

Chapter 1

Exercises

Course “Compiler Construction”

Martin Steffen

Spring 2022



Section

Exercises 01

2.1 First and follow set
2.2 Nullability
2.3 Associativity and precedence
2.4 Tiny language
2.5 AST

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Exercises 02

2.1 First and follow set
2.2 Nullability
2.3 Associativity and precedence
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1.1: Reg. Expressions

1. begin and end with a
2. begin or end with a
3. digits without leading 0
4. even numbers
5. all 2s precede all 9s
6. no 3 consecutive b's
7. odd a's or odd b's
8. even a's and even b's
9. equal number of a's and b's



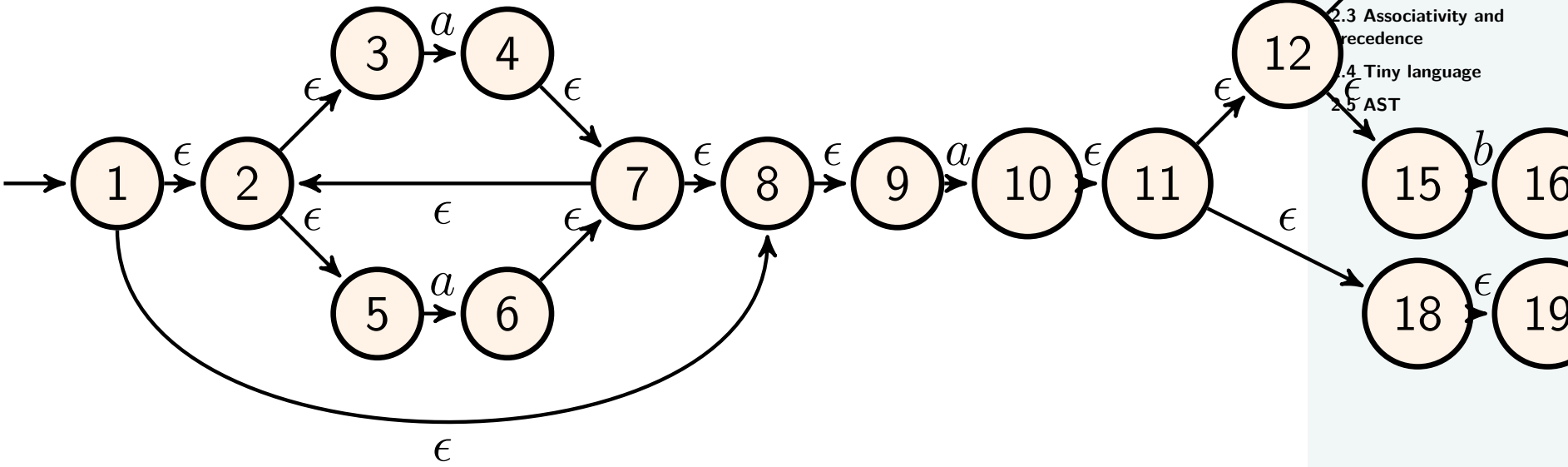
1.2: Reg. Expr $\rightarrow$ automaton

$$(a \mid b)^* a (a \mid b \mid \epsilon)$$

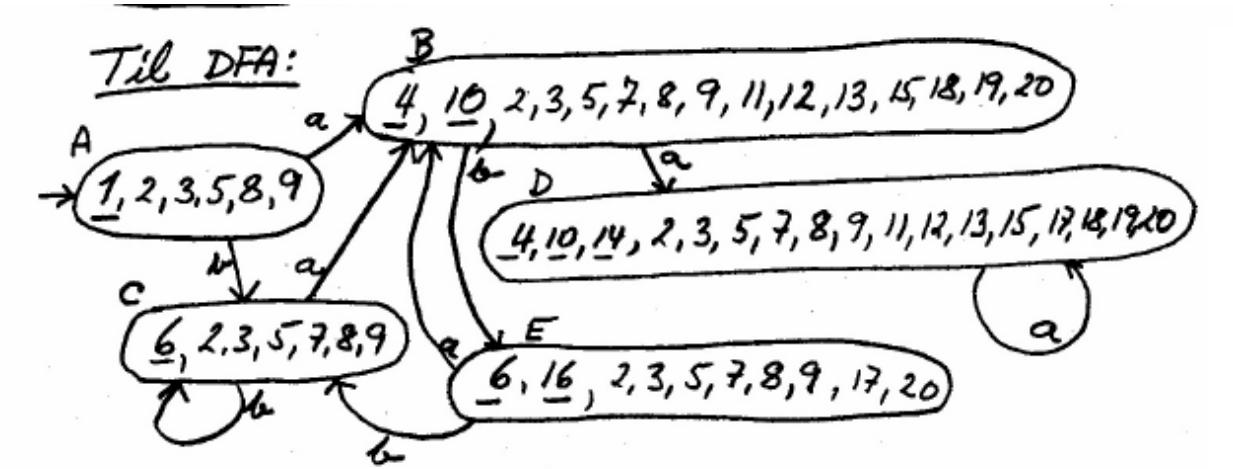
1. in prosa
2. Thompson
3. subset construction
4. minimization



