

## CSI 35 LECTURE NOTES (Ojakian)

### Topic 3: Strong Induction and Well Ordering

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#### OUTLINE

(References: Wells 102-104, Rosen: 5.2)

1. Strong Induction
  2. Well-Ordering
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#### 1. Strong Induction

- (a) Example 1 (about ladders)
- (b) Example 2: Write every integer (greater than 1) as a product of primes.
- (c) Example 4: Prove that every amount of postage of 12 cents or more can be formed using just 4-cent and 5-cent stamps (note: can do with usual induction too).

#### 2. Mistakes in Strong Induction

- (a) Exercises 29, 30, 32

#### 3. Well-ordering and why induction works?

- (a) Smallest counter-example for natural numbers. For integers? For reals?
- (b) Consider: Well-ordering principle  $\Rightarrow$  Induction Principle.

#### 4. Exercises

- (a) Basic: 1, 2
- (b) Stamp-like questions: 3 - 8
- (c) Miscellaneous: 10 (bar breaking), 12 (powers of two)