Homework due Wednesday, October 4

1. Show that every set in DSPACE($n^2$) is $\leq_{m}^{\log}$-reducible to a set in DSPACE($n$).
2. What well-known complexity class is equal to \{ $A : A$ is $\leq_{m}^{\log}$-reducible to a set in DSPACE($n$) \}? (Prove that your answer is correct.)
3. Show that P is not equal to DSPACE($n$). (You might be interested to know that no inclusion relation is known between P and DSPACE($n$), and many experts believe that they are probably incomparable. Also, it is not known if P is equal to PSPACE.)
4. Show that if A is complete for PSPACE, then there is some $\epsilon > 0$ such that $A \notin$ DSPACE($n^\epsilon$). Furthermore, show that this is tight. That is, show that for every $\epsilon > 0$ there is a PSPACE-complete set in DSPACE($n^\epsilon$).