

# Syntax Analysis

Sudakshina Dutta

IIT Goa

22<sup>nd</sup> March, 2022

# Advanced parsing techniques

- ▶ Extra informations are kept in the state by redefining items to include a terminal symbol as the second component
- ▶ The general form is  $[A \rightarrow \alpha.\beta, a]$  where  $A \rightarrow \alpha\beta$  is a production and  $a$  is a terminal symbol (lookahead)
- ▶ The lookahead has no effect if the item is of the form  $A \rightarrow [\alpha.\beta, a]$ . It only has effect when  $A \rightarrow [\alpha\beta., a]$
- ▶ Such objects are called  $LR(1)$  items

## Example

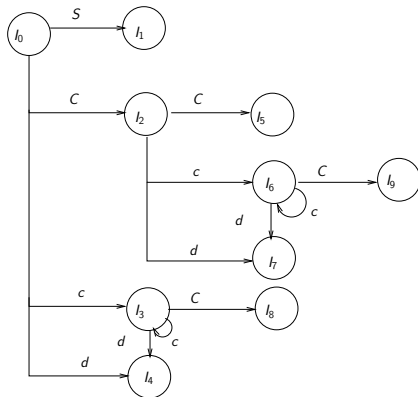
- Consider the following augmented grammar. The grammar generates regular language  $c^*dc^*d$

$$S' \rightarrow S$$

$$S \rightarrow CC$$

$$C \rightarrow cC \mid d$$

# Goto graph



## FOLLOW sets

- ▶  $FOLLOW(S') = \{\$ \}$
- ▶  $FOLLOW(S) = \{\$ \}$
- ▶  $FOLLOW(C) = \{c, d, \$ \}$

► CLR parsing table

STATE	ACTION			GOTO	
	<i>c</i>	<i>d</i>	\$	<i>S</i>	<i>C</i>
0	$s_3$	$s_4$		1	2
1			accept		
2	$s_6$	$s_7$			5
3	$s_3$	$s_4$			8
4	$r_3$	$r_3$			
5			$r_1$		
6	$s_6$	$s_7$			9
7			$r_3$		
8	$r_2$	$r_2$			
9			$r_2$		