# Problem-Based Introduction to Computer Science
# Bubblesort Homework

## Problem

For homework this week, your task is to implement the Bubblesort algorithm. You will use Bubblesort to sort numbers.

Bubblesort works by repeatedly `bubbling' the largest element from the start to the end of the list. The basic operation in bubblesort is swapping a pair of adjacent list elements. Starting with the first two list elements, if the left element is larger than the right, the two elements are swapped. This comparison-and-swap procedure is repeated for each pair of adjacent elements from the start to the end of the list. At the end of the first pass over the list, the largest value will be at the end of the list, as illustrated below.

Input: 3 5 4 2
Pass 1:
Compare 3 & 5; they are in order so no action
Compare 5 & 4; they are out of order, swap
3 4 5 2
Compare 5 & 2; they are out of order, swap
3 4 2 5
End of pass 1; Notice that the 5 has “bubbled” to the top

Pass 2: Data is now 3 4 2 5
Compare 3 & 4; they are in order so no action
Compare 4 & 2; they are out of order; swap
3 2 4 5
Compare 4 & 5; they are in order so no action
End of pass 2; Notice that the 4 has now “bubbled” to the top

Note that additional passes are needed to finish sorting the list. We will repeatedly pass over the list starting from the first two elements, until we make a pass in which no swaps are made, indicating that the list has been sorted.

In keeping with this week's other problems, you should use iteration rather than recursion to implement Bubblesort (e.g. use for or while loops), sorting each list of numbers in-place. *You* must implement this sort – you may not use any sort functions built into Python.

Your solution must do the following:

1. Prompt for an input file name. The file will consist only of integer values, one per line
2. Open the file, read the file, and store the data in a list
3. Print the list
4. Call your Bubblesort
5. Reprint the (now sorted) list

Create your own input files to test your solution.

## Submission

Do not submit your code until you have thoroughly tested your solution! Implement your solution in a file named bubble.py. Submit bubble.py to the Homework 5 myCourses dropbox.