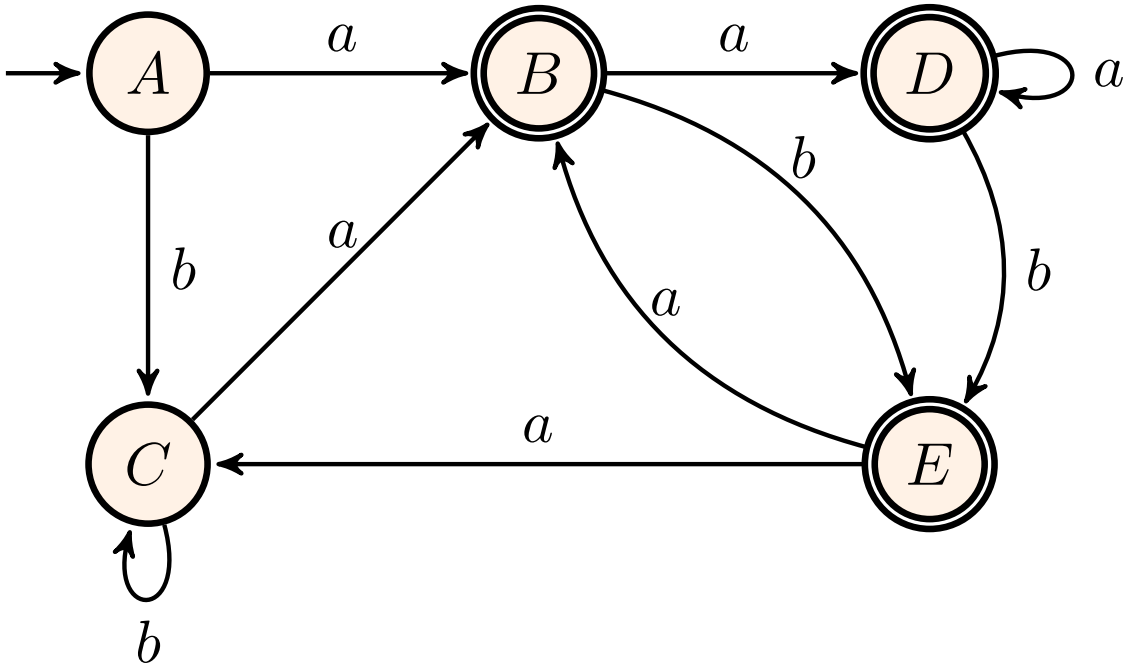
1.2: Reg. Expr $\rightarrow$ automaton (solution: Thomson)



