Today Introduction; preliminaries. § 0.∗.[1]
Next class Finite-state automata (FSAs). §§ 1.{0,1} (thoroughly); § 6.1 (best effort).
Reminders Newsgroup. `aturing` accounts. Homework soon.

1. Write your name in the space below.

2. 1000 keys to success:

   (a) Remove _____ ; this work needs undivided attention and sharp focus.

   (b) Read assigned material _____ and after class.

   (c) Read in _____ -mode, not in fiction-mode or speed-mode.

   (d) Mathematical reading is a _____ activity.

   (e) Use the _____ for questions and discussions outside class.

   (f) Do not be _____ by difficulties.

   (g) You should be very _____ if everything seems easy.

   (h) Go back and forth between intuitive and _____ statements.

3. Let $A = \{1, 2, 4, 8, 16, \ldots, 1024\}$ 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 (provide an explicit listing of) 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. $\mathcal{P}(B)$

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[1]Throughout this course, section numbers such as these will, by default, refer to the textbook: Michael Sipser. *Introduction to the Theory of Computation.* Cengage Learning, 3rd edition, 2013.

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) $\exists x \forall y [\nexists w [w = x^2] \wedge \exists z [x < y < z]]$