

Recognizing Viable Prefixes

Branislav Rovan

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Example

$$G = (\{S', S, A\}, \{a, b, c\}, P, S'), \quad \begin{array}{l} P : S' \rightarrow Sc, \quad S \rightarrow SA \mid A, \\ \quad \quad \quad \quad \quad \quad \quad \quad A \rightarrow aSb \mid ab \end{array}$$

LR(0) items

$$\begin{array}{lll} S' \rightarrow \cdot Sc & S \rightarrow \cdot SA & A \rightarrow \cdot aSb \\ S' \rightarrow S \cdot c & S \rightarrow S \cdot A & A \rightarrow a \cdot Sb \\ S' \rightarrow Sc \cdot & S \rightarrow SA \cdot & A \rightarrow aS \cdot b \\ & S \rightarrow \cdot A & A \rightarrow aSb \cdot \\ & S \rightarrow A \cdot & A \rightarrow \cdot ab \\ & & A \rightarrow a \cdot b \\ & & A \rightarrow ab \cdot \end{array}$$

$$S' \Rightarrow Sc \Rightarrow SAc \Rightarrow S \underbrace{aSb}_\text{handle} c$$

LR(0) items

			$A \rightarrow \cdot aSb$	
		$S \rightarrow \cdot SA$	$A \rightarrow a \cdot Sb$	
$S' \rightarrow \cdot Sc$	$S \rightarrow S \cdot A$	$A \rightarrow aS \cdot b$	$A \rightarrow aSb \cdot$	←
$S' \rightarrow S \cdot c$	$S \rightarrow SA \cdot$	$A \rightarrow \cdot ab$		
$S' \rightarrow Sc \cdot$	$S \rightarrow \cdot A$	$A \rightarrow a \cdot b$		
	$S \rightarrow A \cdot$	$A \rightarrow ab \cdot$		

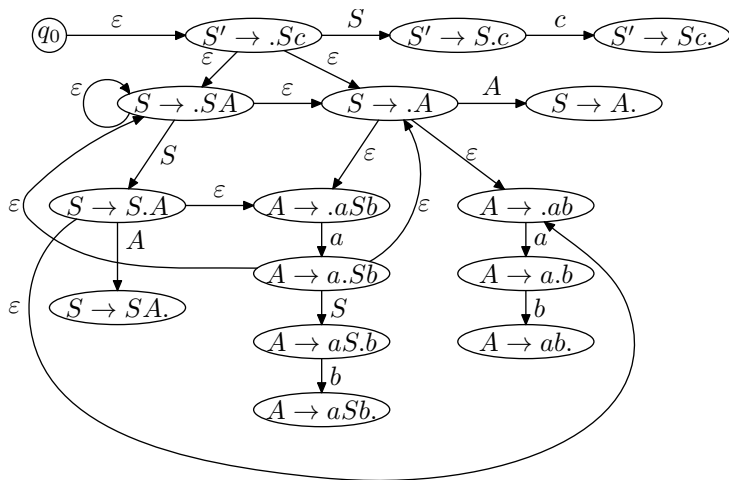
$$S' \Rightarrow Sc \Rightarrow SAc \Rightarrow S \underbrace{aSb}_\text{handle} c$$

Viable prefix $\epsilon, S, Sa, SaS, SaSb$

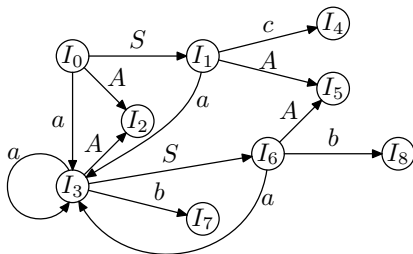
Valid for



NFA Recognizing Viable Prefixes



DFA For Viable Prefixes



$\underline{I_0}$: q_0 , $S' \rightarrow \cdot Sc$, $S \rightarrow \cdot SA$, $S \rightarrow \cdot A$, $A \rightarrow \cdot aSb$, $A \rightarrow \cdot ab$

$\underline{I_1}$: $S' \rightarrow S \cdot c$, $S \rightarrow S \cdot A$, $A \rightarrow \cdot aSb$, $A \rightarrow \cdot ab$

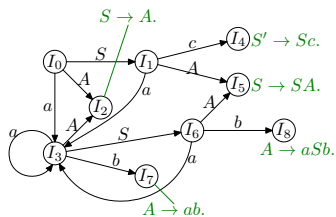
$\underline{I_2}$: $S \rightarrow A \cdot$ $\underline{I_4}$: $S' \rightarrow Sc \cdot$ $\underline{I_5}$: $S \rightarrow SA \cdot$

$\underline{I_3}$: $A \rightarrow a \cdot Sb$, $A \rightarrow a \cdot b$, $S \rightarrow \cdot SA$, $S \rightarrow \cdot A$, $A \rightarrow \cdot aSb$, $A \rightarrow \cdot ab$

$\underline{I_6}$: $A \rightarrow aS \cdot b$, $S \rightarrow S \cdot A$, $A \rightarrow \cdot aSb$, $A \rightarrow \cdot ab$

$\underline{I_7}$: $A \rightarrow ab \cdot$ $\underline{I_8}$: $A \rightarrow aSb \cdot$

DFA For Viable Prefixes



stack	rest of input	action
0	aababbc	shift
0a3	ababbc	shift
0a3a3	babbc	shift
0a3a3b7	abbc	reduce $A \rightarrow ab$
0a3A2	abbc	reduce $S \rightarrow A$
0a3S6	abbc	shift
0a3S6a3	bbc	shift
0a3S6a3b7	bc	reduce $A \rightarrow ab$
0a3S6A5	bc	reduce $S \rightarrow SA$
0a3S6	bc	shift
0a3S6b8	c	reduce $A \rightarrow aSb$
0A2	c	reduce $S \rightarrow A$
0S1	c	shift
0S1c4	-	reduce $S' \rightarrow Sc$
0S'	-	
-	-	Accept

THE END