



# The Beauty and Joy of Computing

## Higher Order Functions I

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### 9 PROBLEMS WITH BIG DATA!

In a refreshing NY Times Op-Ed, Gary Marcus and Ernest Davis tell us that Big Data is useful, but often overhyped as the panacea. Great as a tool, but keep in perspective!



(Image Credit: New York Times)



www.nytimes.com/2014/04/07/opinion/eight-no-nine-problems-with-big-data.html

### Why use functions? (review)

The power of generalization!

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### But how general can we be?

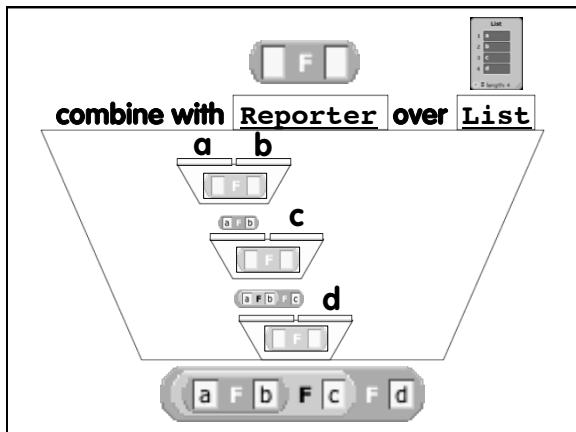
The power of generalization!

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### 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

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### 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"

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