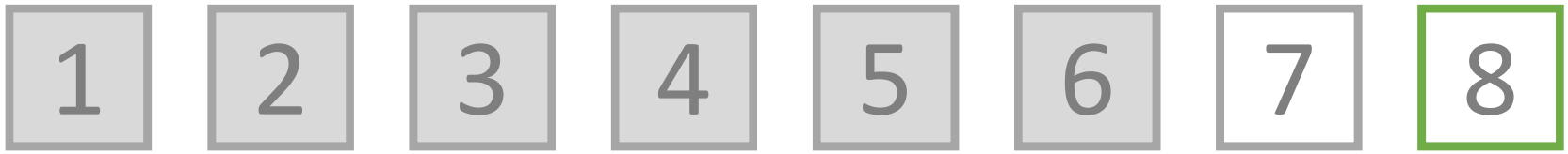

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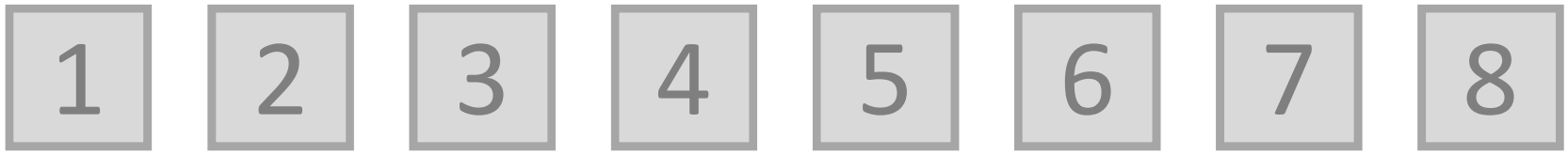


SELECTION SORT

```
void selectionsort(int v[N], int n)
{
        int i, j, posMenor;
        for(i = 0; i < n-1; i++)
        {
                posMenor = i;
                for(j = i+1; j < n; j++)
                {
                        if(v[j] < v[posMenor])
                        {
                                posMenor = j;
                        }
                }
                if(posMenor != i)
                {
                        intercambio(&v[i], &v[posMenor]);
                }
        }
}
```

SELECTION SORT

Peor Caso	Mejor Caso
$O(n^2)$	$\Omega(n^2)$

Todas las iteraciones de este algoritmo se harán independientemente de la distribución de los datos.

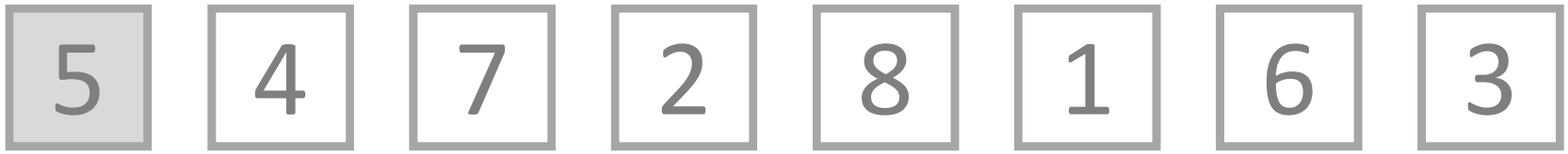
INSERTION SORT

- Este algoritmo divide el arreglo en dos partes: el lado izquierdo que se encuentra ordenado, y el lado derecho que se encuentra desordenado.

- Luego va insertando de manera ordenada cada elemento del arreglo derecho en el arreglo izquierdo.

- Realiza esto hasta que el arreglo esté ordenado.

INSERTION SORT



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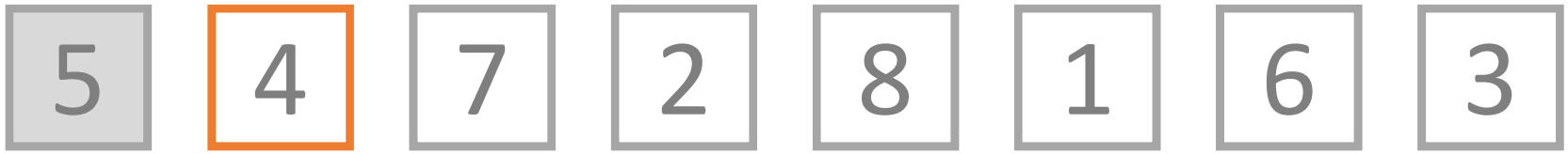
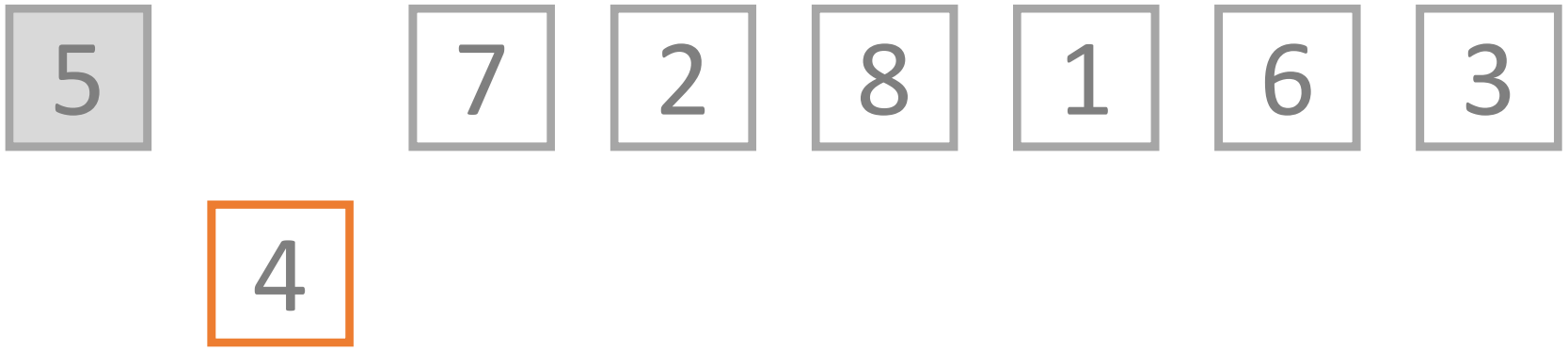


