Homework 2
Due Mon Apr 19, 5:00pm

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General Instructions: Same as in Homework 1.
Honor Principle: Same as in Homework 1.

5. We proved in class that $\overline{\text{STCON}} \in \mathsf{NL}$, thereby concluding $\mathsf{NL} = \mathsf{coNL}$. We remarked that our proof in fact shows that $\mathsf{NSPACE}(f(n)) = \mathsf{coNSPACE}(f(n))$ for any function $f : \mathbb{N} \to \mathbb{N}$ with $f(n) \geq \log_2 n$. Prove this remark rigorously.

   At some point, you will have to take care of the technical difficulty that computing the *value* of $f(n)$ might require more than $O(f(n))$ space — after all, you have no idea what kind of crazy function $f(n)$ is. Consult the proof of Savitch's theorem in Sipser's book for a hint on how to handle this. [2 points]

6. Prove that $\{\langle G \rangle : G \text{ is a strongly connected directed graph}\}$ is NL-complete. [2 points]