Exercise

- Write instructions to make a peanut butter and jelly sandwich.
- You have:
  - jar of peanut butter
  - jar of jelly
  - bagged loaf of bread
  - butter knives

Algorithm

- **algorithm**: a step-by-step procedure for solving a problem
- **program**: instructions for a computer; an algorithm expressed in a *programming language* (vs. *natural language*)
  - The programming language we will use in this class is called JavaScript.

Programming is just like Legos…
Logic Test

- Computers are stupid.
- Computers can't read minds.
- Computers don't make mistakes.

Therefore, if your computer program is not doing what you want …

it is because YOU made a mistake!

Exercise

- Write an algorithm to sort a list of one million numbers.
  - How do you start thinking up a solution?
  - Start small: How do you sort a list of four numbers?
  - Experience helps: How were similar problems solved?

I think the bubble sort would be the wrong way to go.

Barack Obama, when asked by Google CEO Eric Schmidt about "the most efficient way to sort a million 32-bit integers", 11/14/2007

Algorithmic Efficiency

- Not all algorithms are created equal.
- The most obvious solution is not necessarily the most efficient.
  - Could be the difference between an instant and waiting a lifetime (or more?)
  - If we wait long enough, will the question of algorithm efficiency disappear as faster and faster computers come into existence?
    - No. There will always be bigger problems to solve with more and more data.

In this class, do not consider efficiency when writing programs—stick with the most obvious algorithm.

Why Programming Is Hard

- Programming is a fairly detail-oriented task. There is no room for mistakes.
  - Did you forget a semi-colon?
  - Did you use the wrong capitalization?
  - If you keep making the same small mistakes, you will get easily frustrated.
    - Learn from your mistakes and make sure to minimize them.

- Programming requires the ability to think logically.