INSERTION SORT



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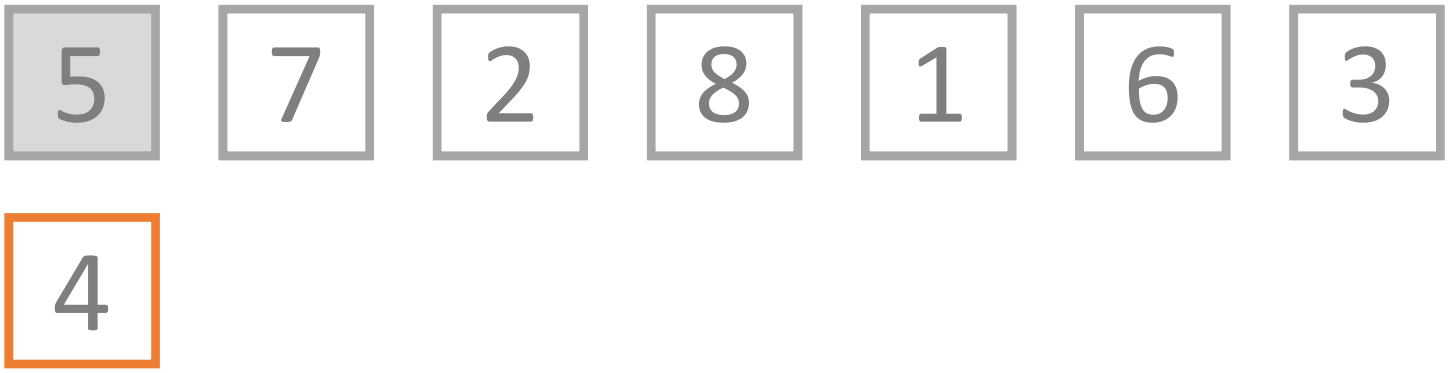

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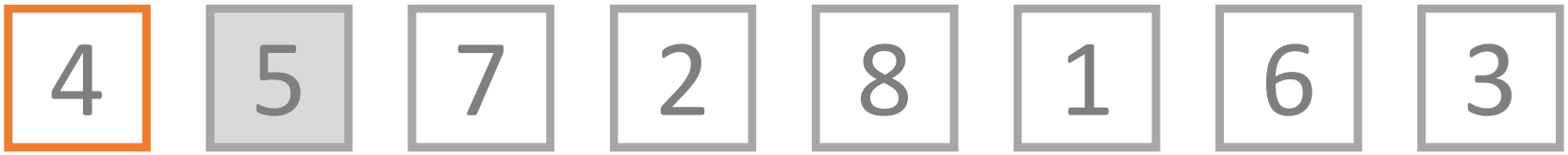

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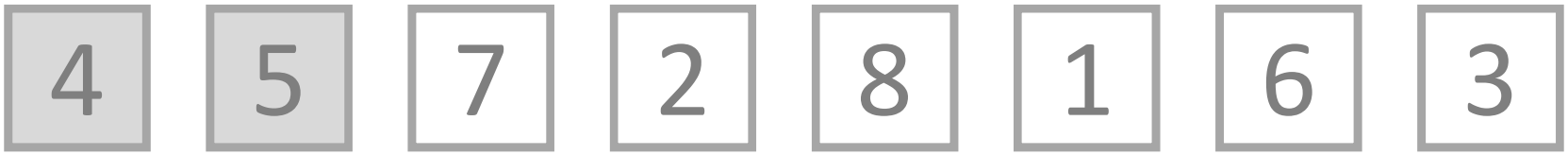

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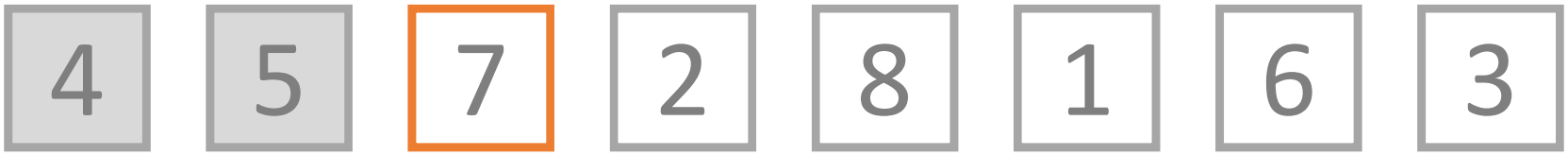

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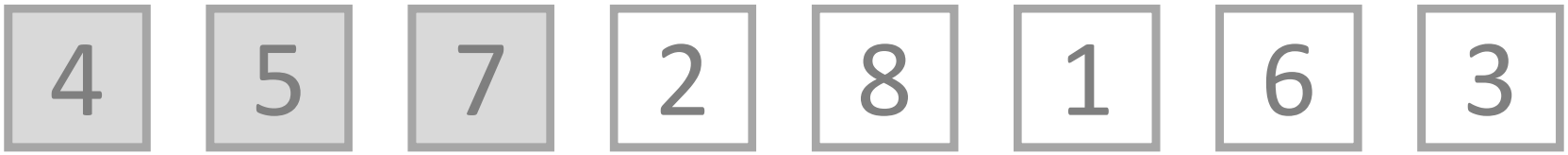

