

**Today** Preliminaries and more. § 0.\* (thoroughly); § 6.1 (the best you can).

**Next class** Finite-state automata (FSAs). §§ 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  $B = \{n \in \mathbb{Z} \mid 0 < n \leq 100 \wedge \sqrt{n} \in \mathbb{Z}\}$ .
- (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.  $\mathcal{P}(B)$

4. With all variables ranging over the set  $\mathbb{Z}$ , 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)  $\forall y \exists x [\nexists w [w = x^2] \wedge \exists z [x < y < z]]$
- (b)  $\exists x \forall y [\nexists w [w = x^2] \wedge \exists z [x < y < z]]$