CODING SHUTTLE

Week 2 LIVE

Basic Array Problems and Sorting Algorithms

In This Lecture

1. Q: Swap two Numbers in an Array
2. Q: Find the Smallest Number in an Array
3. Q: Place the Number in the Sorted position in an Array
4. Bubble Sort
5. Selection Sort
6. Insertion Sort

Swap two Numbers in an Array

```
int a[] = {1, 3, 5, 2, 4}
```

→ i ⇄ j

```
int a = 5;
int b = 2;
```

```
int temp = a[i];
a[i] = a[j];
a[j] = temp;
```

```
temp = a;
a = b;
b = a;
```

```
a = a ^ b
b = a ^ b
a = a ^ b
```

Find the Smallest Number in an Array

a < b

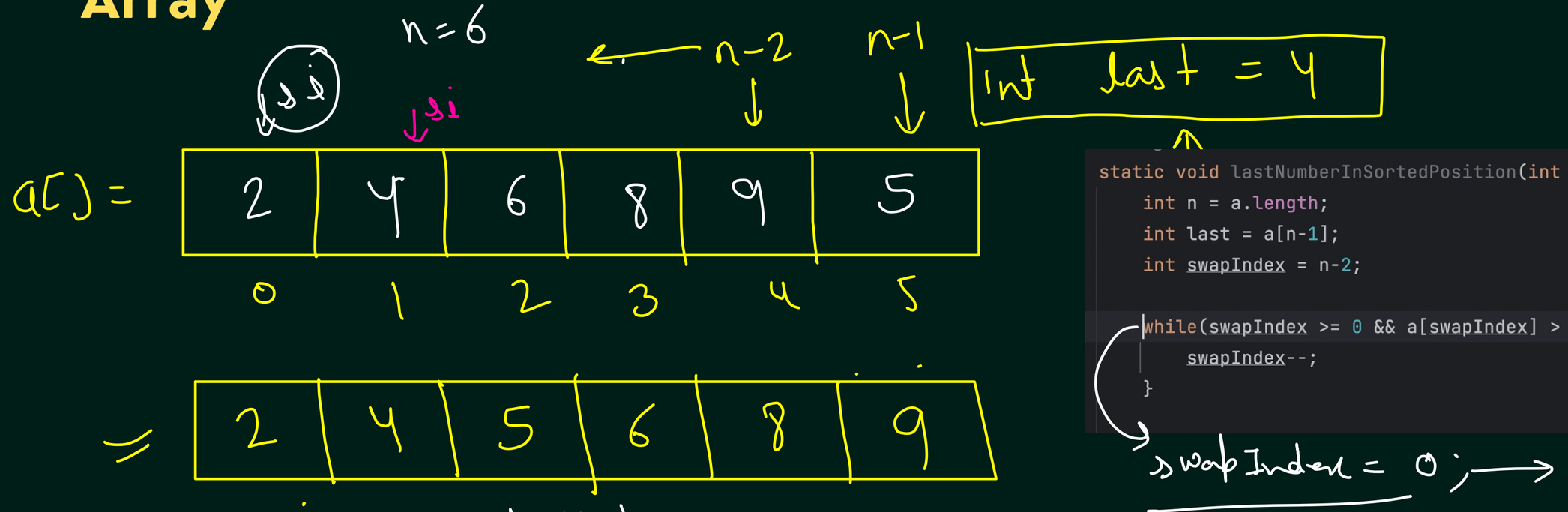
a, b, c

```
int min = Integer.MAX_VALUE; → 2.12 x 10^9

for(int i = 0; i < a.length; i++){
    if(a[i] < min){
        min = a[i];
    }
}
return min;
```