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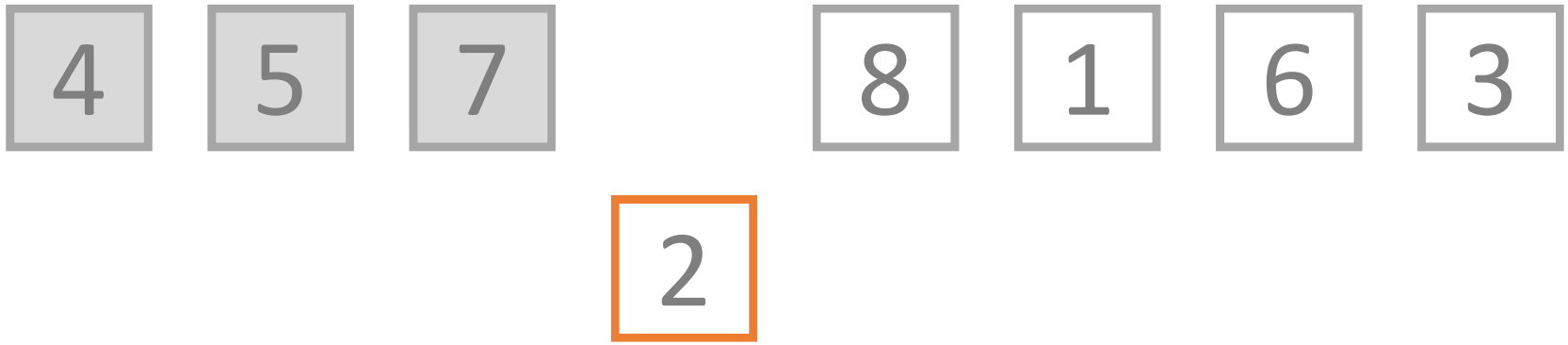

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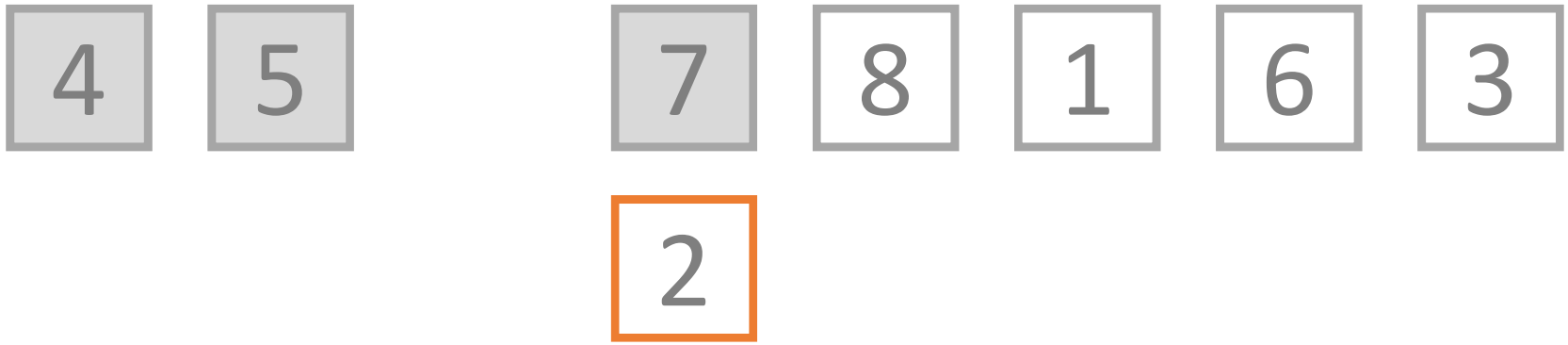

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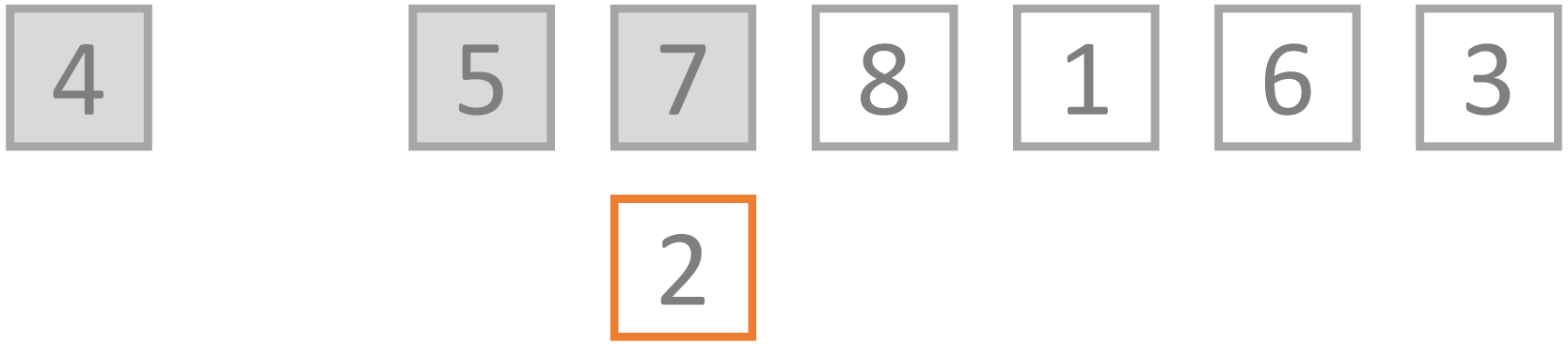

