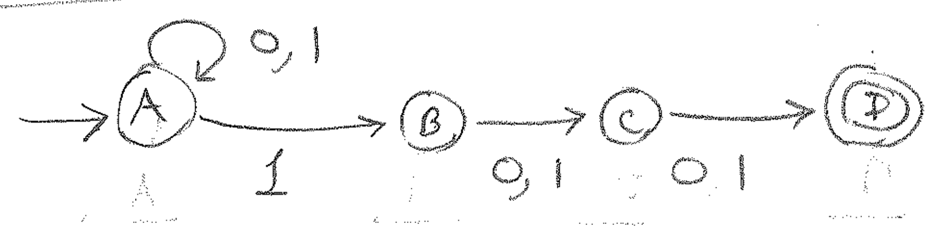
CS 3100 Sep 2, 2010

1. Differences — $a+bc$ versus $\{a, bc\}$
2. Babbage Machines

- NFA
  - $Q\ \Sigma\ \delta\ q_0\ T$
  - Acceptance
  - JFLAP Simulation
  - Motivations
  - Relationship to RE
  - Conversion to DFA
  - Examples

EX 1



$Q = \{A, B, C, D\}$

$\Sigma = \{0, 1\}$

$q_0 = A$

$T = \{D\}$

δ

Q \ $\Sigma \cup \{\varepsilon\}$	0	1	ε
A	$\{A\}$	$\{A, B\}$	ϕ
B	$\{C\}$	$\{C\}$	ϕ
C	$\{D\}$	$\{D\}$	ϕ
D	ϕ	ϕ	ϕ

Acceptance

Any path labeled by the given string leading to some accept state

- JFLAP simulation

Motivations

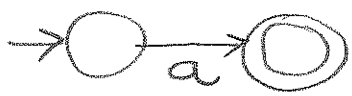
- Makes it easier to specify nontrivial languages (EX1, EX4)
- Direct correspondence with RE

Conversion RE to NFA.