min = 1

Place the Last Number in the Sorted position in an Array



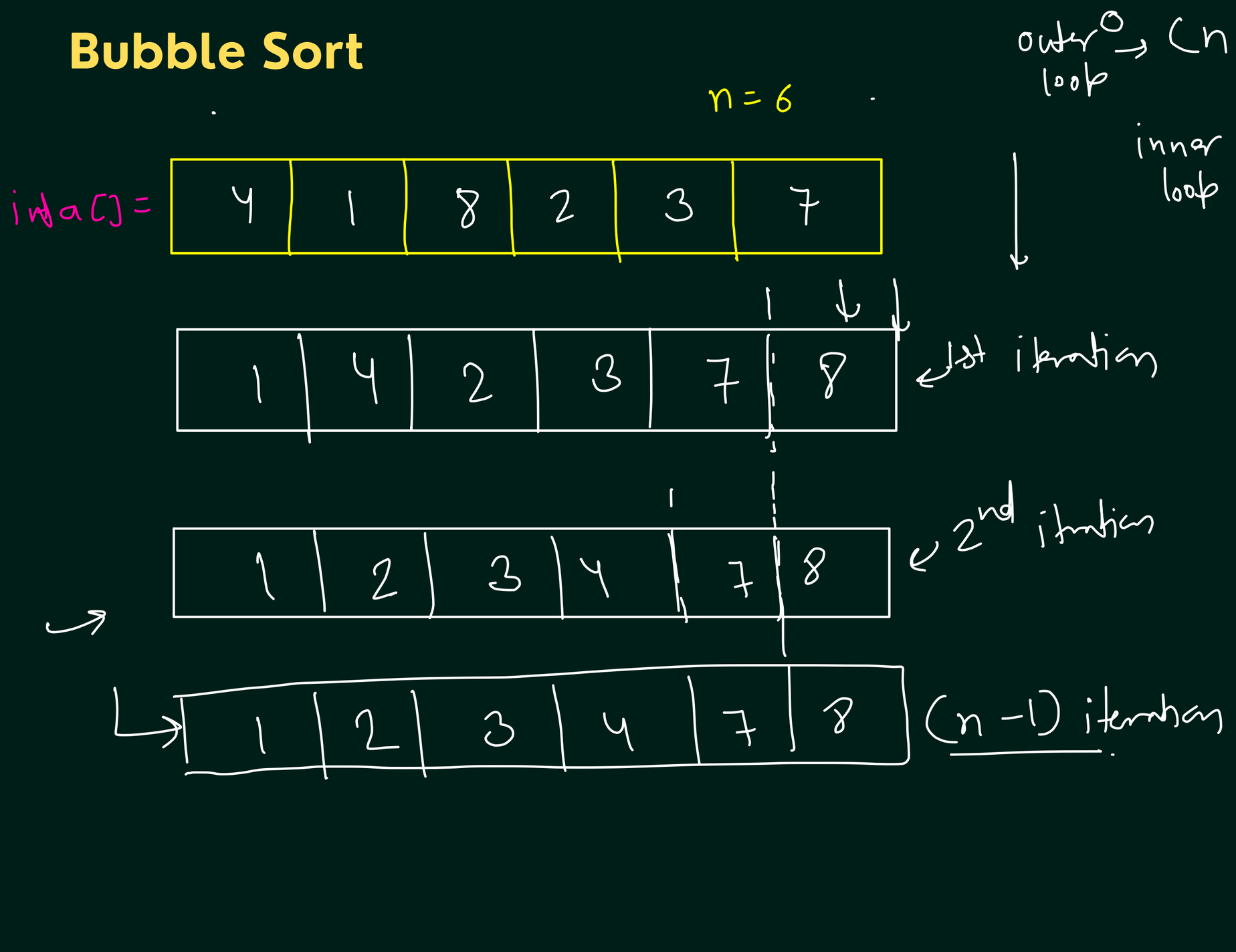

```java
static void lastNumberInSortedPosition(int a[]) {
    int n = a.length;
    int last = a[n-1];
    int swapIndex = n-2;

    while(swapIndex >= 0 && a[swapIndex] > last) {
        swapIndex--;
    }
```

