CS313H
Logic, Sets, and Functions: Honors
Fall 2012

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Challenge

- Prove that for any non-empty set A, there does not exist a bijective function from A to P(A) where P(A) is power set of A (remember that A could be infinite).

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Are there any questions?

Logistics

- Quest last question removed from score
  - Assume Natural numbers ($\mathbb{N}$) start at 1

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  - Assume Natural numbers ($\mathbb{N}$) start at 1
- Next week has relatively little new material
  - Time for concepts to sink in
  - Test review

Quiz!

- Write the **power set** of $\{A, 1\}$:
  $P(\{A, 1\}) = ?$
- Write the **Cartesian product** of $\{A, B\}$ and $\{C, D\}$:
  $\{A, B\} \times \{C, D\} = ?$
- Which of the pictures on the board is an **injection**?
- Which of the pictures on the board is a **surjection**?
- Which of the pictures on the board is a **bijection**?

Challenge

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Prove or disprove

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  Answer: Let $A = \{1, 2, 3\}$ and $f(1) = 1$, $f(2) = 2$ and $f(3) = 1$. Let $Y = \{1, 2\}$ and $Z = \{2, 3\}$. We have $Y \cap Z = \{2\}$ and $f(Y \cap Z) = f(\{2\}) = \{2\}$. However, since $f(Y) = f(\{1, 2\}) = \{1, 2\}$ and $f(Z) = f(\{2, 3\}) = \{1, 2\}$, we have $f(Y) \cap f(Z) = \{1, 2\} \neq f(Y \cap Z)$. Done.

Last Quest Problem

- $f(x, y) = (1/2)(x + y - 2)(x + y - 1) + y$

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Assignments for Tuesday

- Fourth homework **due at start of class**
- Modules 16.6 with associated readings