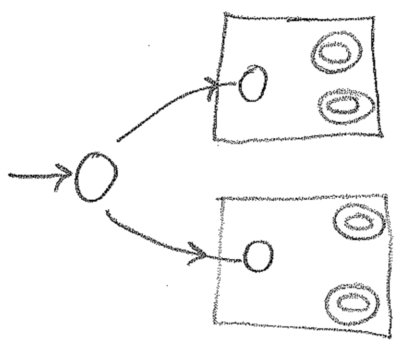
$\emptyset$

ε

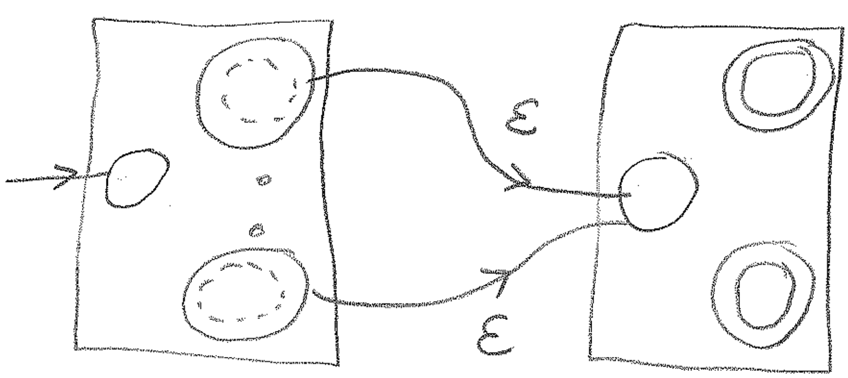
a



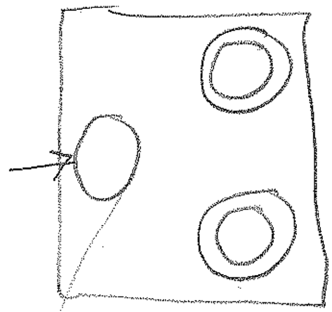
$R_1 + R_2$



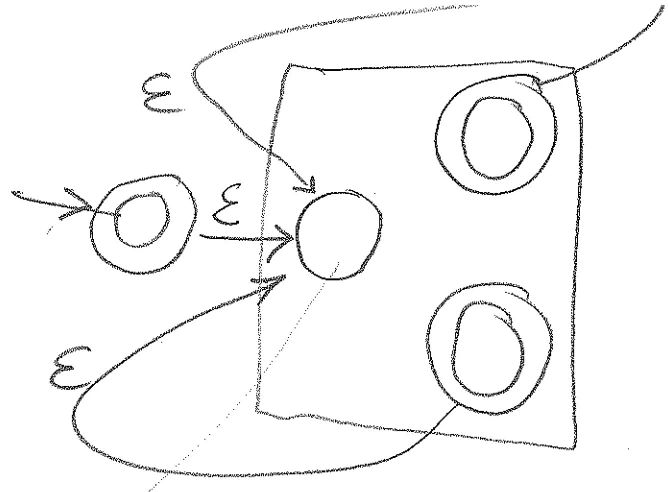
$R_1 R_2$



R^*



R

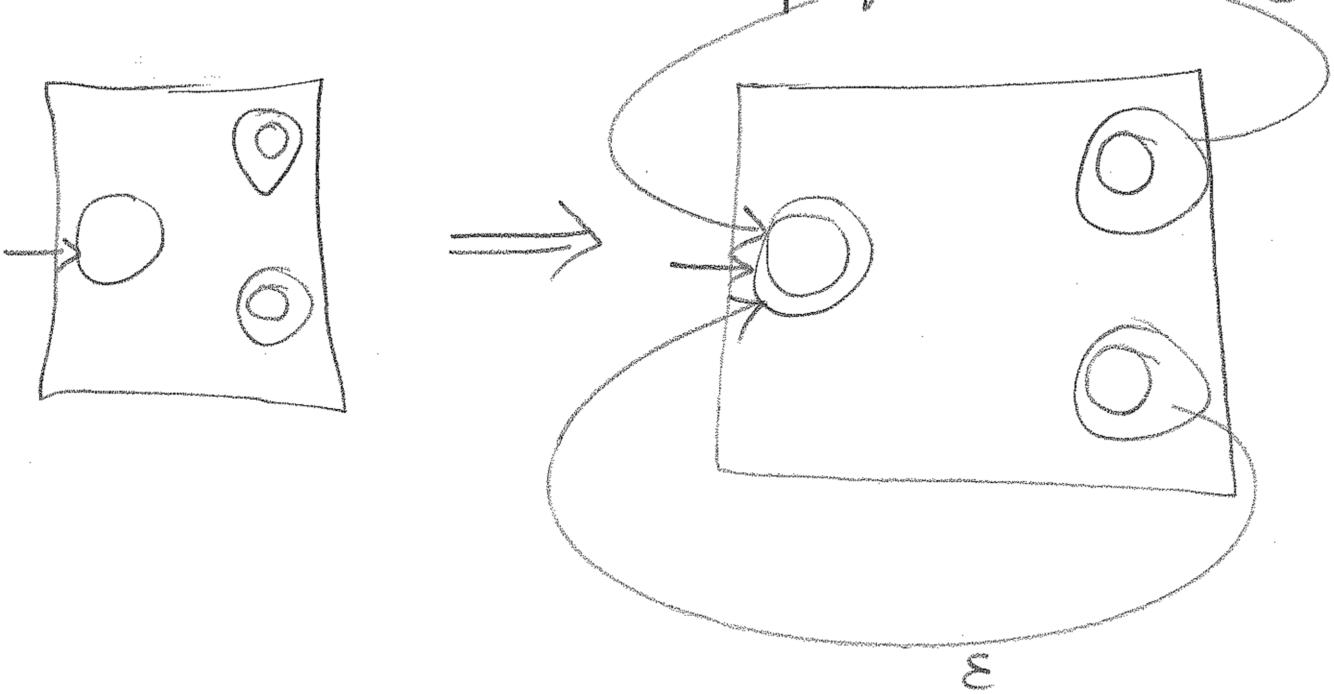


R^*

Same initial state as before

(if it were final, keep it final)