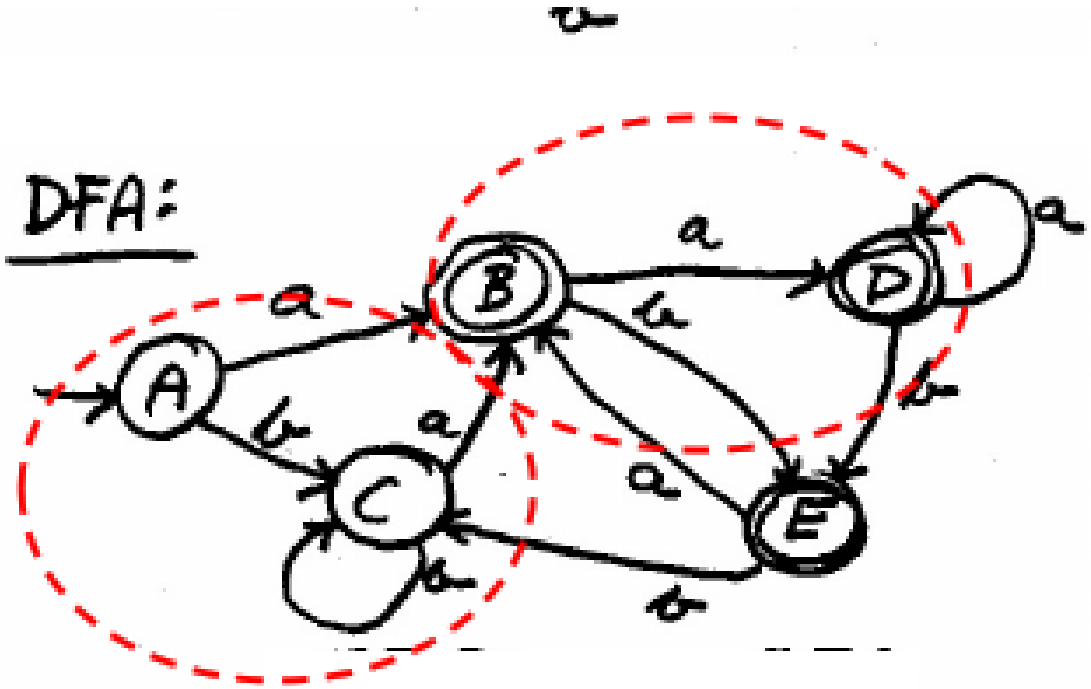
1.2: Reg. Expr $\rightarrow$ automaton (solution: det.)



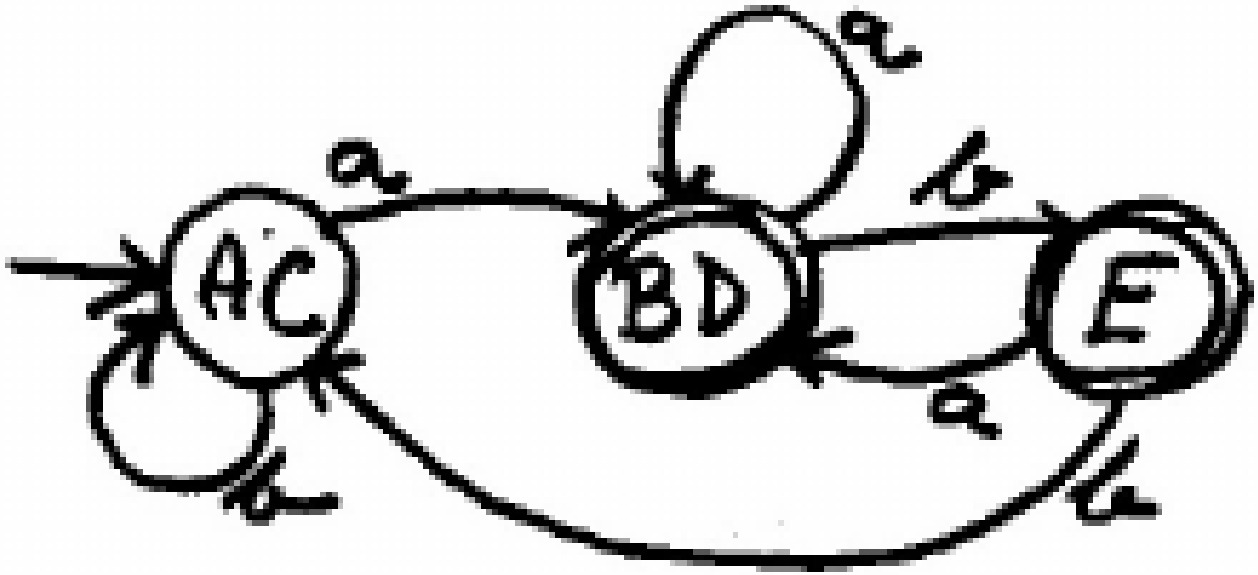
1.2: Reg. Expr $\rightarrow$ automaton (solution: det.)



