

Q LALR(1) - Assignment 1 Q.3

$S \rightarrow Aa / aAc / Bc / bBa$

$A \rightarrow d$

$B \rightarrow d$

Sol

$S \rightarrow Aa$

— (1)

$S \rightarrow aAc$

— (2)

$S \rightarrow Bc$

— (3)

$S \rightarrow bBa$

— (4)

$A \rightarrow d$

— (5)

$B \rightarrow d$

— (6)

Step 1: Augmented grammar

$S_1 \rightarrow S$

$S \rightarrow Aa$

$S \rightarrow aAc$

$S \rightarrow Bc$

$S \rightarrow bBa$

$A \rightarrow d$

$B \rightarrow d$

Step 2: Closure ($S_1 \rightarrow \cdot S$)

$$= \left\{ \begin{array}{l} S_1 \rightarrow \cdot S, \$ \\ S \rightarrow \cdot Aa, \$ \\ S \rightarrow \cdot aAc, \$ \\ S \rightarrow \cdot Bc, \$ \\ S \rightarrow \cdot bBa, \$ \\ A \rightarrow \cdot d, a \\ B \rightarrow \cdot d, c \end{array} \right\} I_0$$

Step 3.

$$\text{goto}(I_0, S) \rightarrow \{S_1 \rightarrow S \cdot, \$\} - I_1$$

$$\text{goto}(I_0, A) \rightarrow \{S \rightarrow A \cdot a, \$\} - I_2$$

$$\text{goto}(I_0, B) \rightarrow \{S \rightarrow B \cdot c, \$\} - I_3$$

$$\text{goto}(I_0, a) \rightarrow \left\{ \begin{array}{l} S \rightarrow a \cdot Ac, \$ \\ A \rightarrow \cdot d, \$ \end{array} \right\} - I_4$$

$$\text{goto}(I_0, b) \rightarrow \left\{ \begin{array}{l} S \rightarrow b \cdot Ba, \$ \\ B \rightarrow \cdot d, \$ \end{array} \right\} - I_5$$

$$\text{goto}(I_0, c) \rightarrow \{\phi\}$$

$$\text{goto}(I_0, d) \rightarrow \left\{ \begin{array}{l} A \rightarrow d \cdot, a \\ B \rightarrow d \cdot, c \end{array} \right\} - I_6$$

$$\text{goto}(I_1, S) \rightarrow \{\phi\}$$

$$\text{goto}(I_1, A) \rightarrow \{\phi\}$$

$$\text{goto}(I_1, B) \rightarrow \{\phi\}$$

$$\text{goto}(I_1, a) \rightarrow \{\phi\}$$

$$\text{goto}(I_1, b) \rightarrow \{\phi\}$$

$$\text{goto}(I_1, c) \rightarrow \{\phi\}$$

$$\text{goto}(I_1, d) \rightarrow \{\phi\}$$

$$\text{goto}(I_2, S) \rightarrow \{\phi\}$$

$$\text{goto}(I_2, A) \rightarrow \{\phi\}$$

$$\text{goto}(I_2, B) \rightarrow \{\phi\}$$

$$\text{goto}(I_2, a) \rightarrow \{S \rightarrow Aa \cdot, \$\} - I_7$$

$$\text{goto}(I_2, b) \rightarrow \{\phi\}$$

$$\text{goto}(I_2, c) \rightarrow \{\phi\}$$

$$\text{goto}(I_2, d) \rightarrow \{\phi\}$$

Page No. _____
Date ____/____/____

$$\text{goto}(\mathcal{I}_3, s) \rightarrow \{\phi\}$$

$$\text{goto}(\mathcal{I}_3, A) \rightarrow \{\phi\}$$

$$\text{goto}(\mathcal{I}_3, B) \rightarrow \{\phi\}$$

$$\text{goto}(\mathcal{I}_3, q) \rightarrow \{\phi\}$$

$$\text{goto}(\mathcal{I}_3, b) \rightarrow \{\phi\}$$

$$\text{goto}(\mathcal{I}_3, c) \rightarrow \{S \rightarrow Bc\cdot, \$\} - \mathcal{I}_8$$

$$\text{goto}(\mathcal{I}_3, d) \rightarrow \{\phi\}$$

$$\text{goto}(\mathcal{I}_4, s) \rightarrow \{\phi\}$$

$$\text{goto}(\mathcal{I}_4, A) \rightarrow \{S \rightarrow qA\cdot c\cdot, \$\} - \mathcal{I}_9$$

$$\text{goto}(\mathcal{I}_4, B) \rightarrow \{\phi\}$$

$$\text{goto}(\mathcal{I}_4, q) \rightarrow \{\phi\}$$

$$\text{goto}(\mathcal{I}_4, b) \rightarrow \{\phi\}$$

$$\text{goto}(\mathcal{I}_4, c) \rightarrow \{\phi\}$$

$$\text{goto}(\mathcal{I}_4, d) \rightarrow \{A \rightarrow d\cdot, \$\} - \mathcal{I}_{10}$$

