15-453
FORMAL LANGUAGES, AUTOMATA AND COMPUTABILITY
Can be decided by a DFA
Can be decided by an NFA
Can be expressed by a regular expression

REGULAR LANGUAGES
Can be decided by a PDA

- REGULAR LANGUAGES
- CFGs
Can be decided by a TM
A TM accepts strings in the language
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!!!