

# Bubble Sort Pure Rec

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```
void BubbleSortRec(int arr[], int n, int i){
    //base case
    if(i==n-1) return ;

    //rec case
    for(int j =0; j<n-i-1; j++){
        if(arr[j]>arr[j+1]){
            swap(arr[j], arr[j+1]);
        }
    }
    BubbleSortRec(arr, n, i+1);
}
```

In 1 func. we are sorting 1 element.

```
void BubbleSortPureRec(int arr[], int n, int i, int j){
    //base case
    if(i==n-1) return ;

    //rec case
    if(arr[j]>arr[j+1]){
        swap(arr[j], arr[j+1]);
    }
    if(j==n-i-1){
        BubbleSortPureRec(arr, n, i+1, 0);
    }
    else{
        BubbleSortPureRec(arr, n, i, j+1);
    }
}
```

In 1 func. we are comparing 2 elements (we are moving 1 element by just 1 place).

int arr[] = {4, 3, 2, 1}

B3(arr, n, 0, 0);

4  
1 < 1

n-i-1  
4-2-1 = 1

2  
4-1-1 = 2  
2 < 2

return;  
B(arr, n, 3, 0);

2 > 1 → swap  
B(arr, n, 2, 1);

B(arr, n, 2, 0);

3 > 1 → swap.  
B(arr, n, 1, 2);

3 > 2 → swap.  
B(arr, n, 1, 1);

4 > arr[n] × 000  
B(arr, n, 1, 0);

arr n i=2 j=1

arr n i=2 j=0  
1 2 3 4  
0 1 2 3

arr n i=1 j=2  
2 3 3 4

arr n i=1 j=1  
1 2 3 4

arr n i=1 j=0  
1 2 3 4

arr n i=2 j=3

```
void BubbleSortPureRec(int arr[], int n, int i, int j){
    //base case
    if(i==n-1) return
```

i=3, n-1=3

```
void BubbleSortPureRec(int arr[], int n, int i, int j){
```

```
//base case
```

```
* if(i==n-1) return
```

$i=3, n-1=3$

```
//rec case
```

```
if(arr[j]>arr[j+1]){
```

```
    swap(arr[j], arr[j+1]);
```

```
}
```

```
if(j==n-i-1){  $\rightarrow 4-1-1 \rightarrow 2$ 
```

```
    BubbleSortPureRec(arr, n, i+1, 0);
```

```
}
```

```
else{
```

```
    BubbleSortPureRec(arr, n, i, j+1);
```

```
}
```

```
}
```

if ( $i \leq n-i-1$  and  $arr[j] > arr[j+1]$ )

$B(arr, n, 0, 0);$

$4 > 1 \rightarrow \text{swap}$   
 $B(arr, n, 0, 3)$

$4 > 2 \rightarrow \text{swap}$   
 $B(arr, n, 0, 2)$

$4 > 3 \rightarrow \text{swap}$   
 $B(arr, n, 0, 1)$

$B(arr, n, 0, 0);$

arr  
n  
 $j=3$

arr  
n  
 $i=0$   
 $j=2$

arr  
n  
 $i=0$   
 $j=1$

3	2	1	4
0	1	2	3

0	1	2	3
3	4	2	1

$n=4$   
 $i=0$   
 $j=0$

$\rightarrow$ 

1	2	3	4
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