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Summary: Lecture 3

Summary for the chapters X and X. [1]

Notes in the lecture:

Basic relations between complexity classes

Deterministic space includes nondeterministic time:
$\text{NTIME}(f(n)) \subseteq \text{SPACE}(f(n)^2)$
d choices in every step (in TM): $1, ..., d$
fill something with 1 in first step
second step: simulate nondeterminstic TM
pick something and simulate it? Until we get to d because we increment by 1 in each step.

The reachability method:
graphs/graph edges are constructed
M empties the tape and puts all the heads to the start
there is only a single node that is accepting

Savitch's theorem:
complexit function is at least $\log n$
we are doing an intuitive sketch now
this theorem grabs some internal node k, check recursively if there is a path from 1 to k and from k to n
test if path from 1 to k with picking a midpoint again...
we can have $\log n$ many segments to work on
PATH(startnode, endnode, pathlength) checks if there is a path from startnode to endnode with the length pathlength (?)

References

[1] Christos H. Papadimitriou. *Computational Complexity*. Addison-Wesley Publishing Company, 1994.