

CSC 456/656 Fall 2025 Study for Second Examination March 12, 2025

1. Study the file tf2st2.pdf
2. Write regular expressions for simple finite automata.
3. Prove that the halting problem is undecidable, and give polynomial time reductions of 3-SAT to IND, and from the subset sum problem to Partition.
4. Know both definitions of the class \mathcal{NP} .
5. Know the definition of " \mathcal{NP} -complete."
6. State the pumping lemma for regular languages **accurately**.
7. Understand what it means for a set to be countable.
8. Understand what it means for a set to be uncountable.
9. What is the Church-Turing thesis? What does it mean to have "Turing power"?
10. Dyck language.
11. Palindromes.
12. What does " \mathcal{NP} -hard" mean?
13. What is the definition of "undecidability"?
14. What is a recursive real number? Give three definitions.
15. Of the many sets, or classes of sets, we have discussed this semester, know which ones are countable.
16. What is the difference between "enumerable" and "recursively enumerable"?
17. Chomsky normal form.
18. Given a definition of a context-free language, construct a PDA that accepts that language.
19. What is the difference between a PDA and a DPDA?
20. What does it mean for a context-free grammar to be ambiguous?
21. Parse trees and derivations.