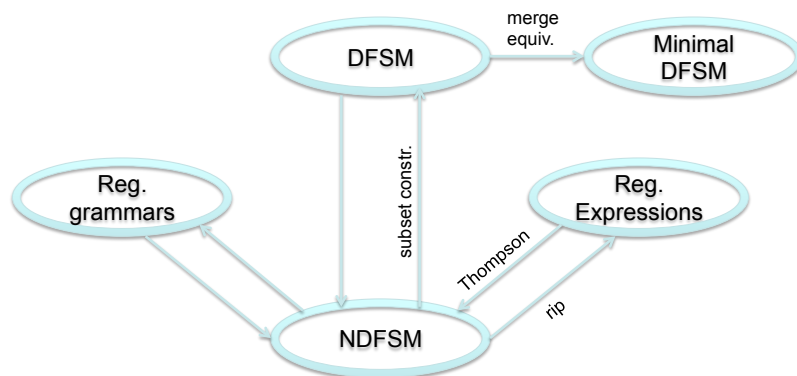


Midterm Review

Regular Languages

- Finite State Machines (FSM)
 - Deterministic (DFSM)
 - Nondeterministic (NDFSM)
- Regular Expressions
- Regular Grammars
- Moore and Mealy Machines

Conversions



Conversions

- NDFSM \rightarrow DFSM
- DFSM \rightarrow minimal DFSM
- Reg.Exp. \rightarrow NDFSM
- NDFSM \rightarrow Reg.Exp.



IS Regular

- Prove that a language is regular
 - Construct a:
 - DFSM
 - NDFSM
 - Reg.Exp.
 - Reg.Grammar
 - Prove that \approx_L has finitely many classes
 - Build minimal DFSM



Closure Properties

- Union
- Concatenation
- Kleene star
- Complement
- Intersection
- Difference
- Reverse



IS NOT Regular

- Prove that a language is not regular
 - Use pumping theorem
 - Use closure operations



Decision Problems

- Membership
- Emptiness
- Totality
- Finiteness
- Equivalence
- Minimality
- Specific questions



Context-Free Languages

- Context-Free Grammars (CFG)
- Pushdown Automata (PDA)



Conversions

- CFG \rightarrow Chomsky Normal Form
 - Algorithm
- CFG \rightarrow unambiguous CFG
 - No algorithm



IS Context-Free

- Prove that a language is context-free
 - Construct a:
 - CFG
 - PDA



Closure Properties

- Union
- Concatenation
- Kleene star
- Reverse
- Intersection with regular language
- Difference with regular language
- Complement – NOT
- Intersection – NOT
- Difference – NOT



IS NOT Context-Free

- Prove that a language is not context-free
 - Use pumping theorem
 - Use closure operations
 - Intersection with a regular language



Decision Problems

- Membership
- Emptiness
- Finiteness
- Specific questions