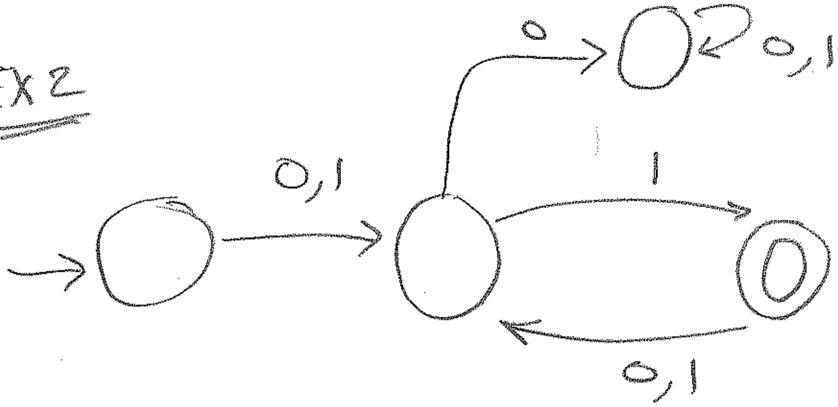
Why not simply?



Consider

$L = \{ x \mid |x| \geq 1$ <u>and</u> every even position of x is a 1 <u>and</u> $x \in \{0,1\}^* \}$

EX 2



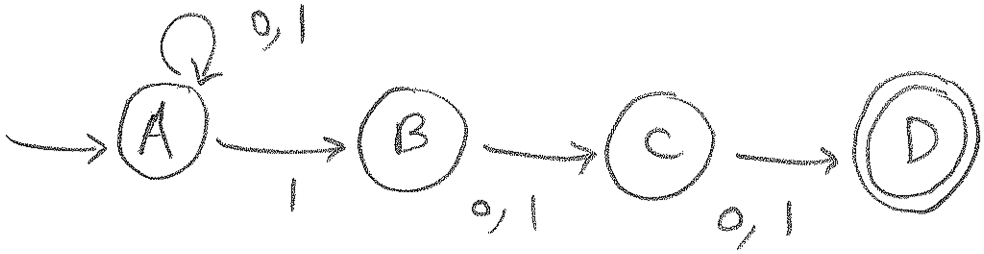
~~Build~~
~~L^*~~

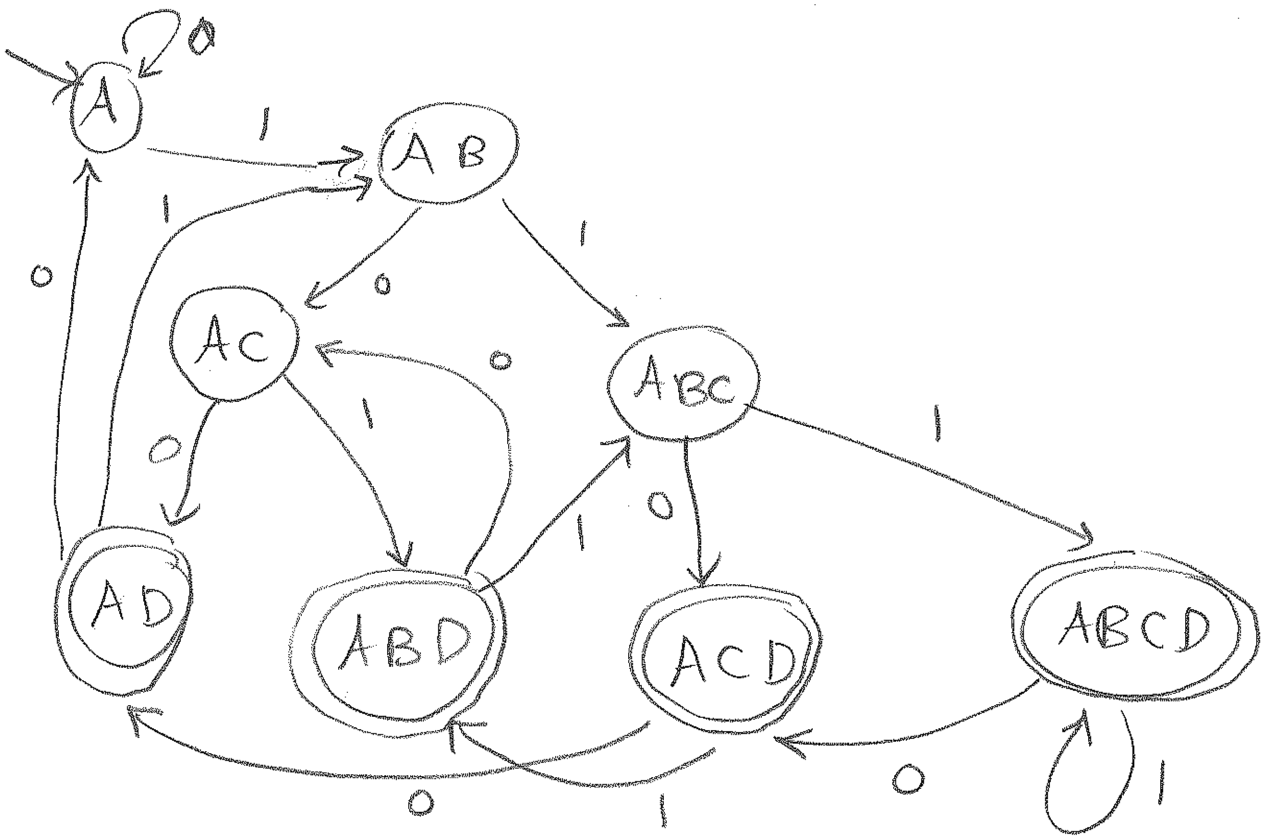
Build L^*.

