WK03\Assignement03_isSorted_&_bubble_sort.py

```python
1   x = [100,65,11,7,8,8,8,5,3,18,3,5,1,2,34,76,3,3,98]
2   y = sorted(x)
3   z = list(reversed(y))
4
5   # class example
6   # def isSorted(arr):
7   #     return arr == sorted(arr) or arr == list(reversed(sorted(arr)))
8
9   def isSorted(arr: list) -> tuple | bool:
10      '''
11      isSorted checks to see if the input list/array is in ascending or descending order.
12
13      Parameters
14      ----------
15      arr : list
16          Input array of values
17
18      Returns
19      -------
20      tuple | bool
21          If the input list/array is sorted, returns a tuple with two entries: boolean True and
    either "ascending" or "descending".\n
22          Otherwise returns the boolean, False.
23      '''
24      for i in range(len(arr)-1):
25          if arr[i] > arr[i+1]:
26              for j in range(len(arr)-2):
27                  if arr[j+1] < arr[j+2]:
28                      return False
29                  else:
30                      continue
31              return True, 'descending'
32          else:
33              continue
34      return True, 'ascending'
35
36
37  def bubble_sort(arr: list, ascending: bool = True) -> list:
38      '''
39      bubble_sort takes in a list/array and, based on the optional bool parameter,\n
40      sorts the array in ascending (default) or descending order.
41
42      Parameters
43      ----------
44      arr : list
45          Input array of values
46      ascending : bool, optional
47          Sort the list in ascending (True) or descending (False) order, by default True
```

```python
48
49        Returns
50        -------
51        list
52            Returns a sorted list/array with respect to the input list/array
53        '''
54
55        if ascending == False:
56            for j in range(len(arr)):
57                for i in range(len(arr)-1, 0+j, -1):
58                    if arr[i] > arr[i-1]:
59                        arr[i], arr[i-1] = arr[i-1], arr[i]
60        else:
61            for j in range(len(arr)):
62                for i in range(len(arr)-1-j):
63                    if arr[i] > arr[i+1]:
64                        arr[i], arr[i+1] = arr[i+1], arr[i]
65        return arr
66
67    print('\nTesting "isSorted" Function\n')
68
69    print('x is not sorted.\t\t\tTesting: is x sorted?', isSorted(x))
70    print('y is sorted in ascending order.\t\tTesting: is y sorted?', isSorted(y))
71    print('z is sorted in descending order.\tTesting: is z sorted?', isSorted(z))
72
73    print("\n----------------------------------------------------\n")
74
75    print('Testing "bubble_sort" Function\n')
76
77    print("Unsorted starting array:\n", x)
78    print("\nAfter bubble_sort, ascending:\n", bubble_sort(x, True))
79    print("Compared to Python sorting:\n", y)
80
81    print("\nAfter bubble_sort, descending:\n", bubble_sort(x, False))
82    print("Compared to Python reversed array:\n", z)
83    print()
```