

CS5230. Tutorial 2

1. Show that $DSPACE(n^3)$ is a proper superset of $DSPACE(n)$.
2. Work out the details of (main) tape content after each basic step in the simulation of k -tape vs 2-tape theorem we did in class, when $k = 1$.

The original machine initially has

$\dots c4\ c3\ c2\ c1\ b0\ b1\ b2\ b3\ b4 \dots$

on the tape, with head at $b0$, and always moves right in each step, without modifying the contents of the tape.

This should give you some idea about how the construction works.

3. Show that $DTIME(n^8)$ is a proper superset of $DTIME(n)$.
4. Show that $NPSPACE = PSPACE$.
(Here $PSPACE$ denotes the class of languages which can be accepted by polynomial space bounded TMs. $NPSPACE$ denotes the class of languages which can be accepted by non-deterministic polynomial space bounded TMs).
5. Why can't a trick similar to that used for space (as in above question) be used for time to show that $P = NP$?

(Here P denotes the class of languages which can be accepted by polynomial time bounded TMs. NP denotes the class of languages which can be accepted by non-deterministic polynomial time bounded TMs).