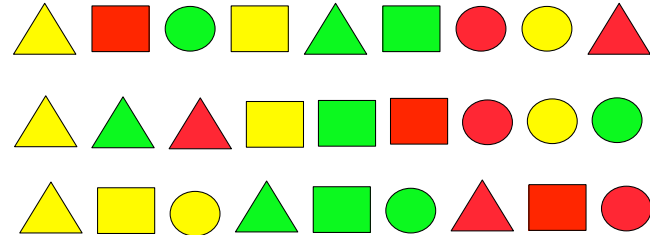


New sorting algorithms happen ...

- **timsort is standard on...**
 - Python as of version 2.3, Android, Java 7
 - According to <http://en.wikipedia.org/wiki/Timsort>
 - Adaptive, stable, natural mergesort with supernatural performance
- **What is mergesort? Fast and Stable**
 - What does this mean?
 - Which is most important?
 - Nothing is faster, what does that mean?
 - Quicksort is faster, what does that mean?

Stable, Stability

- **What does the search query 'stable sort' show us?**
 - Image search explained
 - Why are numeric examples so popular?

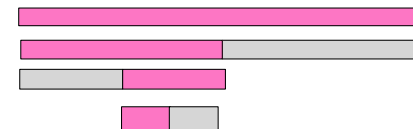


Comparing Algorithms

- **Searching a list of N elements for a specific value**
 - Worst case is
- **Doing binary search (guess a number), sorted list**
 - Worst case is ...
- **Sorting using merge sort**
 - Worst case is ...
- **Naïve finding which ball collides with specific ball**
 - Worst case is ...

Binary Search

- **Before the first guess, there are 1024 numbers**



How many times can we divide list in half?
 $\log_2(N)$ for N element list, why?
What must be true to use binary search?
How is this done in Python?

Bubble Sort, A Personal Odyssey

```

11/08/77 17:23:11 page 0
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00000 = LUPP001;
001 2UT00;
3770
3780
3790
3800
3810
3820 SORT: procedure(hold);
3830 /* SORT sorts BUFFER into alphabetical order
3840 it presently uses bubble sort and an index array */
3850
3860 /* # entries */
3870
3880 /* # holes in catalog */
3890
3900 /* initialize for no hole
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end;

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17 Nov 75 V28007
Caren Astrachan
(role advised terminal)
95

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Brian Reid (Hopper Award 1982)

Feah. I love bubble sort, and I grow weary of people who have nothing better to do than to preach about it. Universities are good places to keep such people, so that they don't scare the general public.

(continued)



Brian Reid (Hopper 1982)

I am quite capable of squaring N with or without a calculator, and I know how long my sorts will bubble. I can type every form of bubble sort into a text editor from memory. If I am writing some quick code and I need a sort quick, as opposed to a quick sort, I just type in the bubble sort as if it were a statement. I'm done with it before I could look up the data type of the third argument to the quicksort library.

I have a dual-processor 1.2 GHz Powermac and it sneers at your N squared for most interesting values of N . And my source code is smaller than yours.

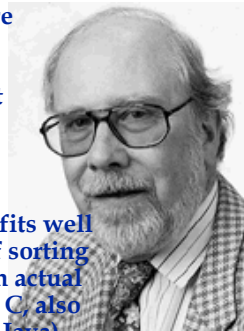
Brian Reid
who keeps all of his bubbles sorted anyhow.



Niklaus Wirth (Turing award 1984)

I have read your article and share your view that Bubble Sort has hardly any merits. I think that it is so often mentioned, because it illustrates quite well the principle of sorting by exchanging.

I think BS is popular, because it fits well into a systematic development of sorting algorithms. But it plays no role in actual applications. Quite in contrast to C, also without merit (and its derivative Java), among programming codes.



Owen O' Malley

- Debugging can be frustrating, but very rewarding when you find the cause of the problem. One of the nastiest bugs that I've found when I was at NASA and the Mars Explorer Rovers had just landed on Mars.

<http://sortbenchmark.org/>

Hadoop sets Terabyte sort record

- Java
- 34252 nodes
- Greedy!

