Lecture 08 - Bubble Sort
What is Bubble Sort?

- The most simple sorting algorithm
- Compares adjacent array elements
- Exchanges their values if they are out of order
- Smaller values bubble up to the top of the array
- Larger values sink to the bottom
An Example of Bubble Sort
An Example of Bubble Sort
Bubble Sort Algorithm

procedure bubbleSort( A : list of sortable items ) defined as:
do
    swapped := false
    for each i in 0 to length(A) - 2 inclusive do:
        if A[i] > A[i+1] then
            swap( A[i], A[i+1] )
            swapped := true
        end if
    end for
    while swapped
end procedure
Bubble Sort Running Time

- Excellent performance in some cases.
- But very poor performance in others.
- Works best when array is nearly sorted to begin with.
- Worst case number of comparisons: $O(n^2)$
- Worst case number of exchanges: $O(n^2)$
- Best case occurs when the array is already sorted.
  - $O(n)$ comparisons
  - $O(1)$ exchanges (none actual)
More Sorting

- Shell sort
- Quick sort
- Merge sort
- Other sorting techniques such as radix, heap sort (if time permits)
Questions
Time for Quiz