1.2: Reg. Expr $\rightarrow$ automaton (solution: minimization (1))



1.2: Reg. Expr $\rightarrow$ automaton (solution: minimization (2))



1.3: Tools



Exercises 02

2.1 First and follow set

2.2 Nullability

2.3 Associativity and precedence

2.4 Tiny language

2.5 AST

1.4: Reflection: why multi-stage



Exercises 02

2.1 First and follow set

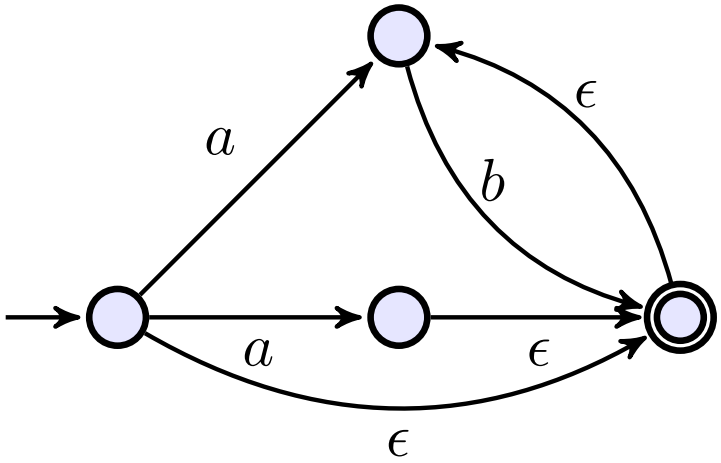
2.2 Nullability

2.3 Associativity and precedence

2.4 Tiny language

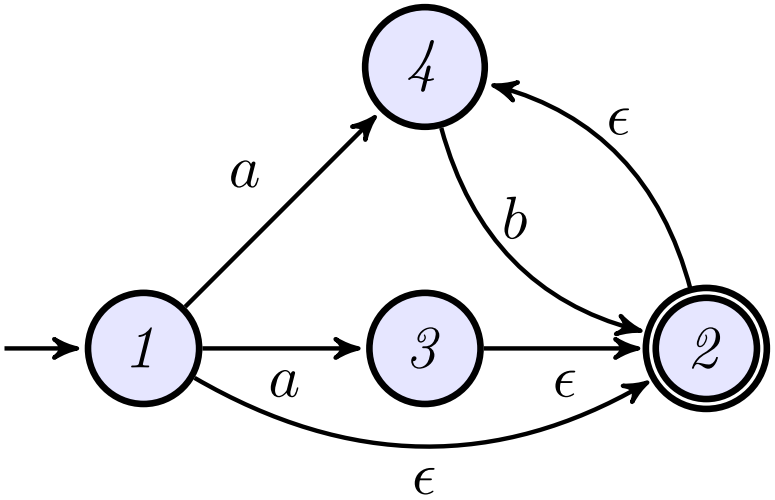
2.5 AST

1.5: Determinization

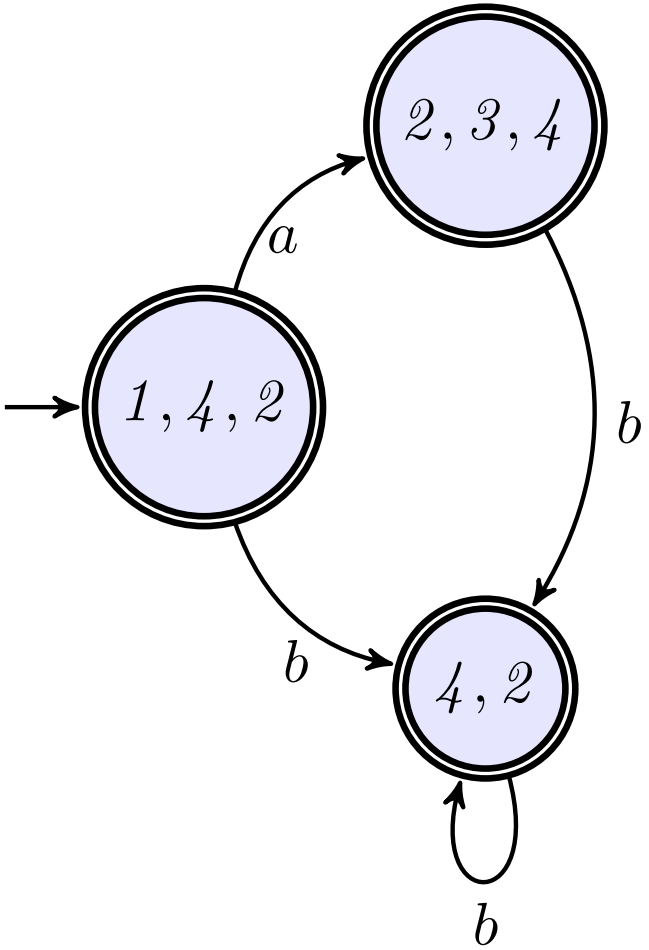




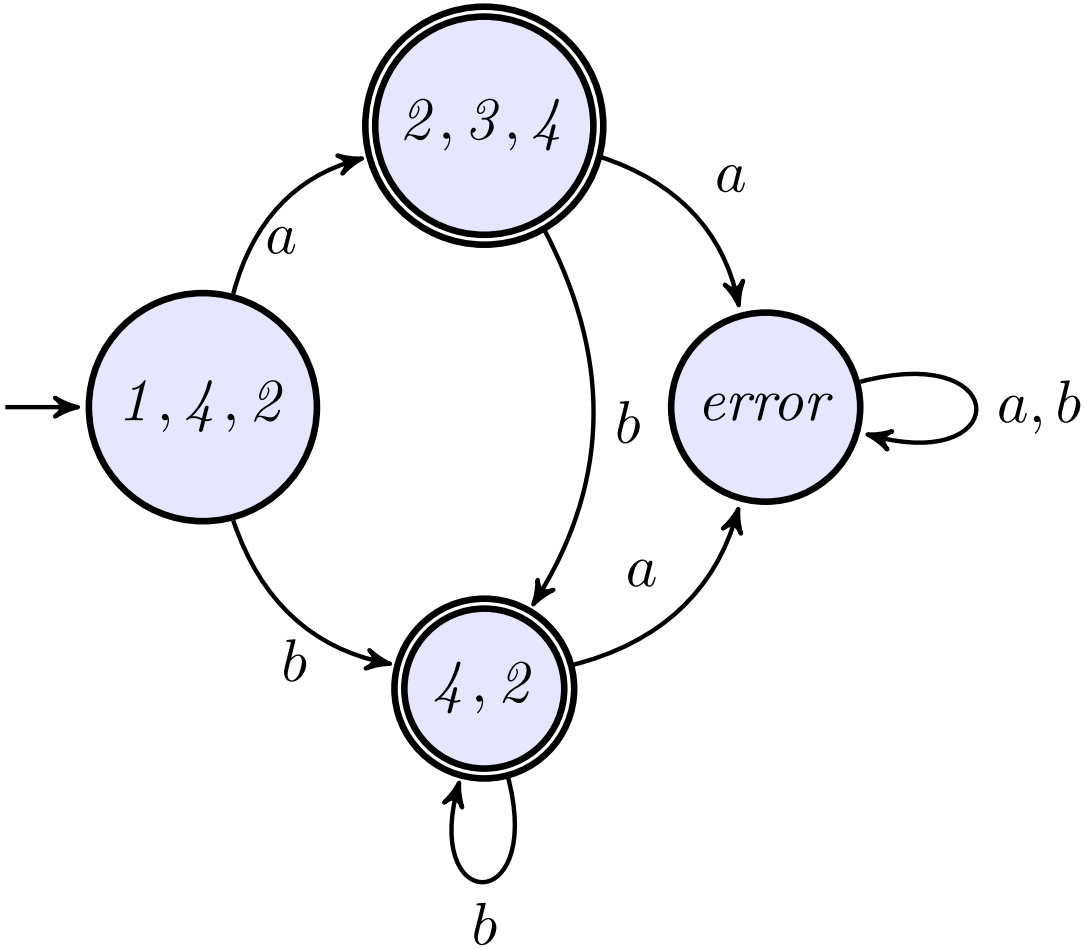
1:5: Determinization (solution)



