Lec 3/23

Friday, March 23, 2018 12:46

Sample Midterm

P1: (ii) yes A is r.e

(i) yes A is recursive since if it run for $> 10^6$ steps on an input of size 10^6 it must run for $> 10^6$ steps on a shorter input since it takes at least 10^6 steps to read the input.

So we only need to check 2^{10^6} inputs to decide e.

P2: (ii) there is no constraint clause on the "Guess" bits

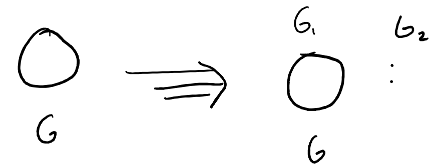
P3: $2SAT \leq_p 3SAT$? Yes, $2SAT \in P \leq NP$.

$3SAT \leq_p 2SAT$? Yes iff $P = NP$.

P4: Double-Ham:

Two undirected graphs G_1, G_2. is it the case that G_1 has a ham. circ. but G_2 doesn't.

i)



(ii) ???

Notation: If $A \leq_T B$ and $B \leq_T A$ then we write $A \equiv_T B$ meaning A and B are Turing-equivalent.

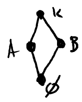
we write $A <_T B$ if $A \leq_T B$ but $B \not\leq_T A$.

is there something between A and A'? yes, a shitload.

Are every two languages comparable? are there A, B s.t. $A \not\leq_T B$ and $B \not\leq_T A$? yes.

DFN: Languages A and B are incomparable if $A \not\leq_T B$ and $B \not\leq_T A$.

Kleene-Post Theorem: There exist incomparable languages below K



in fact, these are $<_T$

(A, B incomparable s.t. $A \leq_T K$ and $B \leq_T K$).

Pf Next time