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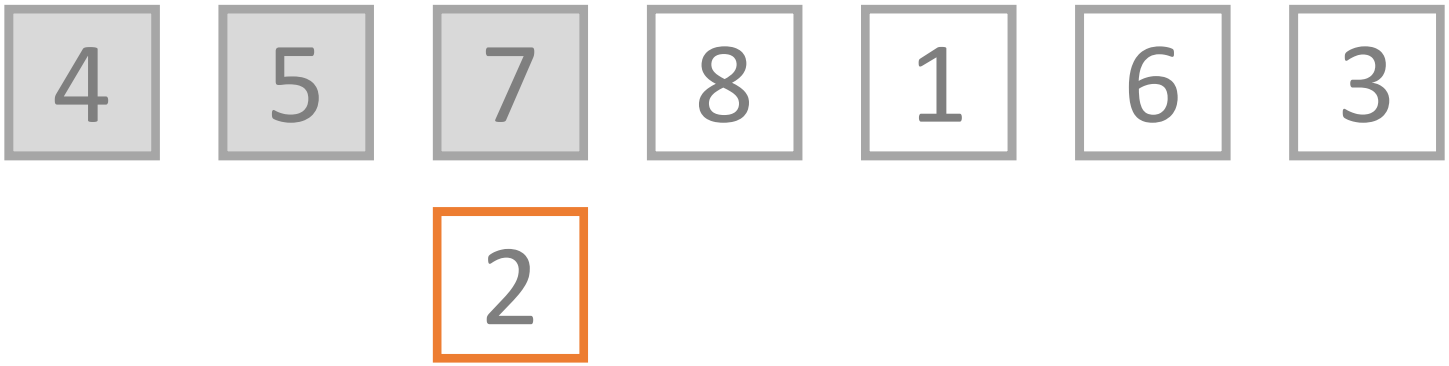

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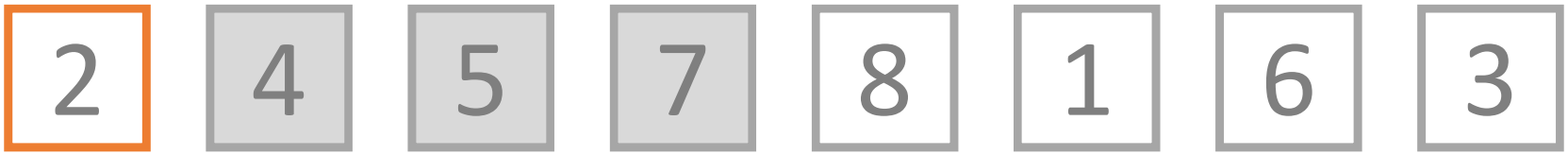

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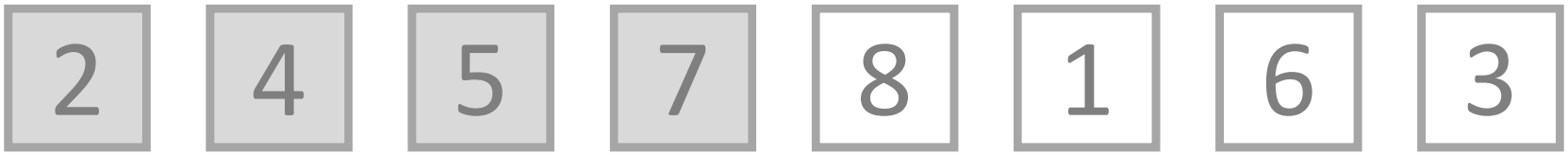
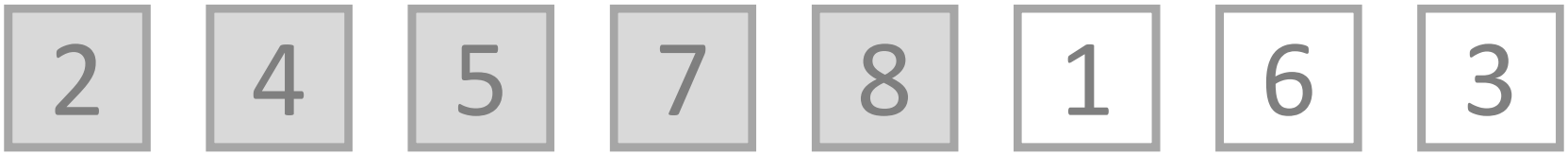
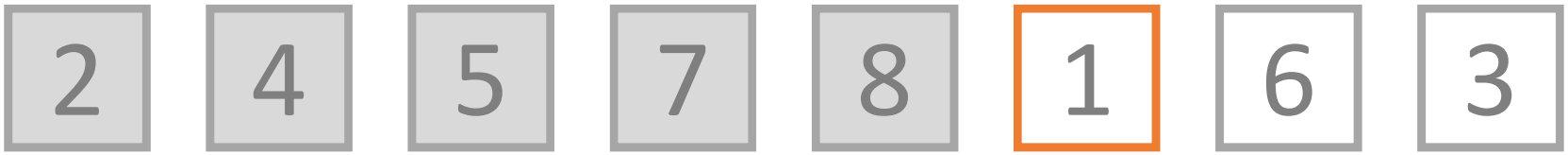


INSERTION SORT

INSERTION SORT



INSERTION SORT



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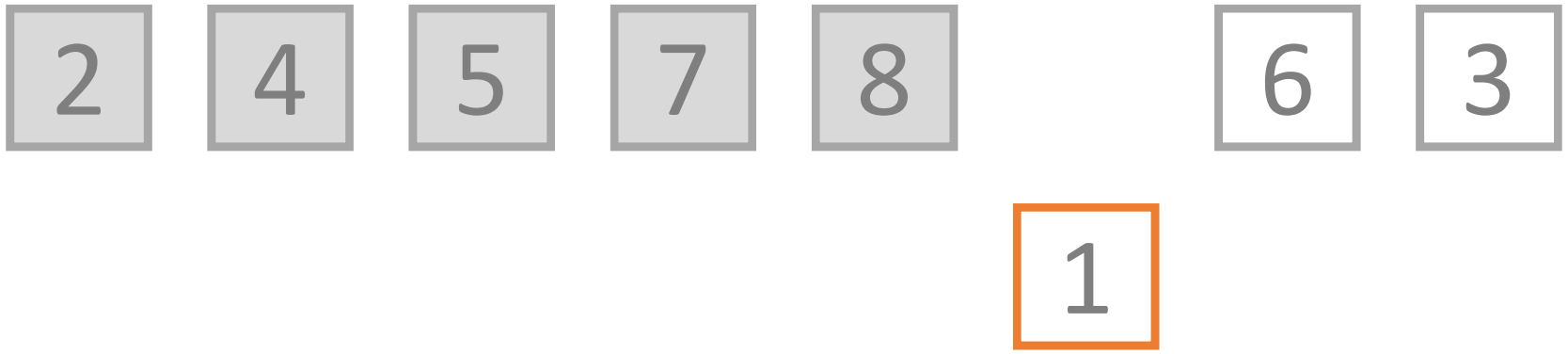