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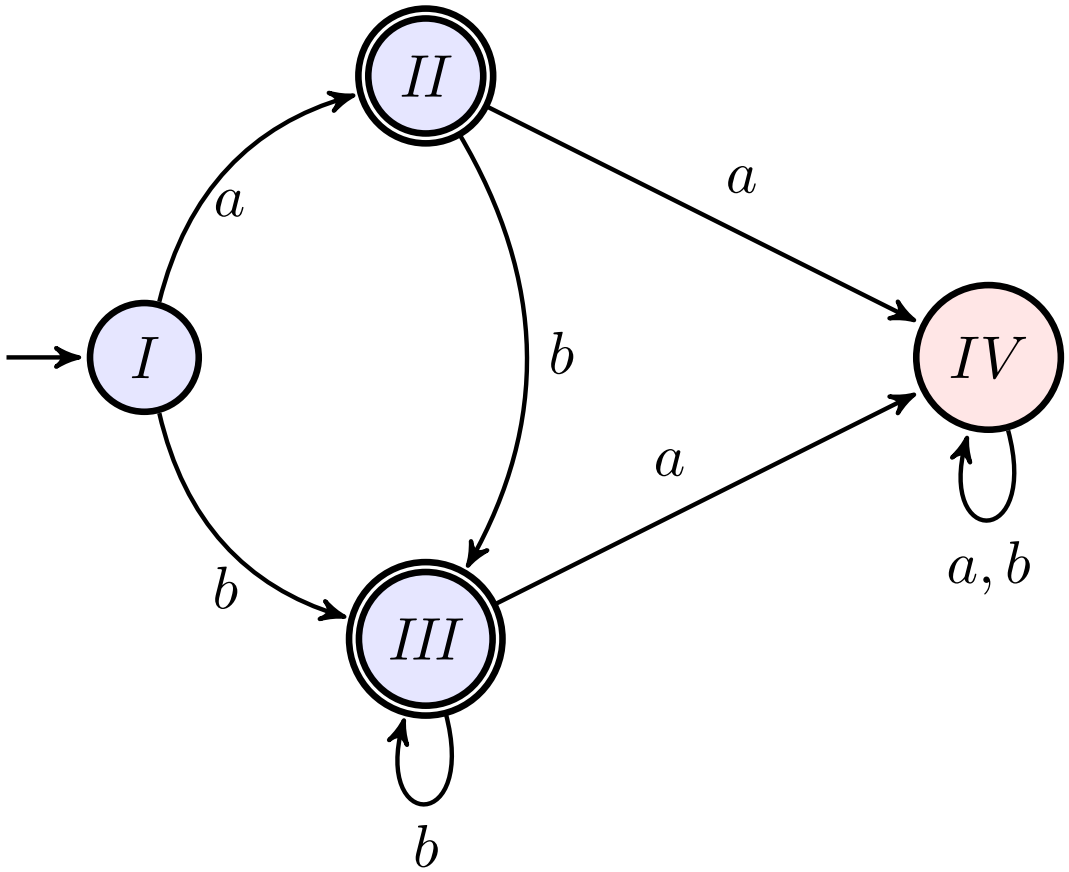


1:5: Determinization (solution)

