



CS10 The Beauty and Joy of Computing

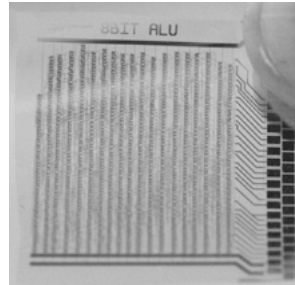
Lecture #17 Higher Order Functions I 2011-10-31

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(Image Credit: Technology Review)

FIRST PLASTIC PROCESSOR!

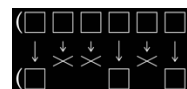
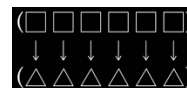
Silicon (normally what processors are made of) is rigid and expensive, and researchers in Europe recently used 4k plastic transistors to create a flexible microprocessor 2cm² big.

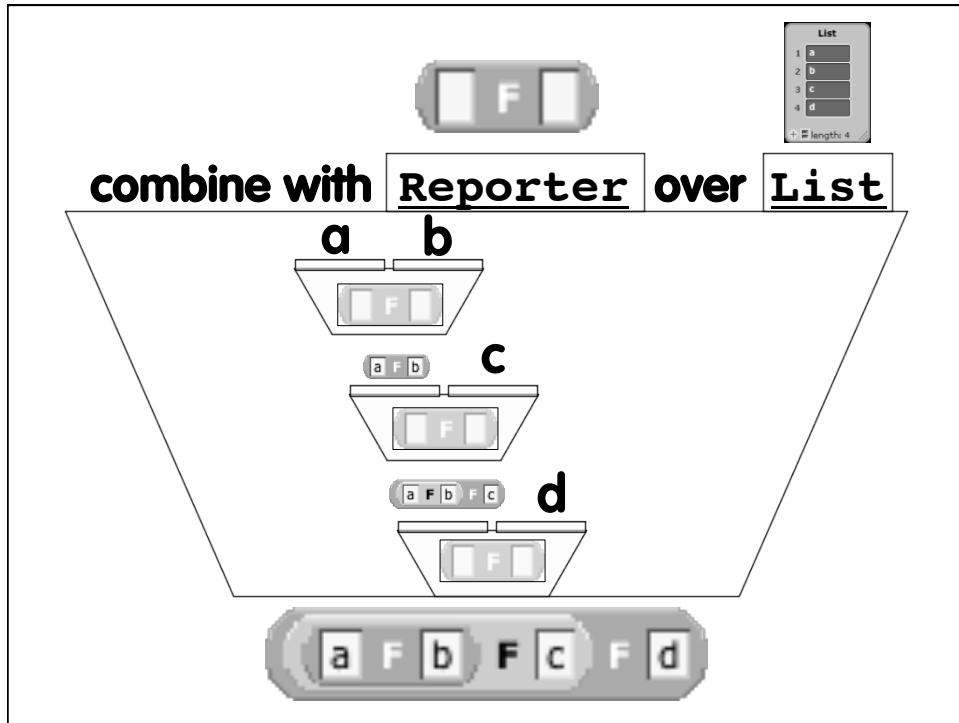


technologyreview.com/computing/37126

Today

- Functions as Data
- Higher-Order Functions
- Useful HOFs (you can build your own!)
 - map Reporter over List
 - Report a new list, every element E of List becoming Reporter(E)
 - keep items such that Predicate from List
 - Report a new list, keeping only elements E of List if Predicate(E)
 - combine with Reporter over List
 - Combine all the elements of List with Reporter(E)
 - This is also known as "reduce"
- Acronym example
 - keep → map → combine





Summary

- **Functions as data is one of the two (programming) big ideas in this course**
- **It's a beautiful example of the abstraction of the list iteration details**
- **Google (and other companies) use this!**
 - They use "map-reduce"

(Image Credit: *Simply Scheme* by Brian Harvey & Matt Wright)