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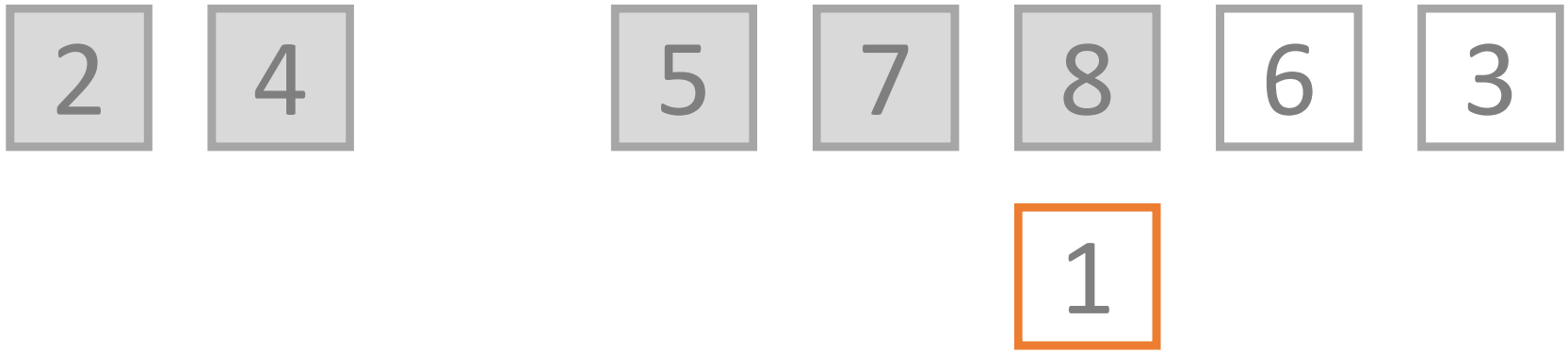

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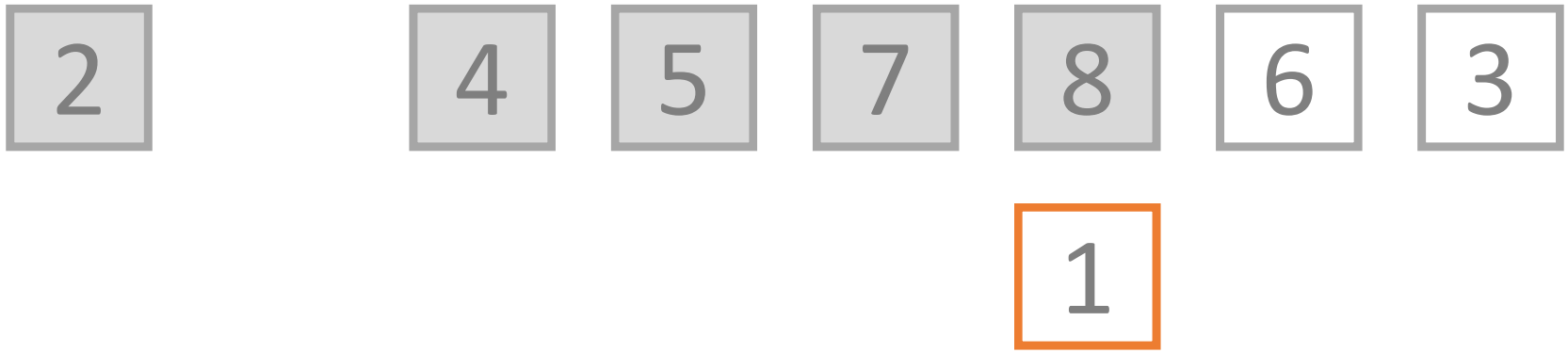

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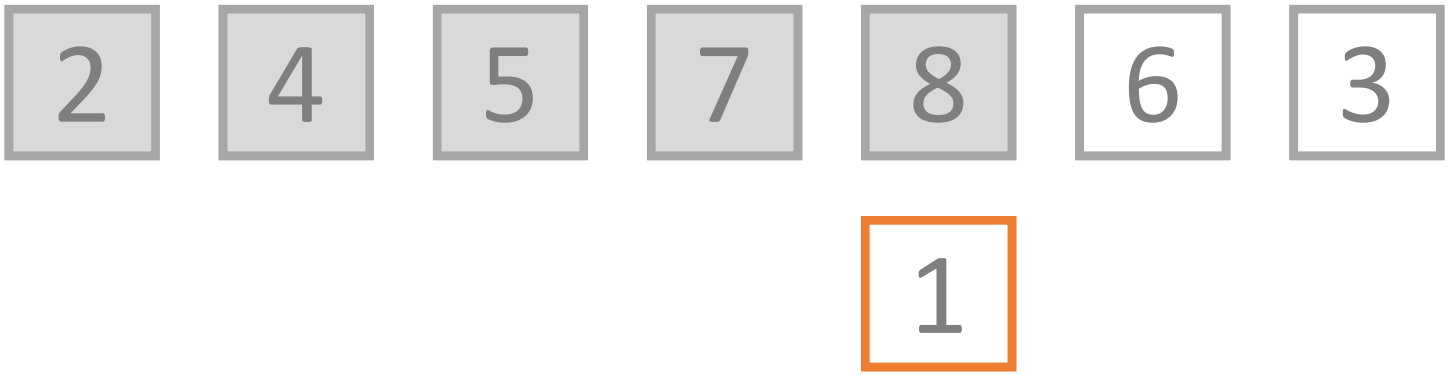

