15-453

FORMAL LANGUAGES, AUTOMATA AND COMPUTABILITY

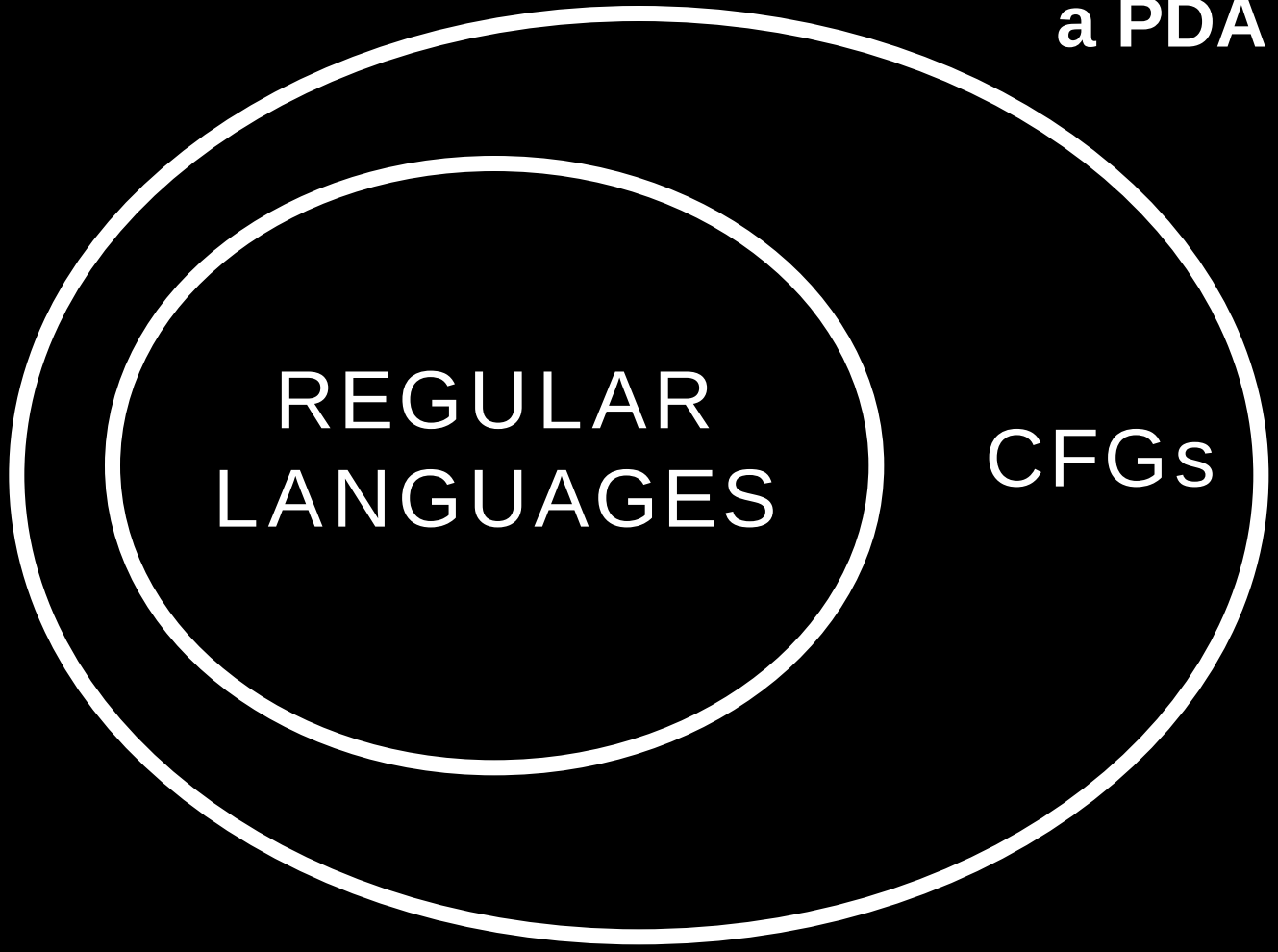
