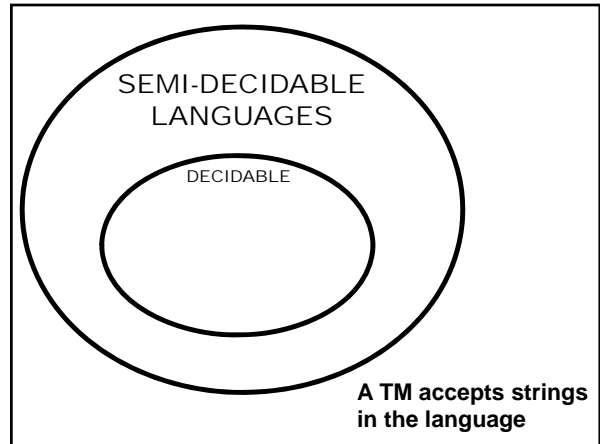
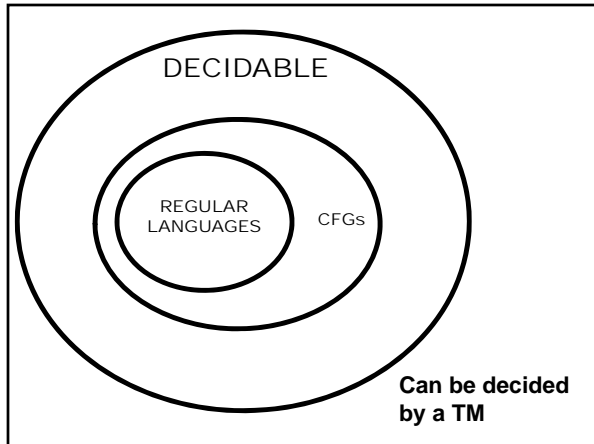
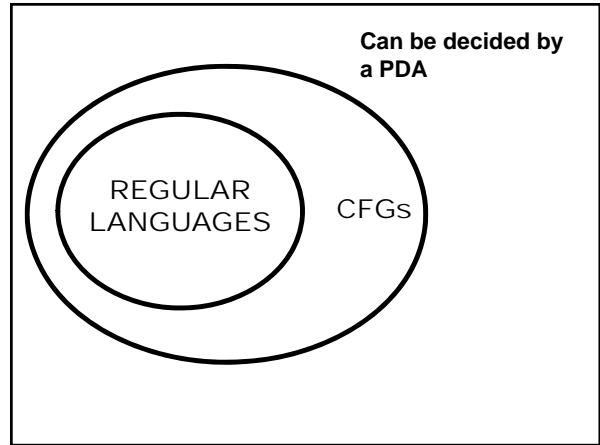
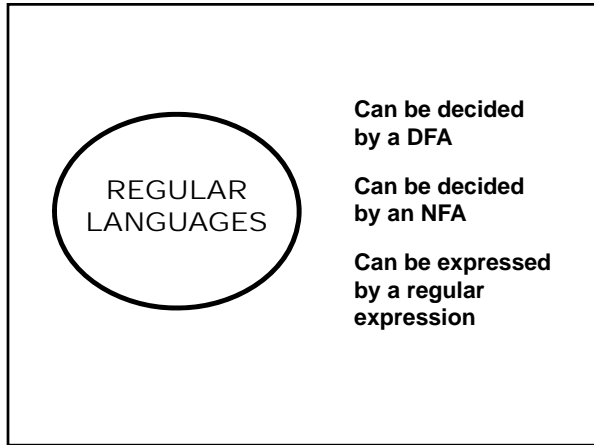
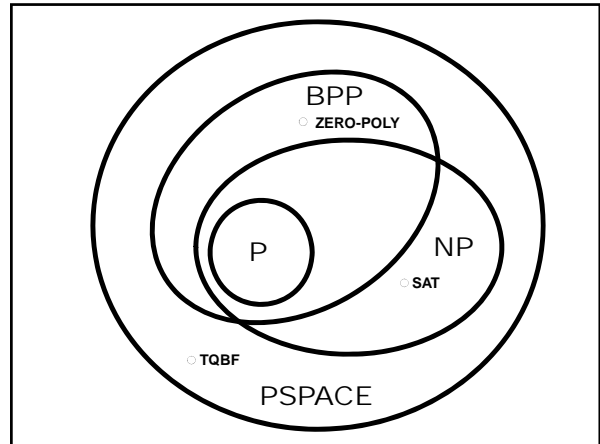
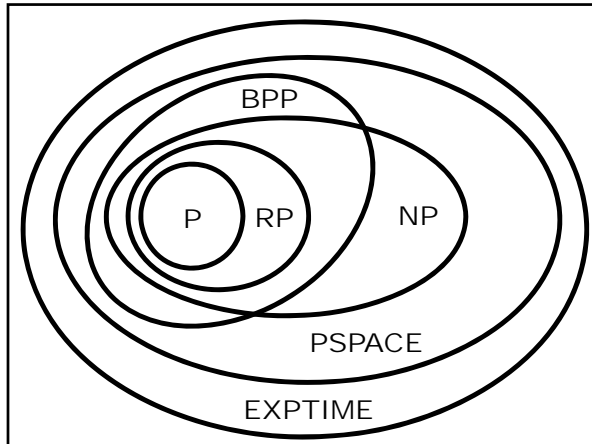


# 15-453

FORMAL LANGUAGES,  
AUTOMATA AND  
COMPUTABILITY

REVIEW  
Thursday, May 1





**Some other things you should know:**

**Definitions (formal and intuitive):** DFA, NFA, CFG, PDA, TM, Oracle TM, Non-Deterministic TM, Polynomial Time TM, etc...

**Important Languages:**  $\{0^n1^n \mid n \geq 0\}$ ,  $A_{TM}$ ,  $HALT_{TM}$ , SAT, 3SAT, TAUT, TQBF

**Reductions:**  $\leq_m$ ,  $\leq_T$ ,  $\leq_P$

**Completeness:** NP-Completeness, PSPACE-Completeness, coNP-Completeness

**Important Theorems:**

- Pumping Lemma for Regular Languages
- Pumping Lemma for CFGs
- $A_{TM}$  is undecidable
- Rice's Theorem
- Cook-Levin Theorem
- Savitch's Theorem
- TQBF is PSPACE-Complete

May or May Not be on Final:

- Minimizing DFAs
- The Arithmetic Hierarchy
- Kolmogorov Complexity

**The final will emphasize topics from the part of the course, but the rest is also fair game**

**FINAL**  
**Friday, May 9**  
**5:30pm-8:30pm**  
**MM, A14**

**Good luck!!!**

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