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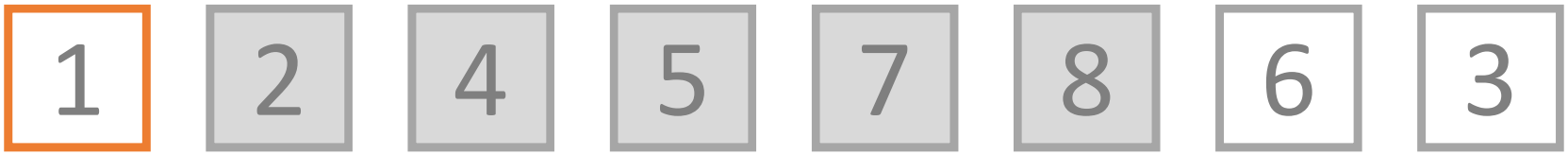

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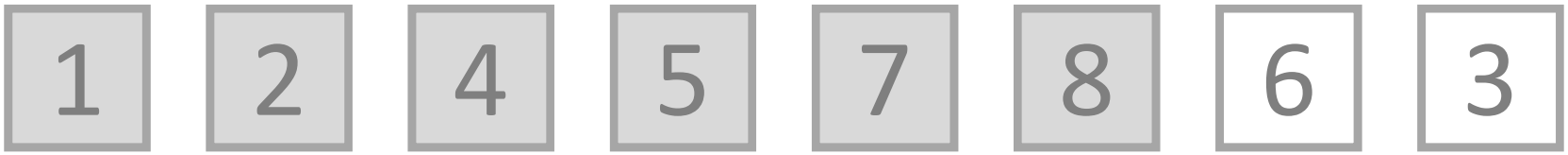

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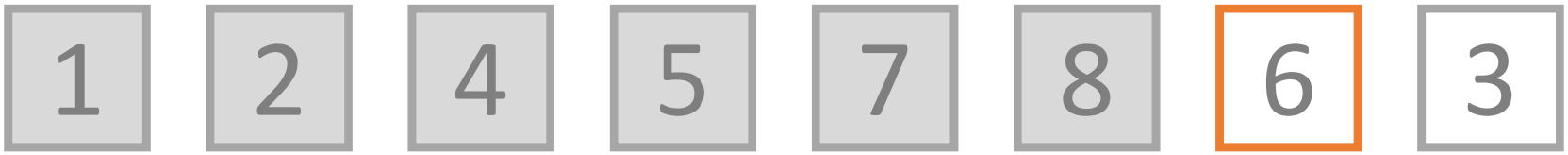

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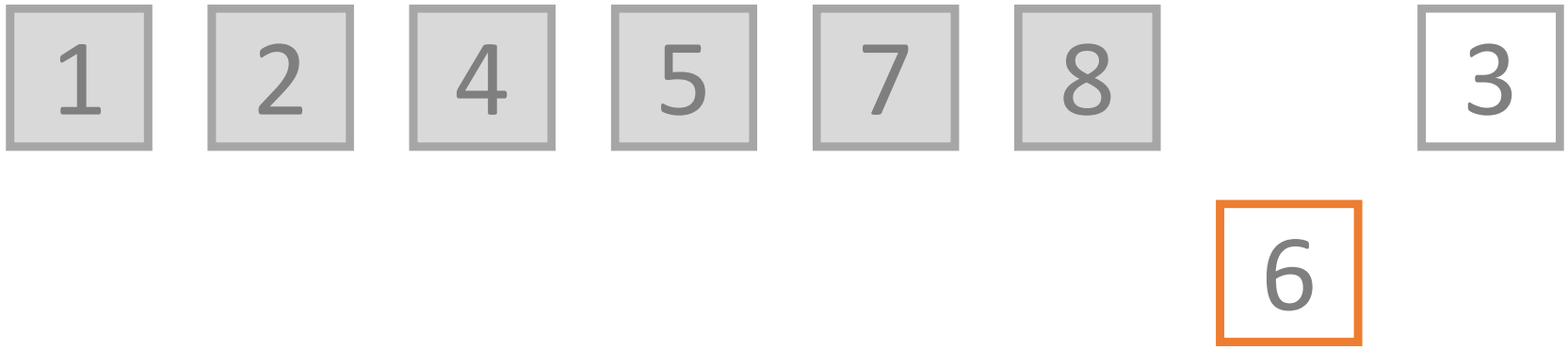

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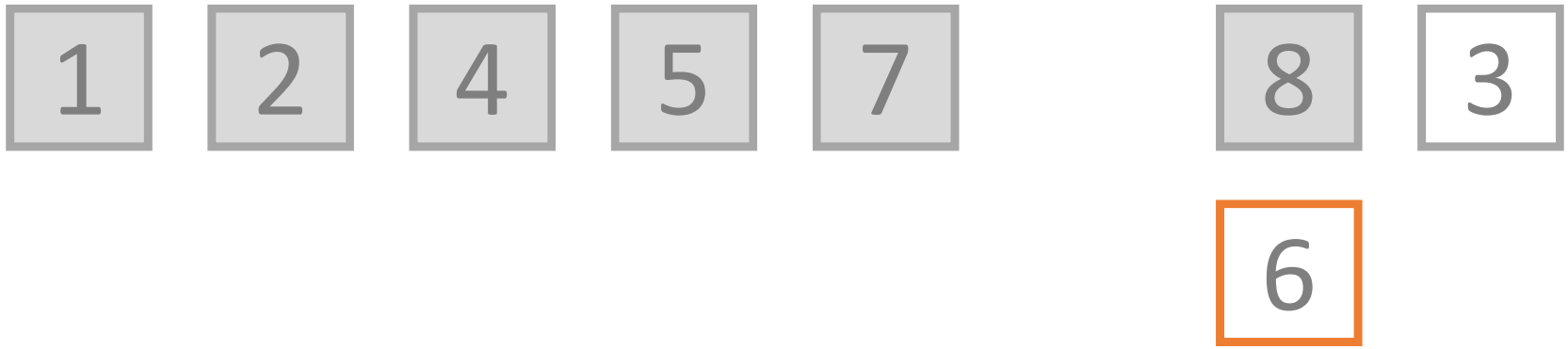