REVIEW
Thursday, May 1

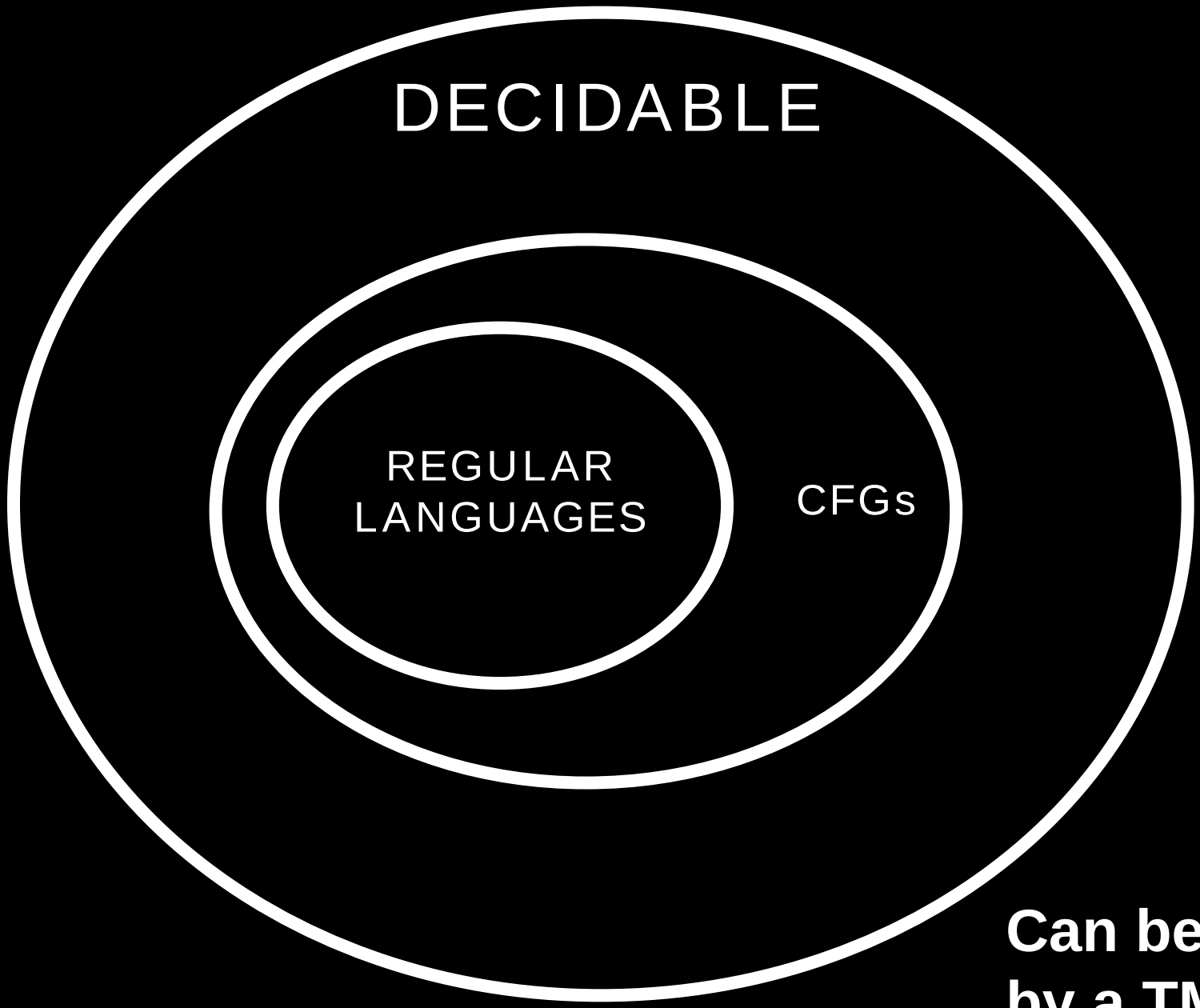
Can be decided by a DFA

