Honors Theory, Spring 2002, Yap
Homework 4

1. (10x3 Points) There are three possible responses to the following statements: True, False or Perhaps. "Perhaps" reflects the uncertainty that only assume the results in chapter 2. If your answer is True or False, you must give brief reasons in order to obtain full credit.
(a) T/F/P: $NSPACE(n) \subseteq DTIME(O(1)^n)$.
(b) T/F/P: $NTIME(n) \subseteq DTIME(2^n)$.
(c) T/F/P: $NREVERSAL(n) \subseteq DREVERSAL(O(1)^n)$.

SOLUTION:
(a) True. $NSPACE(n) \subseteq DTIME(n^3 O(1)^n) = DTIME(O(1)^n)$.
(b) Perhaps. There is no single constant such that we can prove $NTIME(n) \subseteq DTIME(c^n)$.
(c) This is tricky: We know that $NREVERSAL(2) = RE$. So the question amounts to asking if $RE = DREVERSAL(O(1)^n)$. Based on the results of Chapter 2, the answer is "perhaps". But using hierarchy theorems in later chapters, we actually know the answer is "false".