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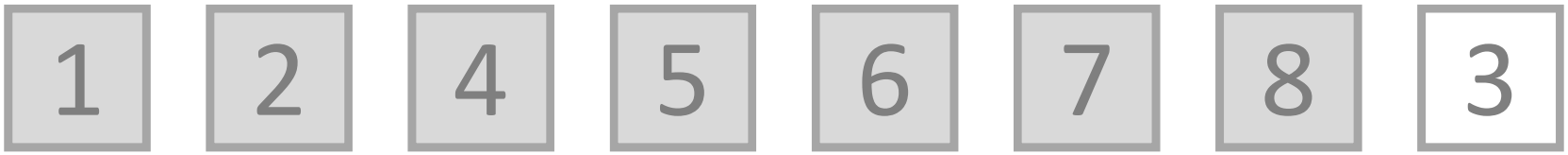

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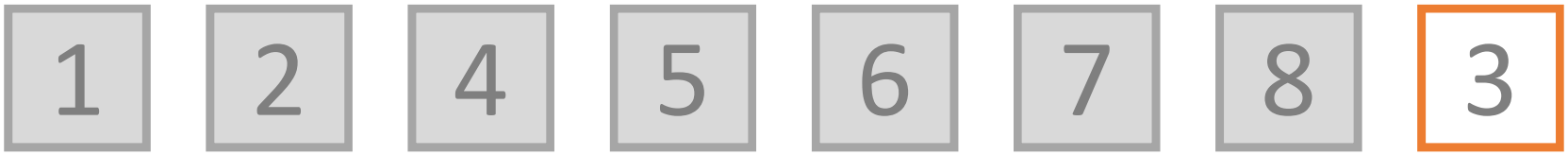

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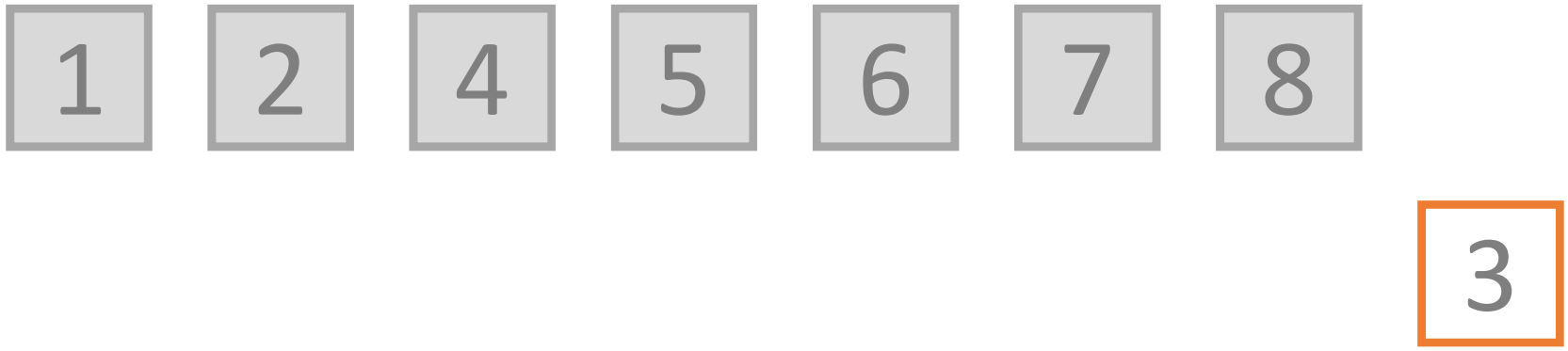

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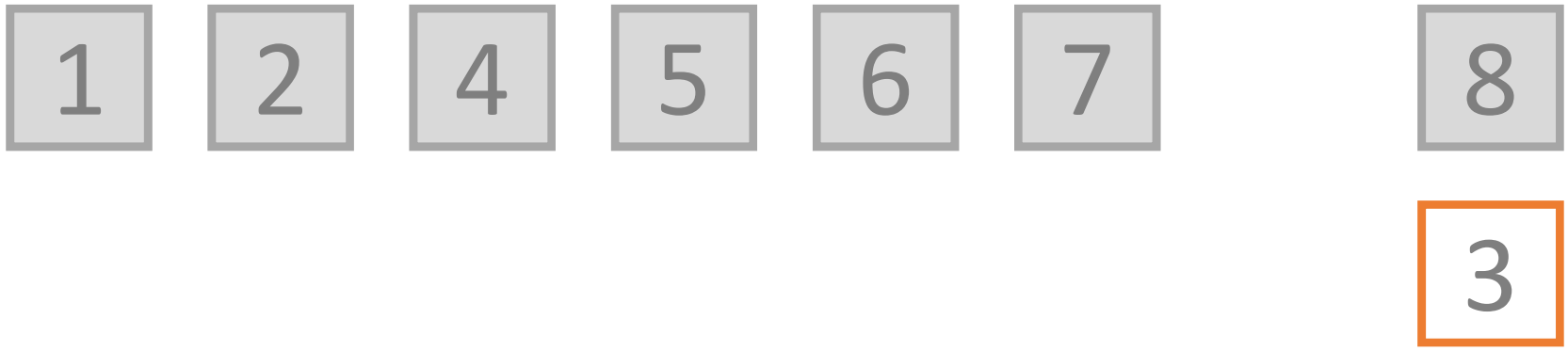