Can be decided by an NFA

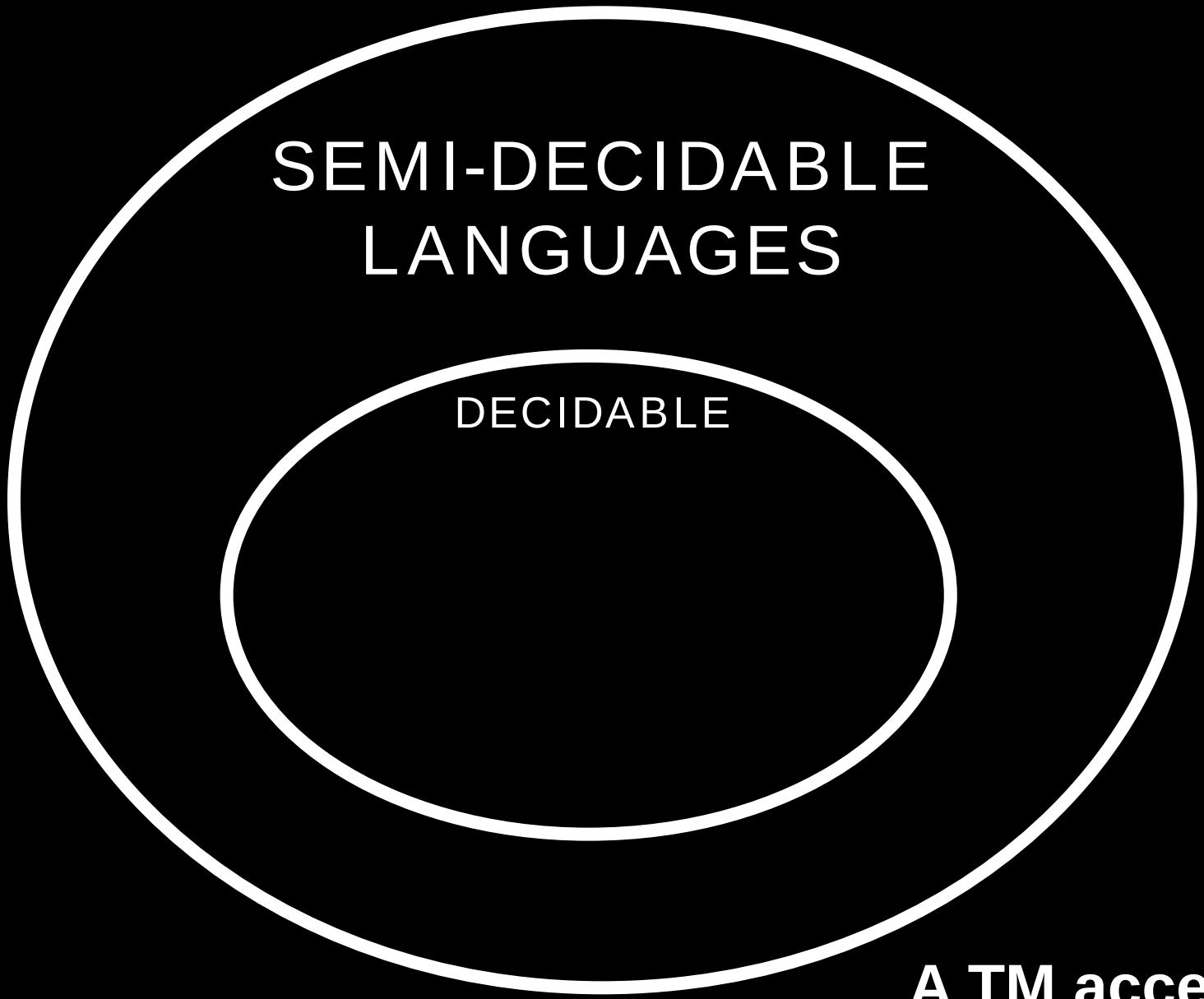
Can be expressed by a regular expression