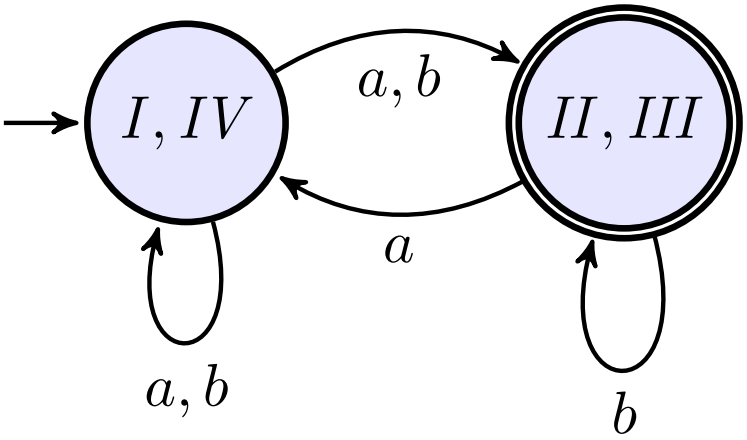




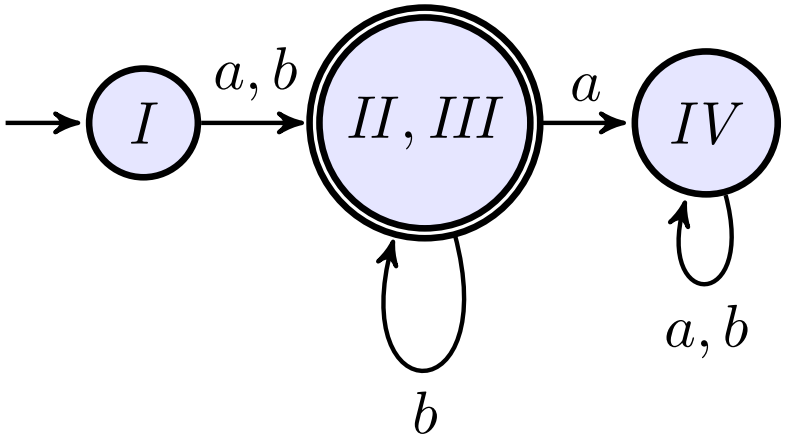
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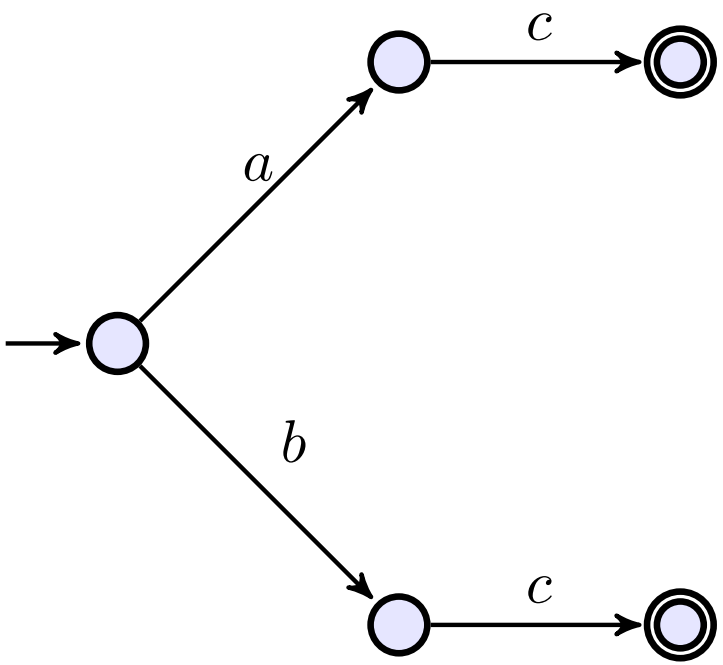


1:5: Determinization (solution)



