CSC 456/656 Fall 2025 Topics for First Examination February 12, 2025

1. True/False/Open questions.
2. Symbol, alphabet, string, language.
3. Draw DFA or NFA for a given regular language.
4. Convert an NFA to a DFA.
5. Convert a DFA to a minimal DFA.
6. Union, intersection, concatenation, complement, Kleene closure.
7. Understand regular expressions.
8. Give a regular expression for the language accepted by a given NFA. (I will make sure that I give an easy example.)
9. Understand what a grammar is.
10. Derivation of a string using a grammar.
11. If G is a grammar, what is $L(G)$?
12. Convert NFA to a regular grammar.
13. Convert regular grammar to an NFA.
14. $\mathcal{P}$–TIME, $\mathcal{P}$–SPACE, and $\mathcal{NP}$. What are the definitions of those classes?
15. Define context-free grammar.
16. What is the Dyck Language? Is it regular?
17. Number vs numeral.
18. Countable sets, uncountable sets.
19. Is every function computable? Can every problem be solved by some program?