

The Bubble Sort

and

Other Sorts of Sorts

One job that computers often do (and they do it well!) is sorting. For example, the inbox of my email program usually shows my mail sorted by date (and time) received. But if I wish, I can click a button and the computer will show me my emails sorted by sender or by subject. And even though there are hundreds of emails to sort, it takes less than a second!

How does the computer know how to do this job? Well, a human being (or a human team) programmed it. Someone had to give the computer step-by-step instructions to know how to do this job. The step-by-step instructions can be called an algorithm.

There are many sorting algorithms, and one of the simplest is called the bubble sort. To help us understand it we'll watch a wonderful video. Someone at Sapientia University in Romania must really love computer science *and* folk dancing. (On Youtube, Fuzesi Albert is listed as the choreographer.) On this channel you can see several sorting algorithms demonstrated by wonderful dancing to great music. Here's the video of the bubble sort:

<http://www.youtube.com/watch?v=lyZQPjUT5B4>

(There's a dance intro until about the 52 second mark, then the sorting begins.)

- 1) You'll work in a team of four or five students. Each child needs to wear a number (0, 1, 2...). Line up in a random unsorted way, and do the bubble sort until you're in order!
- 2) Describe how the bubble sort works using words. Use pictures too, if you wish.
- 3) Can you and your team learn one of the other sorting algorithms shown in the videos? (I kinda like the quicksort.)
- 4) In sorting algorithms we're comparing two elements at a time, and there are two possible outcomes each time, either $a > b$, or $b > a$. So you can show all the possible outcomes of a sorting algorithm as a binary tree! Try to learn how to do that!
- 5) But how does the computer do it so quickly?! Can you find out something about the speed of modern computers? How is the speed measured?
- 6) Whoa! Where does that word *algorithm* come from? Do a little research! (And remember to cite your sources.)
- 7) Bring in some music you like and perform the bubble sort to your music.
- 8) Have fun!