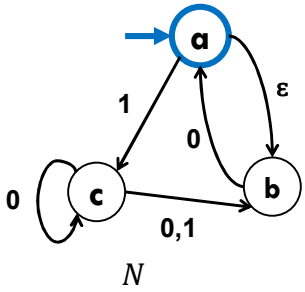
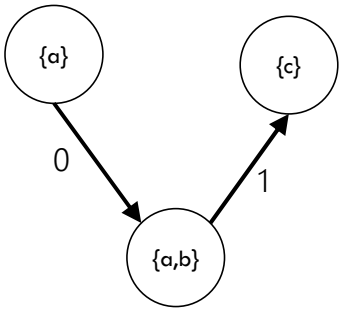
An example (starting point)



N



D

26

Regular Expressions

Basis:

ε is a regular expression. The empty string itself matches the pattern (and nothing else does).

$\emptyset$ is a regular expression. No strings match this pattern.

a is a regular expression, for any $a \in \Sigma$ (i.e. any character). The character itself matching this mattern.

Recursive

If A, B are regular expressions then $(A \cup B)$ is a regular expression
matched by any string that matches A or that matches B [or both]).

If A, B are regular expressions then AB is a regular expression.
matched by any string x such that $x = yz$, y matches A and z matches B.

If A is a regular expression, then A^* is a regular expression.
matched by any string that can be divided into 0 or more strings that match A.

33

Let $P(A)$ be "There is an NFA whose language is the same as the language for A."

Base Cases:

$\emptyset$

ε

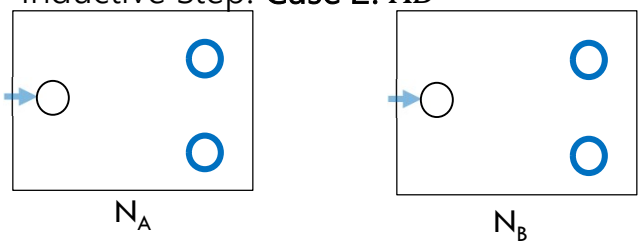
a $(a \in \Sigma)$

34

Let $P(A)$ be "There is an NFA whose language is the same as the language for A."

Let R be a regex not covered by the base cases. By the exclusion rule, $R = A \cup B$ or AB or A^* from some regexes A, B
Inductive Hypothesis: Suppose $P(A)$ and $P(B)$.

Inductive Step: Case 2: AB



Want a machine that accepts exactly strings matched by AB.

39