# Bubble sort

Sorting is where you have a list of numbers not in order and to sort/put them in order.

For example:

Unsorted: [3, 2, 4, 3, 7, 9, 5, 6, 2]

Sorted: [2, 2, 3, 3, 4, 5, 6, 7, 9]

Bubble sort is one of the many ways to sort numbers.

You compare two numbers of the list at a time, if they are in the wrong order they are swapped.

This is repeated for the whole list.

Let's get started :)

0. Open up the IDLE and create new file(CTRL+N)

1. Save it as bubble_sort.py

2. Give it a list to sort. An example would be:
   ```
   a = [3, 2, 4, 3, 7, 9, 5, 6, 2]
   ```
   You can name it whatever you want

3. We want to add a loop, a while loop. It would repeat as long as the list is not sorted. We want the loop to run at the first time, so we set a variable. A Boolean can be only true or false.
   ```
   sort = False
   ```

4. Now add the while loop. Remember all the lines in the loop should be indented.
   ```
   while not sort:
   ```
   The `not` is used to tell it to loop only when sort is False

5. To prevent the loop from never ending, we now need to assume the list is sorted.
   ```
   sort = True
   ```

6. Now we need a for loop to loop through the list. The amount it will loop is the length of the list minus 1(you'll see why later)

```python
for i in range(len(a) - 1):
```

7. Now we compare the list items. Here a[i] refers to the current item and a[i+1] is the item after the current one. Remember everything inside needs to be indented one more than the if statement.

```python
if a[i] > a[i+1]:
```

8. Since this would only happen if the list was not sorted, let's set sorted to False.

```python
sort = False
```

9. Now we swap the two numbers. This will first store the first number in a temporary variable, set the first number as the second number, and then set the second number to the temporary variable.

```python
temp = a[i]
a[i] = a[i+1]
a[i+1] = temp
```

There's a shorthand that does exactly the same thing:

```python
a[i], a[i+1] = a[i+1], a[i]
```

10. We now need to add an elif block(last 2 lines). It runs when we have gone through the whole list without any swapping:

```python
if a[i] > a[i+1]:
    sort = False
    a[i], a[i+1] = a[i+1], a[i]
elif i == len(a):
    sort = True
```

11. Now print the output:

```python
print(a)
```

12. Upload the code onto GitHub

Extra: give it a longer list and let it sort it.