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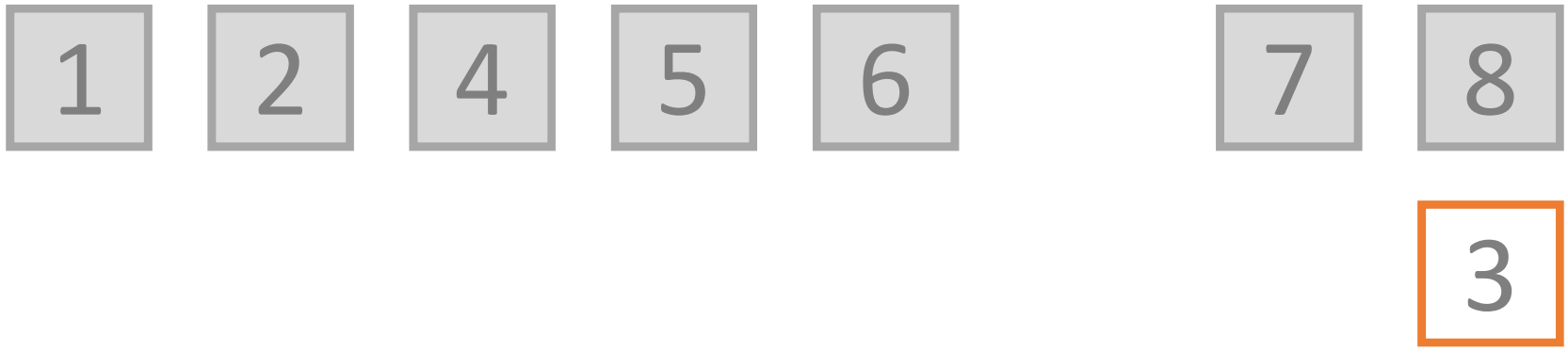

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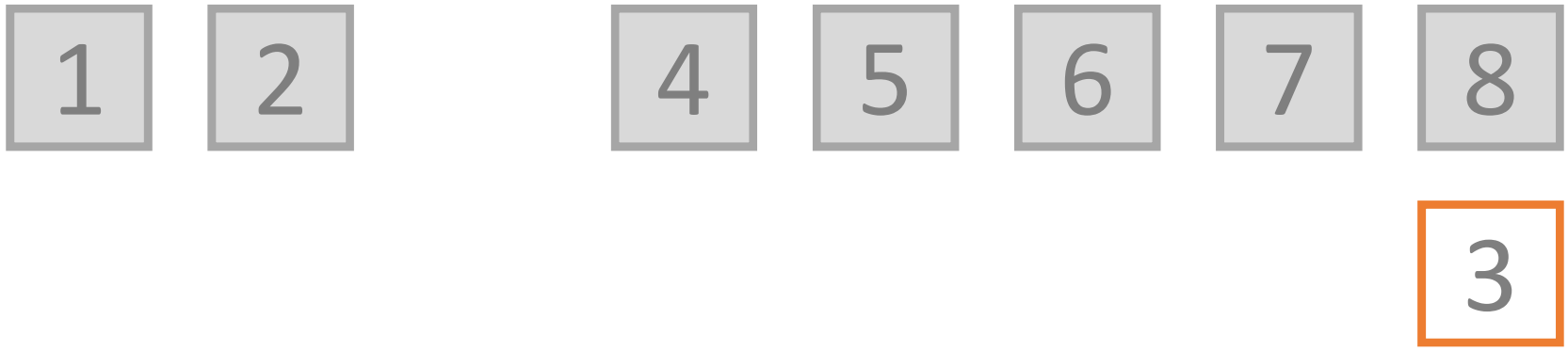

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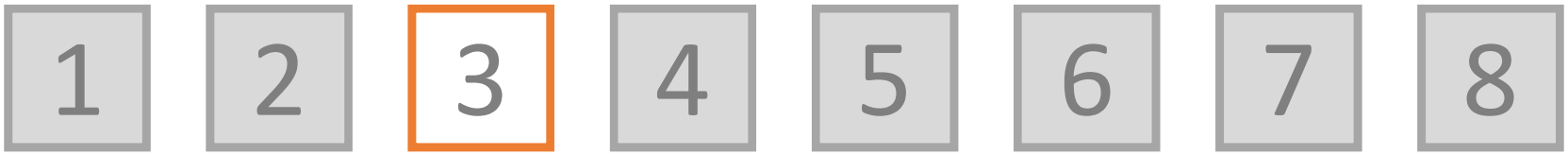

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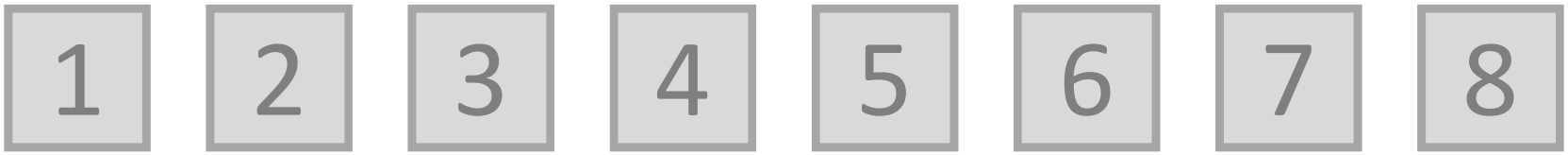

INSERTION SORT

```
void insertionsort (int v[N], int n)
{
        int i, j, aux;
        for(i = 1; i < n; i++)
        {
                j = i;
                aux = v[j];
                while(j > 0 && aux < v[j-1])
                {
                        v[j] = v[j-1];
                        j--;
                }
                v[j] = aux;
        }
}
```

INSERTION SORT

Peor Caso

$O(n^2)$

Cuando el arreglo está ordenado de manera inversa.

Mejor Caso

$\Omega(n)$

Cuando el arreglo ya se encuentra ordenado correctamente.

¿PREGUNTAS?