

# CS310 Automata Theory – 2016-2017

Nutan Limaye

Indian Institute of Technology, Bombay

[nutan@cse.iitb.ac.in](mailto:nutan@cse.iitb.ac.in)

Lecture 36: Effective computation

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## Theorem

If  $L$  is in  $NSPACE(s(n))$  then  $L$  is in  $TIME(2^{O(s(n))})$ .

We know that  $L \in NSPACE(s(n))$ . Let  $M$  be the machine.

First note that,  $w \in L$  if and only if  $C_{acc}$  is reachable from  $C_0$  in  $\mathcal{G}_{M,w}$ .

On any input  $w$ , the graph  $\mathcal{G}_{M,w}$  can be computed in time  $TIME(2^{O(s(n))})$ .

Checking whether  $C_{acc}$  is reachable from  $C_0$  can be checked in time  $2^{O(s(n))}$ .

Reachability in a graph of size  $2^{O(s(n))}$ .

## Corollary

$NL$  is contained in  $P$ .