

# PSPACE

$$\text{Defn: NPSPACE} = \bigcup_k \text{SPACE}(n^k)$$

Languages that can be decided by a non-det TM using  $n^k$  space. /

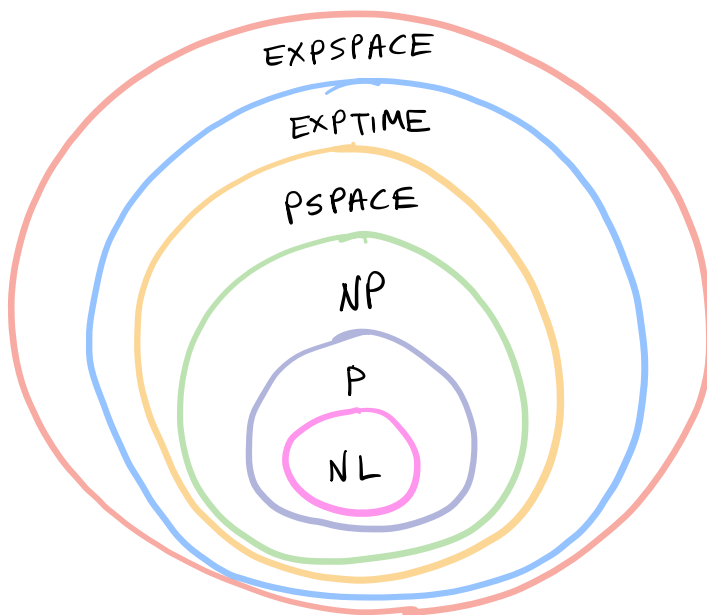
$$\text{Defn: PSPACE} = \bigcup_k \text{SPACE}(n^k)$$

Languages that can be decided by a det TM using  $n^k$  space.

Savitch's Theorem:  $\text{PSPACE} = \text{NPSPACE}$

... So we just refer to it as  $\text{PSPACE}$ .

The amount of space used by the det-TM that simulates a given non-det TM at most uses the square of the space required by the non-det TM.



$$\text{NL} \subseteq \text{P} \subseteq \text{NP} \subseteq \text{PSPACE}$$

$$\text{PSPACE} \subseteq \text{EXPTIME} \subseteq \text{EXSPACE}$$

$$\text{NL} \subset \text{PSPACE} \subset \text{EXSPACE}$$

$$\text{P} \subset \text{EXPTIME}$$