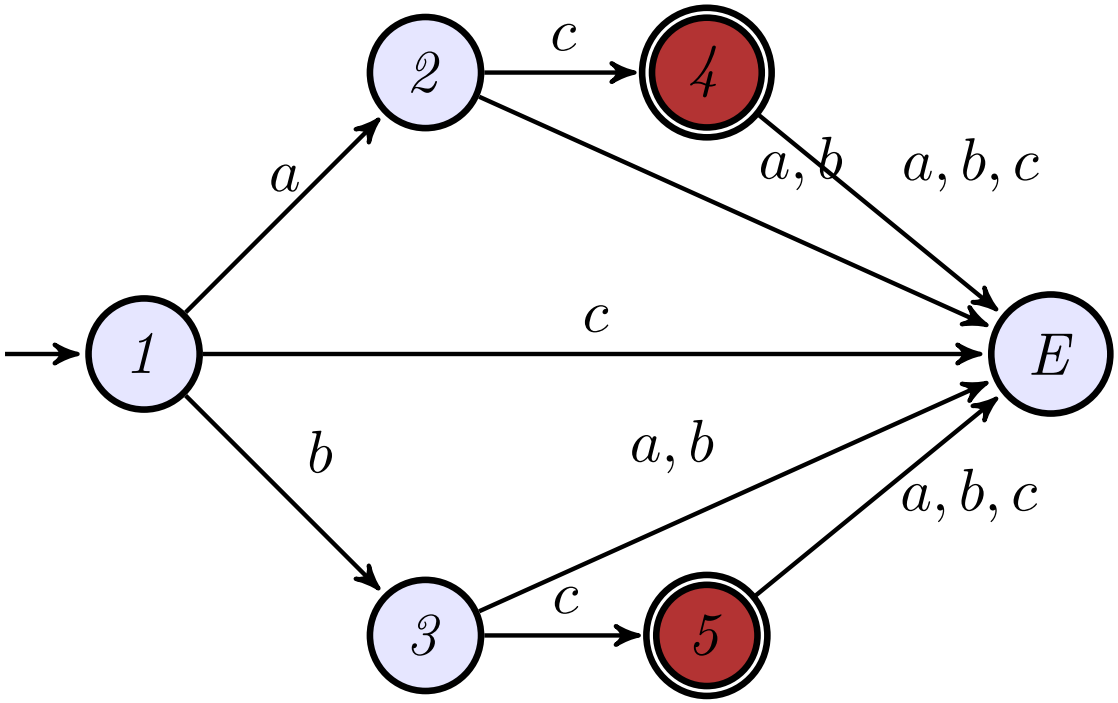


1.6: Minimize the following ("ac or ab")

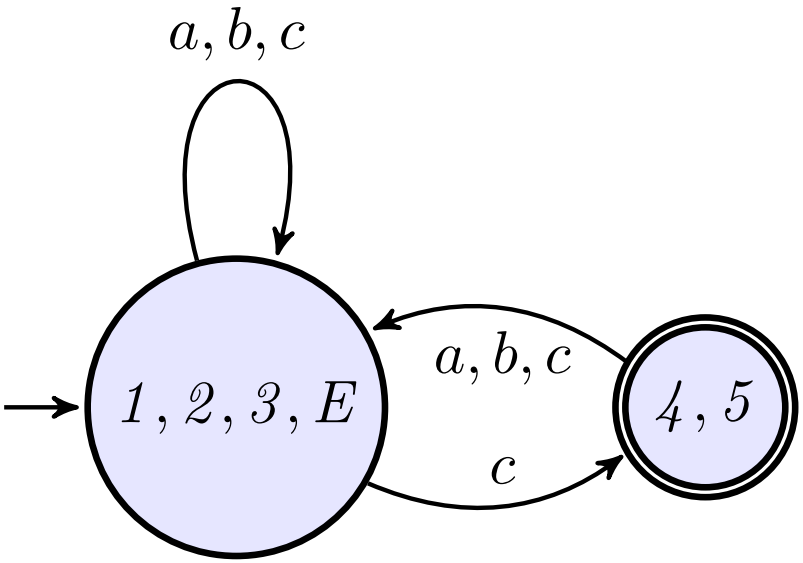




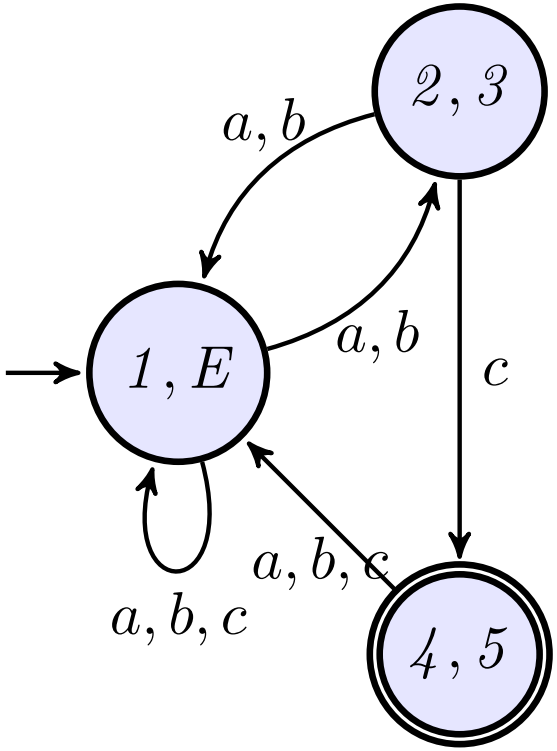
1.6: Complete (+ labelling for identification) (solution)



1.6: Initial partitioning (solution)



1.6: After one refinement step (solution)



1.6: Stable (solution)