NFA for

$\{ x \mid x \in \{0,1\}^*$
x has odd 1's or even 0's $\}$.

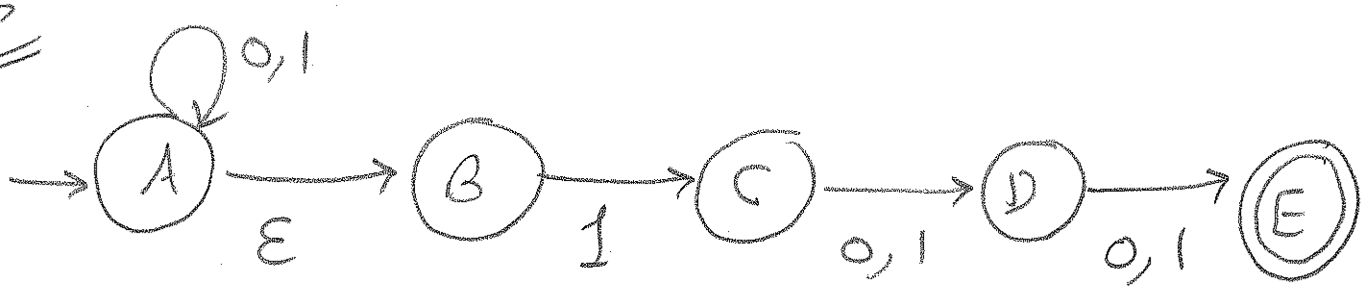
Conversion to DFA





NFA with ε

EX3

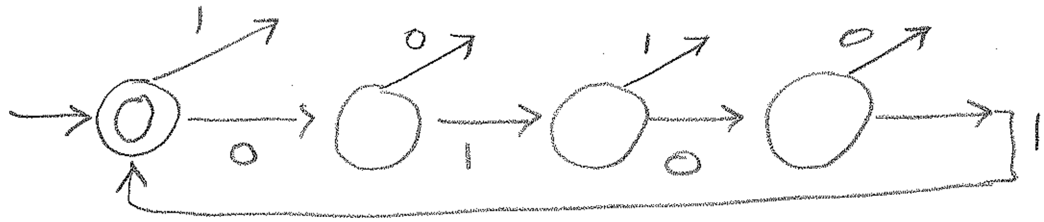


- δ table
- Jflap simulation
  - step by state
  - step with closure
- Conversion to DFA.

