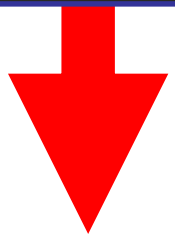
Algorithm

Bubble Sort

Example

Bubble Sort

```
["Donut", "Pizza", "Ice Cream", "Cake"]
```



Sort

```
["Cake", "Donut", "Ice Cream", "Pizza"]
```

Bubble Sort

```
["Donut", "Pizza", "Ice Cream", "Cake"]
```

Bubble Sort

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["Donut", "Ice Cream", "Pizza", "Cake"]
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Bubble Sort

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["Donut", "Cake", "Ice Cream", "Pizza"]
```

Bubble Sort

```
["Cake", "Donut", "Ice Cream", "Pizza"]
```

["Donut", "Pizza", "Ice Cream", "Cake"]

```python
def bubble_sort(lst):
    n = len(lst)

    for i in range(n):
        swapped = False

        for j in range(0, n-i-1):
            if lst[j] > lst[j+1]:
                lst[j], lst[j+1] = lst[j+1], lst[j]
                swapped = True

        if not swapped:
            break
```

```
>>> bubble_sort(["Donut", "Pizza", "Ice Cream", "Cake"])
========> Starting Bubble Sort

Initial list: ['Donut', 'Pizza', 'Ice Cream', 'Cake']
List length: 4

-----> Outer Loop iteration #1

-> Inner Loop iteration #1
Left element: Donut
Right element: Pizza
Already sorted: Donut < Pizza
No change: ['Donut', 'Pizza', 'Ice Cream', 'Cake']
```

["Donut", "Pizza", "Ice Cream", "Cake"]

```python
def bubble_sort(lst):
    n = len(lst)

    for i in range(n):
        swapped = False

        for j in range(0, n-i-1):
            if lst[j] > lst[j+1]:
                lst[j], lst[j+1] = lst[j+1], lst[j]
                swapped = True

        if not swapped:
            break
```

```
-> Inner Loop iteration #2
Left element: Pizza
Right element: Ice Cream
Not sorted: Pizza > Ice Cream
Swapping...
Old list: ['Donut', 'Pizza', 'Ice Cream', 'Cake']
New list: ['Donut', 'Ice Cream', 'Pizza', 'Cake']

-> Inner Loop iteration #3
Left element: Pizza
Right element: Cake
Not sorted: Pizza > Cake
Swapping...
Old list: ['Donut', 'Ice Cream', 'Pizza', 'Cake']
New list: ['Donut', 'Ice Cream', 'Cake', 'Pizza']
```

["Donut", "Ice Cream", "Pizza", "Cake"]

```python
def bubble_sort(lst):
    n = len(lst)

    for i in range(n):
        swapped = False

        for j in range(0, n-i-1):
            if lst[j] > lst[j+1]:
                lst[j], lst[j+1] = lst[j+1], lst[j]
                swapped = True

        if not swapped:
            break
```

```
-> Inner Loop iteration #2
Left element: Pizza
Right element: Ice Cream
Not sorted: Pizza > Ice Cream
Swapping...
Old list: ['Donut', 'Pizza', 'Ice Cream', 'Cake']
New list: ['Donut', 'Ice Cream', 'Pizza', 'Cake']

-> Inner Loop iteration #3
Left element: Pizza
Right element: Cake
Not sorted: Pizza > Cake
Swapping...
Old list: ['Donut', 'Ice Cream', 'Pizza', 'Cake']
New list: ['Donut', 'Ice Cream', 'Cake', 'Pizza']
```

["Donut", "Ice Cream", "Cake", "Pizza"]

```python
def bubble_sort(lst):
    n = len(lst)

    for i in range(n):
        swapped = False

        for j in range(0, n-i-1):
            if lst[j] > lst[j+1]:
                lst[j], lst[j+1] = lst[j+1], lst[j]
                swapped = True

        if not swapped:
            break
```

```
-> Inner Loop iteration #2
Left element: Pizza
Right element: Ice Cream
Not sorted: Pizza > Ice Cream
Swapping...
Old list: ['Donut', 'Pizza', 'Ice Cream', 'Cake']
New list: ['Donut', 'Ice Cream', 'Pizza', 'Cake']