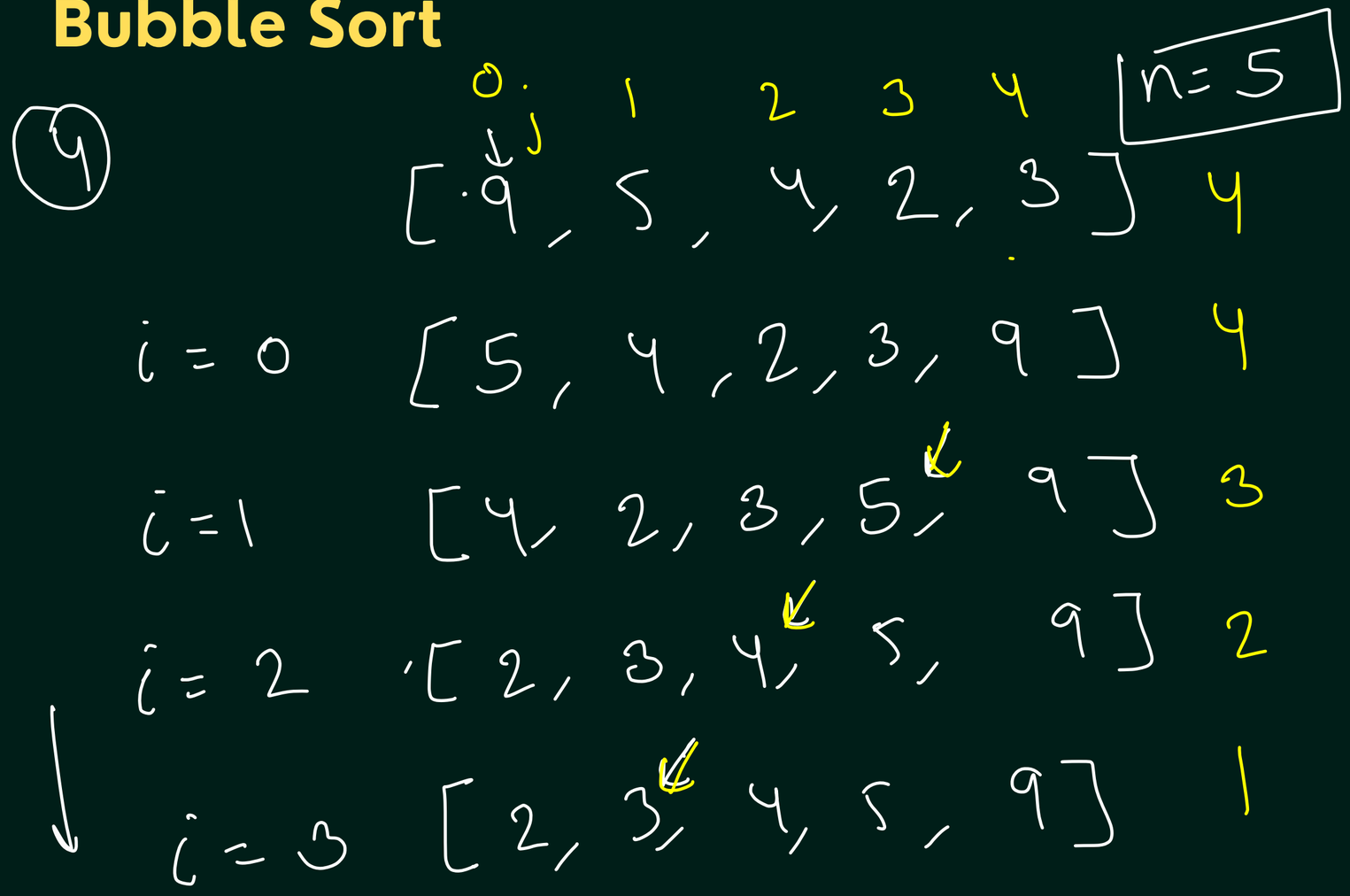
swapIndex = 0;