$$\text{goto}(\mathcal{I}_5, s) \rightarrow \{\phi\}$$

$$\text{goto}(\mathcal{I}_5, A) \rightarrow \{\phi\}$$

Page No. _____
Date ____/____/____

$$\text{goto}(I_5, B) \rightarrow \{S \rightarrow bB \cdot a, \$\} - I_{11}$$

$$\text{goto}(I_5, a) \rightarrow \{\phi\}$$

$$\text{goto}(I_5, b) \rightarrow \{\phi\}$$

$$\text{goto}(I_5, c) \rightarrow \{\phi\}$$

$$\text{goto}(I_5, d) \rightarrow \{B \rightarrow d \cdot, \$\} - I_{12}$$

$$\text{goto}(I_6, A) \rightarrow \{\phi\}$$

$$\text{goto}(I_6, B) \rightarrow \{\phi\}$$

$$\text{goto}(I_6, a) \rightarrow \{\phi\}$$

$$\text{goto}(I_6, b) \rightarrow \{\phi\}$$

$$\text{goto}(I_6, c) \rightarrow \{\phi\}$$

$$\text{goto}(I_6, d) \rightarrow \{\phi\}$$

$$\text{goto}(I_7, S) \rightarrow \{\phi\}$$

$$\text{goto}(I_7, A) \rightarrow \{\phi\}$$

$$\text{goto}(I_7, B) \rightarrow \{\phi\}$$

$$\text{goto}(I_7, a) \rightarrow \{\phi\}$$

$$\text{goto}(I_7, b) \rightarrow \{\phi\}$$

$$\text{goto}(I_7, c) \rightarrow \{\phi\}$$

$$\text{goto}(I_7, d) \rightarrow \{\phi\}$$

$$\text{goto}(I_8, S) \rightarrow \{\phi\}$$

$$\text{goto}(I_8, A) \rightarrow \{\phi\}$$

$$\text{goto}(I_8, B) \rightarrow \{\phi\}$$

$$\text{goto}(I_8, a) \rightarrow \{\phi\}$$

$$\text{goto}(I_8, b) \rightarrow \{\phi\}$$

$$\text{goto}(I_8, c) \rightarrow \{\phi\}$$

$$\text{goto}(I_8, d) \rightarrow \{\phi\}$$

$$\text{goto}(I_9, S) \rightarrow \{\phi\}$$

$$\text{goto}(I_9, A) \rightarrow \{\phi\}$$

$$\text{goto}(I_9, B) \rightarrow \{\phi\}$$

$$\text{goto}(I_9, a) \rightarrow \{\phi\}$$

$$\text{goto}(I_9, b) \rightarrow \{\phi\}$$

$$\text{goto}(I_9, c) \rightarrow \{S \rightarrow aAc., \$\} \quad I_{13}$$

$$\text{goto}(I_9, d) \rightarrow \{\phi\}$$

$$\text{goto}(I_{10}, S) \rightarrow \{\phi\}$$

$$\text{goto}(I_{10}, A) \rightarrow \{\phi\}$$

$$\text{goto}(I_{10}, B) \rightarrow \{\phi\}$$

$$\text{goto}(I_{10}, a) \rightarrow \{\phi\}$$

$$\text{goto}(I_{10}, b) \rightarrow \{\phi\}$$

$$\text{goto}(I_{10}, c) \rightarrow \{\phi\}$$

$$\text{goto}(I_{10}, d) \rightarrow \{\phi\}$$

$$\text{goto}(I_{11}, S) \rightarrow \{\phi\}$$

$$\text{goto}(I_{11}, A) \rightarrow \{\phi\}$$

$$\text{goto}(I_{11}, B) \rightarrow \{\phi\}$$

$$\text{goto}(I_{11}, a) \rightarrow \{S \rightarrow bBa., \$\} \quad I_{14}$$

$$\text{goto}(I_{11}, b) \rightarrow \{\phi\}$$

$$\text{goto}(I_{11}, c) \rightarrow \{\phi\}$$

$$\text{goto}(I_{11}, d) \rightarrow \{\phi\}$$

$\text{goto}(\Sigma_{12}, S) \rightarrow \{\phi\}$
 $\text{goto}(\Sigma_{12}, A) \rightarrow \{\phi\}$
 $\text{goto}(\Sigma_{12}, B) \rightarrow \{\phi\}$
 $\text{goto}(\Sigma_{12}, a) \rightarrow \{\phi\}$
 $\text{goto}(\Sigma_{12}, b) \rightarrow \{\phi\}$
 $\text{goto}(\Sigma_{12}, c) \rightarrow \{\phi\}$
 $\text{goto}(\Sigma_{12}, d) \rightarrow \{\phi\}$

$\text{goto}(\Sigma_{13}, S) \rightarrow \{\phi\}$
 $\text{goto}(\Sigma_{13}, A) \rightarrow \{\phi\}$
 $\text{goto}(\Sigma_{13}, B) \rightarrow \{\phi\}$
 $\text{goto}(\Sigma_{13}, a) \rightarrow \{\phi\}$
 $\text{goto}(\Sigma_{13}, b) \rightarrow \{\phi\}$
 $\text{goto}(\Sigma_{13}, c) \rightarrow \{\phi\}$
 $\text{goto}(\Sigma_{13}, d) \rightarrow \{\phi\}$

$\text{goto}(\Sigma_{14}, S) \rightarrow \{\phi\}$
 $\text{goto}(\Sigma_{14}, A) \rightarrow \{\phi\}$
 $\text{goto}(\Sigma_{14}, B) \rightarrow \{\phi\}$
 $\text{goto}(\Sigma_{14}, a) \rightarrow \{\phi\}$
 $\text{goto}(\Sigma_{14}, b) \rightarrow \{\phi\}$
 $\text{goto}(\Sigma_{14}, c) \rightarrow \{\phi\}$
 $\text{goto}(\Sigma_{14}, d) \rightarrow \{\phi\}$

States	Action Table					Go To Table		
	a	b	c	d	\$	AS	A	B
I ₀	S ₄	S ₅		S ₆		1	2	3
I ₁					Accept			
I ₂	S ₇							
I ₃			S ₈					
I ₄				S ₁₀			4	
I ₅				S ₁₂				11
I ₆	R ₅		R ₆					
I ₇					R ₁			
I ₈					R ₃			
I ₉			S ₁₃					
I ₁₀					R ₅			
I ₁₁	S ₁₄							
I ₁₂					R ₆			
I ₁₃					R ₂			
I ₁₄					R ₄			