Sep 8

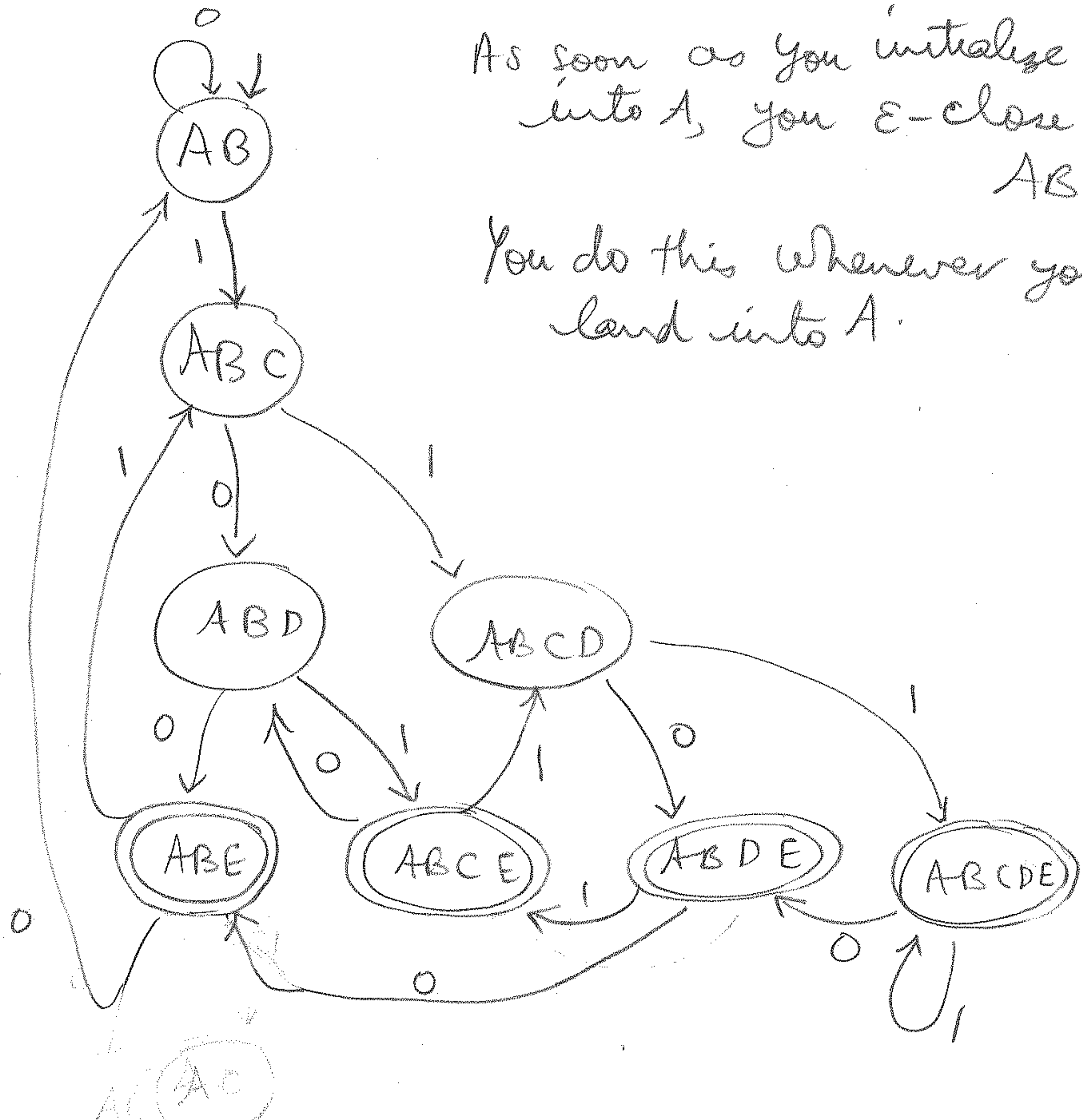
1) DFA for $(0101)^*$

Ex4



2) NFA for all 0101 with a 1-bit error.

3) NFA for all 0101 with a 2-bit error



As soon as you initialize into A, you ε-close into AB

You do this whenever you land into A.

There is no A state without a B also occurring in the state (due to ε closure)