subIndex + 2

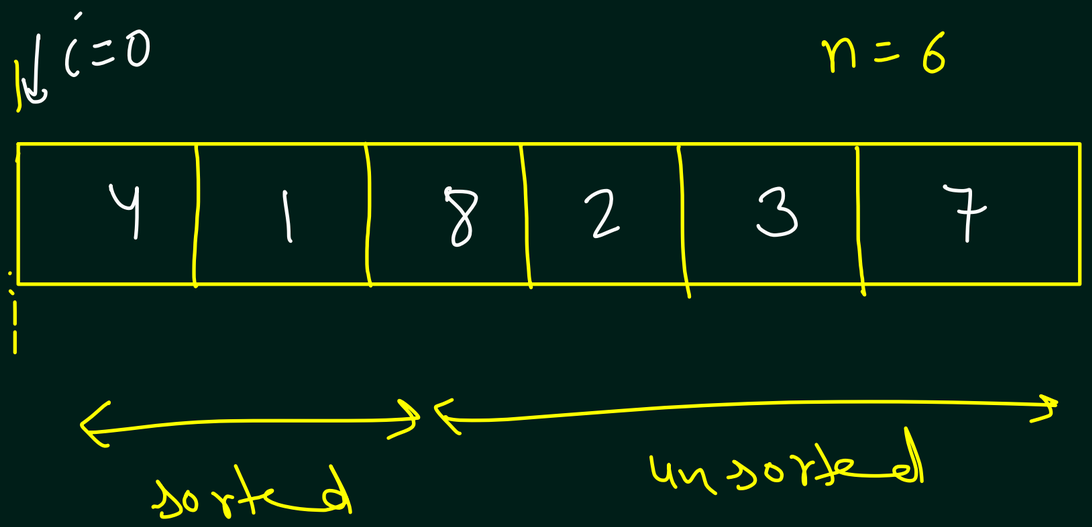
Bubble Sort

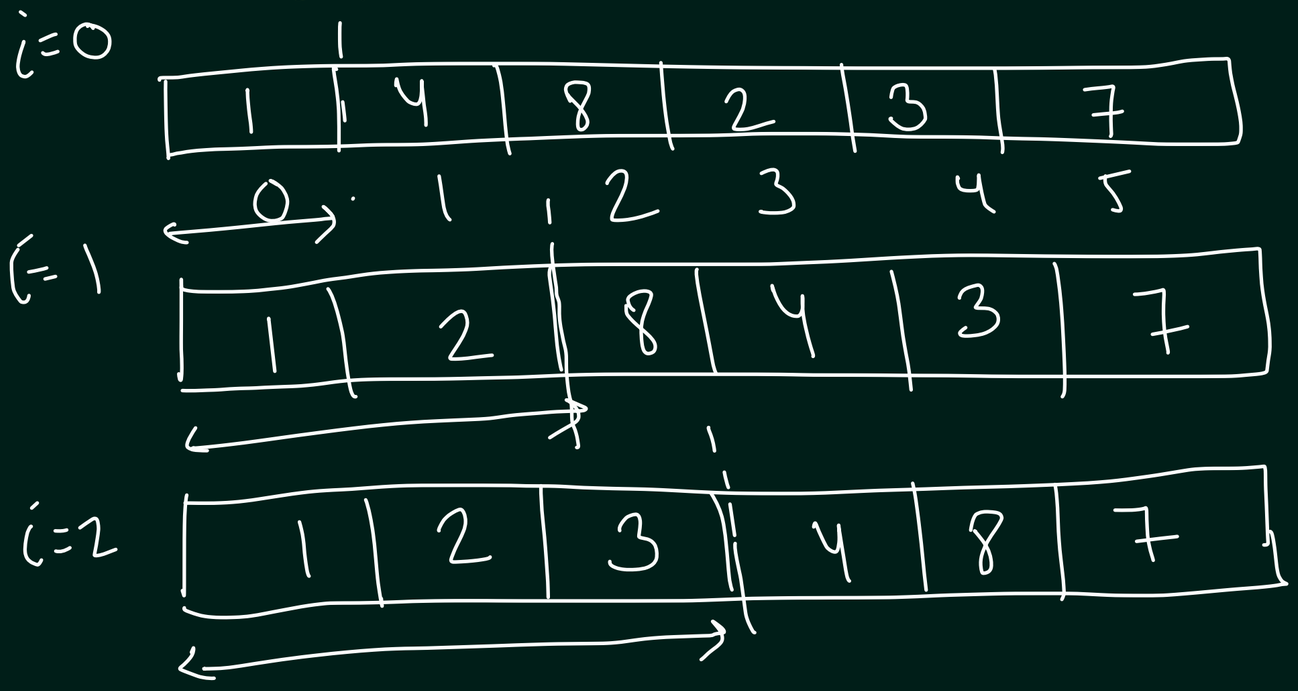

n = 6
outer loop 0 → (n-1)
inner loop 0 → (n-i-1)
int a[] =
4 1 8 2 3 7
1 4 2 3 7 8
1st iteration
1 2 3 4 7 8
2nd iteration
1 2 3 4 7 8
(n-1) iterations

