CompSci 162
Spring 2023 Lecture 4.2:
Non-Deterministic Finite Automata
Question 18: Introducing NFAs

- Some think of NFAs as “proof of concept” DFA
- Give an NFA: \( \Sigma = \{a, b\} \)
  third-to-last character in the string is a \( b \).
- Ex: \( aaabaa \in L \) but \( aabb \not\in L \).

DFA: \( \delta : Q \times \Sigma \rightarrow Q \)
NFA: \( \delta : Q \times \Sigma \rightarrow 2^Q \) (go to some subset)
Question 19

Incomplete, Todo

Give an equivalent DFA to this:

\[ a, b \]

"Subset Construction"
Question 20

Do you accept or reject the following claims?

- DFA-Acceptable \( \subseteq \) NFA-Acceptable
  
  Kinda trivial.
  
  all range on \( \Sigma \) singleton

- NFA-Acceptable \( \subseteq \) DFA-Acceptable

  Subset construction
Question 21

Give an NFA. \( \Sigma = \{a\} \).

Want: \( \{ a^n | n = 2k \text{ or } n = 3j \text{ for some } k, j \in \mathbb{N} \} \)

Also, could you do a DFA?
Question 22

Given RegEx, draw NFA for same language

- Any char $x \in \Sigma$ is valid, as is $\emptyset$:

- $u \cup v$ is valid when $u, v$ are:
Question 22

Given RegEx, draw NFA for same language

- $uv$ is valid when $u, v$ are:

- $(u)^*$ is valid when $u$ is: