Slide 1

Administrivia

- None.

Slide 2

Infinite Sets are Interesting, Continued

- Finite sets have finite sizes.
- The "smallest" infinite set is $\mathbb{N}$. Many other infinite sets are the "same size" — e.g., $\mathbb{Z}$, $\mathbb{Q}$. This set's size is referred to as $\aleph_0$ ("aleph null"). Assuming that these sizes can be ordered, the "next bigger" size is $\aleph_1$, etc.
- $\mathbb{R}$ is "bigger", and the Continuum Hypothesis says it has size $\aleph_1$. Interestingly enough, $\mathbb{R}^2$ is "the same size" as $\mathbb{R}$, etc.
- And then there are infinitely many bigger sizes, since in general we can prove that S and $\mathscr{P}(S)$ are not "the same size". The proof is by contradiction and is — interesting? clever?

Slide 3

Recursion Can Be Fun (?)

- Let's try to define integer arithmetic (well, for non-negative integers) without `int`s as follows:
  - Let n be some sort of list of n elements. We could implement this as something even simpler than a linked list — just a chain of pointers.
  - Define "primitive" operations `isZero`, `add1`, `sub1`.
  - Try to build arithmetic and relational operations using primitive operations and recursion.
- Do you think this is doable in actual code? How much slower do you think it will be?

Slide 4

Minute Essay

- None — sign in.