Bubble Sort:

Bubble Sort

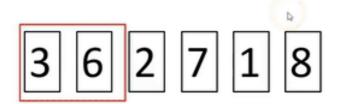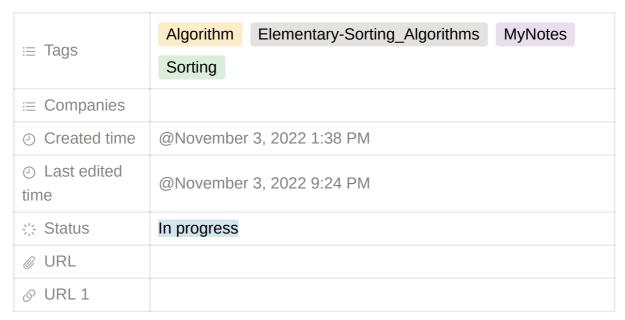|	
☰ Tags	Algorithm Elementary-Sorting_Algorithms MyNotes Sorting
☰ Companies	
⏱ Created time	@November 3, 2022 1:38 PM
⏱ Last edited time	@November 3, 2022 9:24 PM
⟳ Status	In progress
📎 URL	
🔗 URL 1	

Bubble Sort is the simplest sorting algorithm that works by repeatedly swapping the adjacent elements if they are in the wrong order.

it is a in-place sorting algorithm so space complexity of this algorithm is O(1).

and it uses nested loop which makes its average/best/worst time complexity to O(n^2).

How this works:

we start loop from 0 to array.size inside
it we make a nested loop that runs from
1 to array.size-i in each iteration we

check if the Jth element is smaller then
its to left adjacent element if it is then
we swap them otherwise don't do
anything this makes sure we always
have the largest element in index j and
in the end of the inside loop the largest
element end up in the size-i and since
we are incrementing i in each outer loop
iteration we are excluding the element
we set in size-i and after the loop we
have a sorted array.

i	j	0	1	2	3	4	5	6	7
0	0	5	3	1	9	8	2	4	7
	1	3	5	1	9	8	2	4	7
	2	3	1	5	9	8	2	4	7
	3	3	1	5	9	8	2	4	7
	4	3	1	5	8	9	2	4	7
	5	3	1	5	8	2	9	4	7
	6	3	1	5	8	2	4	9	7
1	0	3	1	5	8	2	4	7	9
	1	1	3	5	8	2	4	7	
	2	1	3	5	8	2	4	7	
	3	1	3	5	8	2	4	7	
	4	1	3	5	2	8	4	7	
	5	1	3	5	2	4	8	7	
2	0	1	3	5	2	4	7	8	
	1	1	3	5	2	4	7		
	2	1	3	5	2	4	7		
	3	1	3	2	5	4	7		
	4	1	3	2	4	5	7		
3	0	1	3	2	4	5	7		
	1	1	3	2	4	5			
	2	1	2	3	4	5			
	3	1	2	3	4	5			
4	0	1	2	3	4	5			
	1	1	2	3	4				
	2	1	2	3	4				
5	0	1	2	3	4				
	1	1	2	3					
6	0	1	2	3					
		1	2						

```cpp
void bubbleSort(vector<int> &arr){
  for (size_t i = 0; i < arr.size(); i++)
    for (size_t j = 1; j < arr.size() - i; j++)
      if (arr[j - 1] > arr[j])
        swap(arr[j - 1], arr[j]);
}
```