Can be decided by a PDA

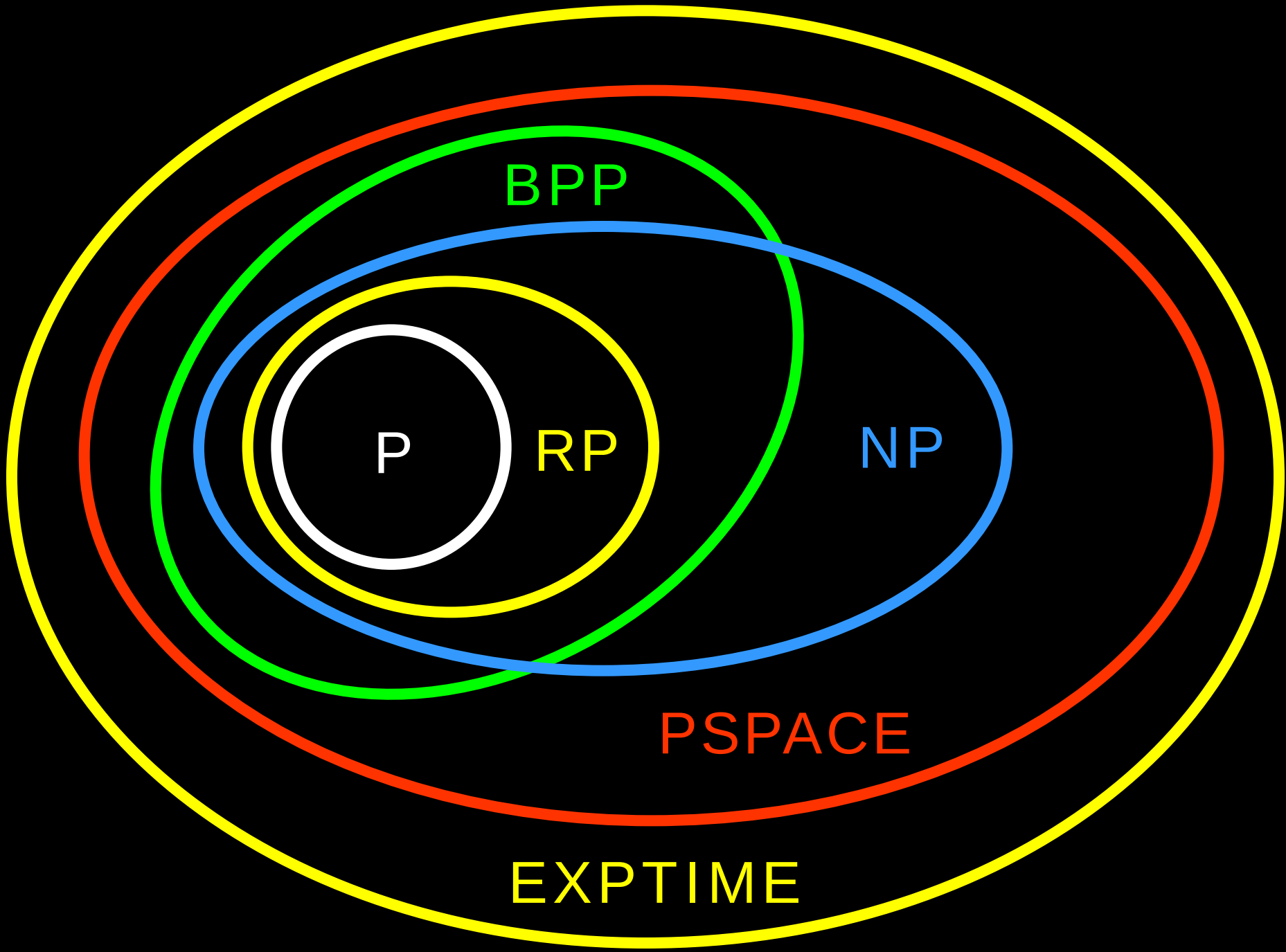


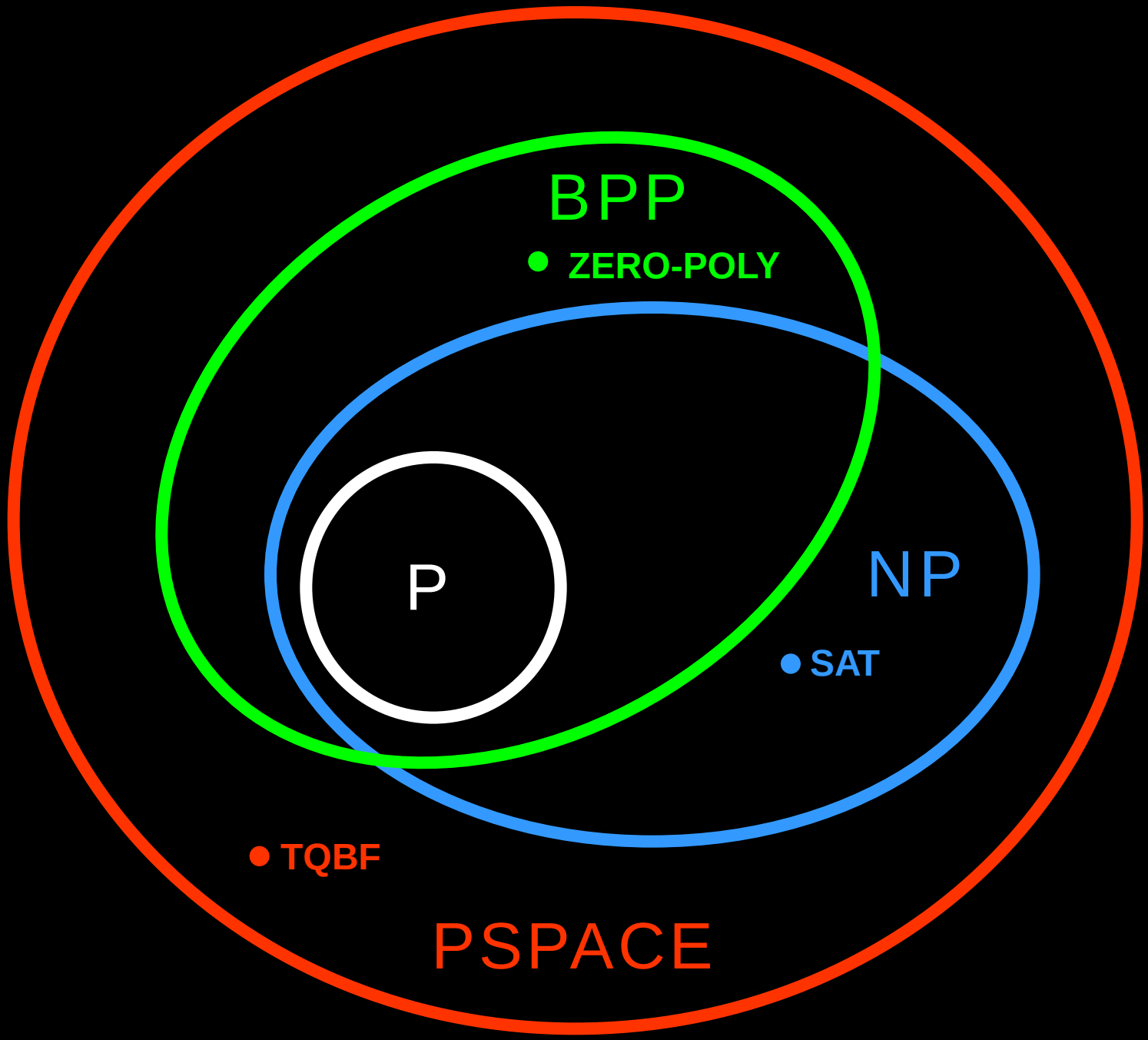


Can be decided by a TM



A TM accepts strings in the language


BPP
P
RP
NP
PSPACE
EXPTIME


BPP
ZERO-POLY
P
NP
SAT
TQBF
PSPACE

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!!!

WWW.FLAC.WS