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Today Preliminaries; recursion theorem recap. $\S 0.*$ (thoroughly); $\S 6.1$ (the best you can). Next class Finite-state automata. $\S 1.1, 1.2$.

- 1. List the members of your group below. Underline your name.
- 2. Use the scheme described on p. 247 of the textbook to generate a concrete implementation of the *self* program.

Ask questions and use group discussions to clarify ideas.

Explain how your program works by detailing the correspondence between its elements and those in the description.

- 3. Let $A = \{1, 2, 4, 8, 16, \dots, 1024\}$ and $B = \{n \in \mathbb{Z} \mid 0 < n \le 100 \land \sqrt{n} \in \mathbb{Z}\}.$
 - (a) Provide a compact implicit definition of A.
 - (b) Enumerate the elements of B.
 - (c) Enumerate each of the following. You may abbreviate if the result is clear and unambiguous.
 - i. $A \cup B$
 - ii. $A\cap B$
 - iii. $A \setminus B$
 - iv. $A \times B$
 - v. $\mathcal{P}(B)$

- With all variables ranging over the set Z, for each of the following logical sentences,
 (1) provide a brief but precise English equivalent, (2) provide a prenex normal form equivalent, and (3) either prove or disprove it.
 - (a) $\forall y \exists x [\not\exists w [w = x^2] \land \exists z [x < y < z]]$
 - (b) $\exists x \forall y [\not\exists w [w = x^2] \land \exists z [x < y < z]]$