Lecture #14: Oracle Reductions Questions for Review

- 1. What is a *reducibility*? (Please define this as precisely as you can.)
- 2. What is an *oracle for a language* $L \subseteq \Sigma_L^\star$?
- 3. What is an *oracle Turing machine with an oracle for a language* $L\subseteq \Sigma_L^{\star}$? What "real world" thing does this model?
- 4. What is an *oracle reduction* from a language $L_1 \subseteq \Sigma_1^*$ to a language $L_2 \subseteq \Sigma_2^*$? What *notation* can be used to state that there is an oracle reduction from L_1 to L_2 ?
- 5. What is another *name* for an oracle reduction that you might find in the computing literature?
- 6. Describe a *process* that you can follow to show that there is an oracle reduction from L_1 to L_2 , for a given pair of languages $L_1 \subseteq \Sigma_1^*$ and $L_2 \subseteq \Sigma_2^*$.
- 7. Describe a *process*, that includes giving an oracle language, that can be used to prove that a given language, $L \subseteq \Sigma^*$ is *undecidable*.
- 8. Can this process also be used (in a very slightly changed way) to prove that a given language, $L \subseteq \Sigma^*$, is *unrecognizable*? Why, or why not?