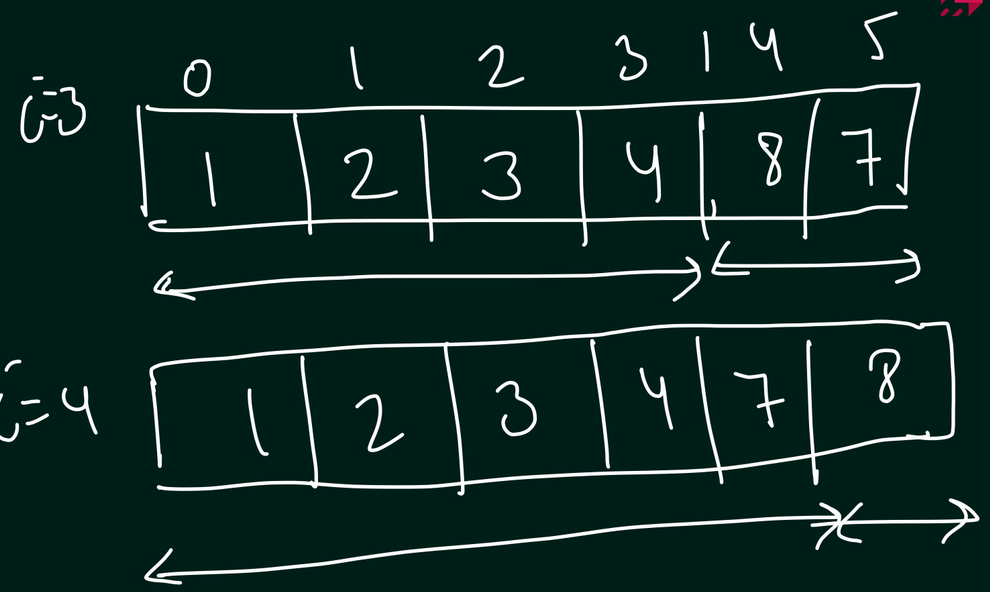
Bubble Sort



Selection Sort







$[i = 0 \rightarrow 4]$

Selection Sort

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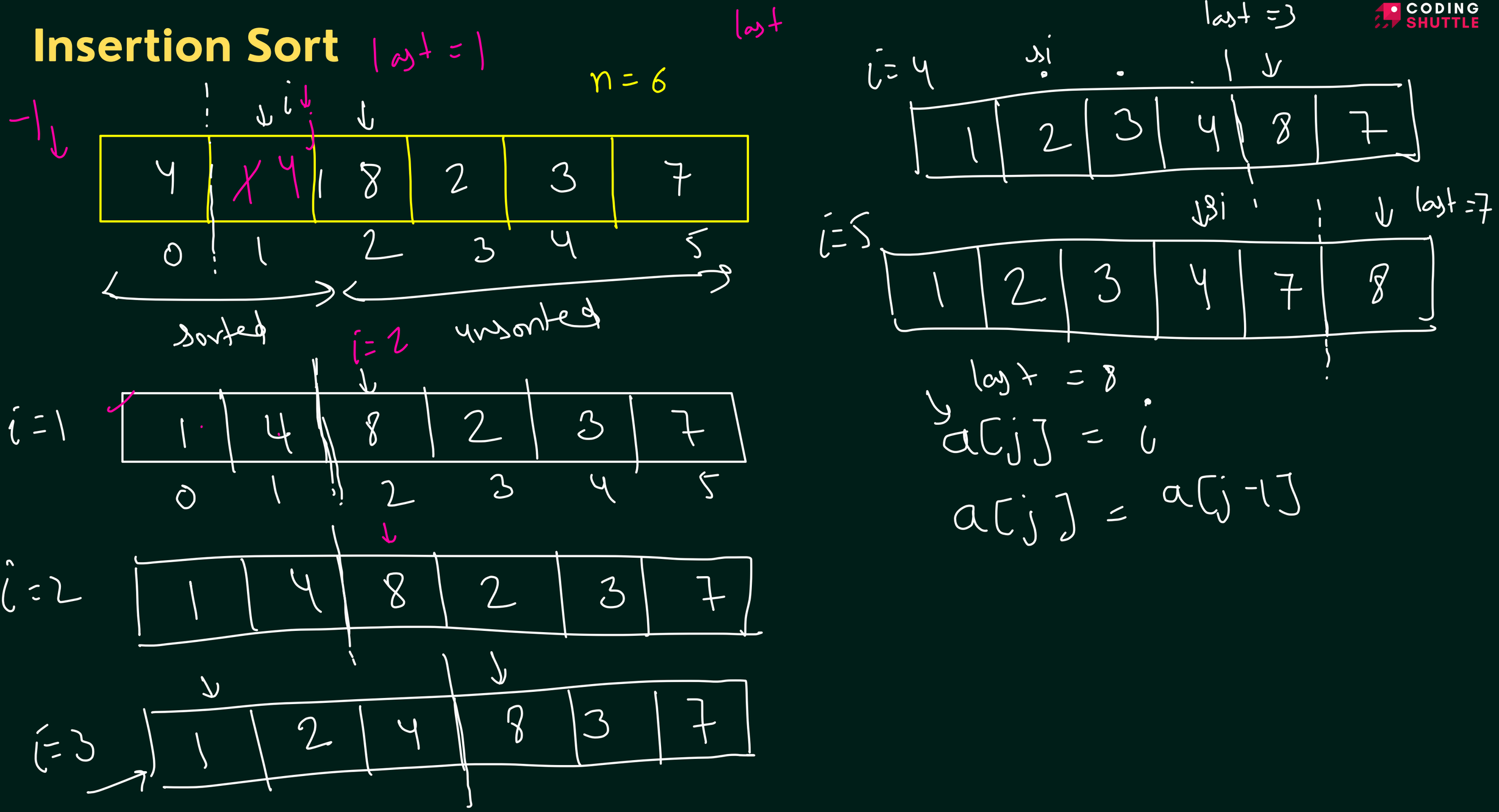
Insertion Sort



Insertion Sort