Today Reducibility and undecidable languages, continued. Ch. 5.
Next class Time complexity; classes P, NP, NPC. Ch. 7.

1. List the members of your group below. Underline your name.

2. Solve the following instances of the Post Correspondence Problem. The first is from Post's original paper describing the problem,[1] which is very readable.

   (a) $\left\{ \left[\frac{bb}{b}\right], \left[\frac{ab}{ba}\right], \left[\frac{b}{bb}\right] \right\}$

   (b) $\left\{ \left[\frac{ab}{abab}\right], \left[\frac{b}{a}\right], \left[\frac{aba}{bb}\right], \left[\frac{aa}{bb}\right] \right\}$

   (c) $\left\{ \left[\frac{bba}{b}\right], \left[\frac{b}{a}\right], \left[\frac{a}{bba}\right] \right\}$

3. Prove or disprove each, for languages A and B:

   (a) If $A \leq_m B$ and B is decidable then A is decidable.

   (b) If $A \leq_m B$ and A is decidable then B is decidable.

[1] Emil L. Post. A variant of a recursively unsolvable problem. *Bulletin of the American Mathematical Society*, 52:264–268, April 1946

4. Prove or disprove each, for languages A and B:
   (a) If $A \leq_m B$ and A is regular then B is regular.
   (b) If $A \leq_m B$ and B is regular then A is regular.

5. Provide precise definitions of the following languages.
   (a) Equivalent CFGs.
   (b) Non-equivalent CFGs.

6. Prove or disprove the (1) decidability and (2) recognizability of each language in Question 5.