-> Inner Loop iteration #3
Left element: Pizza
Right element: Cake
Not sorted: Pizza > Cake
Swapping...
Old list: ['Donut', 'Ice Cream', 'Pizza', 'Cake']
New list: ['Donut', 'Ice Cream', 'Cake', 'Pizza']
```

["Donut", "Ice Cream", "Cake", "Pizza"]

```python
def bubble_sort(lst):
    n = len(lst)

    for i in range(n):
        swapped = False

        for j in range(0, n-i-1):
            if lst[j] > lst[j+1]:
                lst[j], lst[j+1] = lst[j+1], lst[j]
                swapped = True

        if not swapped:
            break
```

```
-----> Outer Loop iteration #2

-> Inner Loop iteration #1
Left element: Donut
Right element: Ice Cream
Already sorted: Donut < Ice Cream
No change: ['Donut', 'Ice Cream', 'Cake', 'Pizza']

-> Inner Loop iteration #2
Left element: Ice Cream
Right element: Cake
Not sorted: Ice Cream > Cake
Swapping...
Old list: ['Donut', 'Ice Cream', 'Cake', 'Pizza']
New list: ['Donut', 'Cake', 'Ice Cream', 'Pizza']
```

["Donut", "Cake", "Ice Cream", "Pizza"]

```python
def bubble_sort(lst):
    n = len(lst)

    for i in range(n):
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        for j in range(0, n-i-1):
            if lst[j] > lst[j+1]:
                lst[j], lst[j+1] = lst[j+1], lst[j]
                swapped = True

        if not swapped:
            break
```

```
-----> Outer Loop iteration #2

-> Inner Loop iteration #1
Left element: Donut
Right element: Ice Cream
Already sorted: Donut < Ice Cream
No change: ['Donut', 'Ice Cream', 'Cake', 'Pizza']

-> Inner Loop iteration #2
Left element: Ice Cream
Right element: Cake
Not sorted: Ice Cream > Cake
Swapping...
Old list: ['Donut', 'Ice Cream', 'Cake', 'Pizza']
New list: ['Donut', 'Cake', 'Ice Cream', 'Pizza']
```

["Donut", "Cake", "Ice Cream", "Pizza"]

```python
def bubble_sort(lst):
    n = len(lst)

    for i in range(n):
        swapped = False

        for j in range(0, n-i-1):
            if lst[j] > lst[j+1]:
                lst[j], lst[j+1] = lst[j+1], lst[j]
                swapped = True

        if not swapped:
            break
```

```
-----> Outer Loop iteration #3

-> Inner Loop iteration #1
Left element: Donut
Right element: Cake
Not sorted: Donut > Cake
Swapping...
Old list: ['Donut', 'Cake', 'Ice Cream', 'Pizza']
New list: ['Cake', 'Donut', 'Ice Cream', 'Pizza']


-----> Outer Loop iteration #4

There was no need to swap! The list is now sorted
['Cake', 'Donut', 'Ice Cream', 'Pizza']
```

["Cake", "Donut", "Ice Cream", "Pizza"]

```python
def bubble_sort(lst):
    n = len(lst)

    for i in range(n):
        swapped = False

        for j in range(0, n-i-1):
            if lst[j] > lst[j+1]:
                lst[j], lst[j+1] = lst[j+1], lst[j]
                swapped = True

        if not swapped:
            break
```

```
-----> Outer Loop iteration #3

-> Inner Loop iteration #1
Left element: Donut
Right element: Cake
Not sorted: Donut > Cake
Swapping...
Old list: ['Donut', 'Cake', 'Ice Cream', 'Pizza']
New list: ['Cake', 'Donut', 'Ice Cream', 'Pizza']


-----> Outer Loop iteration #4

There was no need to swap! The list is now sorted
['Cake', 'Donut', 'Ice Cream', 'Pizza']
```

Time to Practice!