

Úlohy na cvičenie:

1. Pre uvedené gramatiky zostrojte syntaktický analyzátor $LR(0)$, t.j. $LR(0)$ -automat, tabuľky $ACTION$, $GOTO$ a určte, či ide o $LR(0)$ -gramatiky.

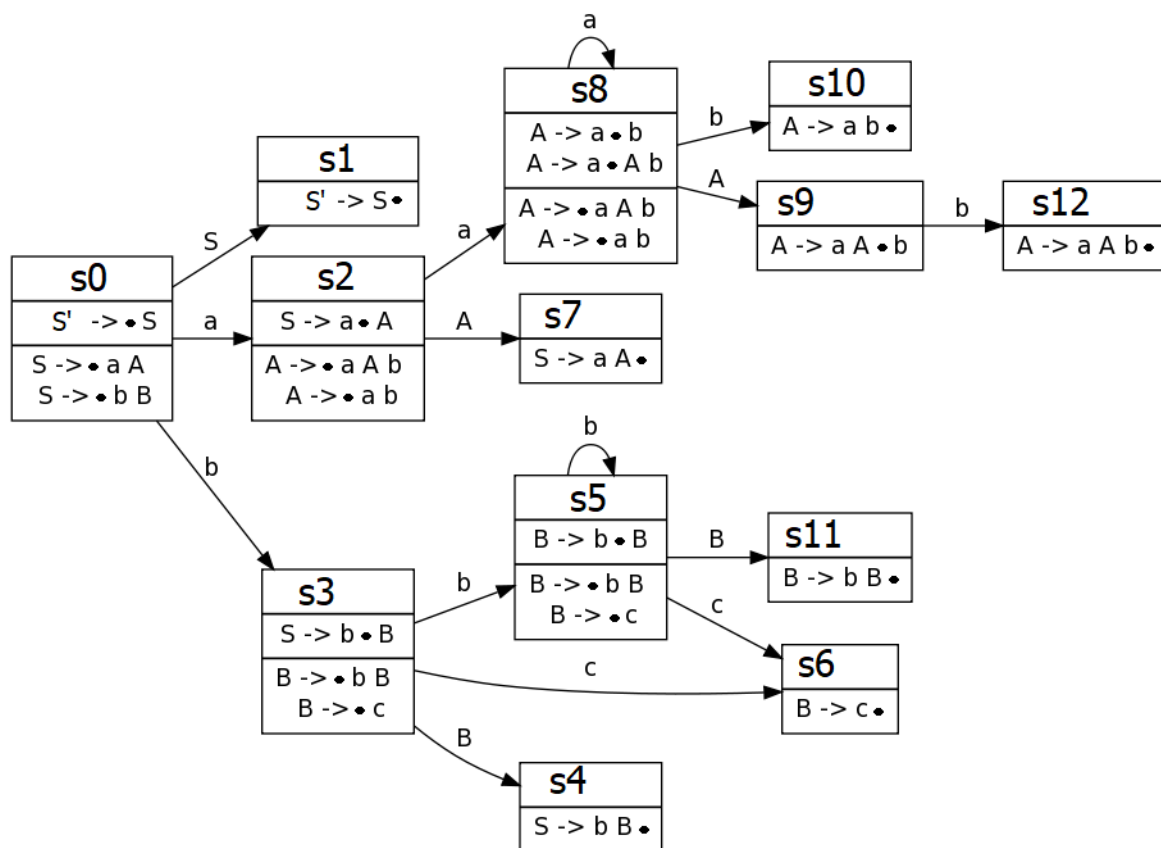
$$S \rightarrow aA \mid bB$$

$$A \rightarrow aAb \mid ab$$

$$B \rightarrow bB \mid c$$

Riešenie:

$LR(0)$ -automat:



$ACTION$	s ₀	s ₁	s ₂	s ₃	s ₄	s ₅	s ₆	s ₇	s ₈	s ₉	s ₁₀	s ₁₁	s ₁₂
	P	A	P	P	R2	P	R6	R1	P	P	R4	R5	R3
$GOTO$	s ₀	s ₁	s ₂	s ₃	s ₄	s ₅	s ₆	s ₇	s ₈	s ₉	s ₁₀	s ₁₁	s ₁₂
a	s ₂		s ₈					s ₈					
b	s ₃			s ₅		s ₅		s ₁₀	s ₁₂				
c				s ₆		s ₆							
S	s ₁												
A			s ₇					s ₉					
B				s ₄		s ₁₁							

Ide o $LR(0)$ -gramatiku, keďže $ACTION$ neobsahuje konflikty.

$$S \rightarrow aSb \mid bAb$$

$$A \rightarrow aAb \mid ab$$

$$B \rightarrow bB \mid c$$

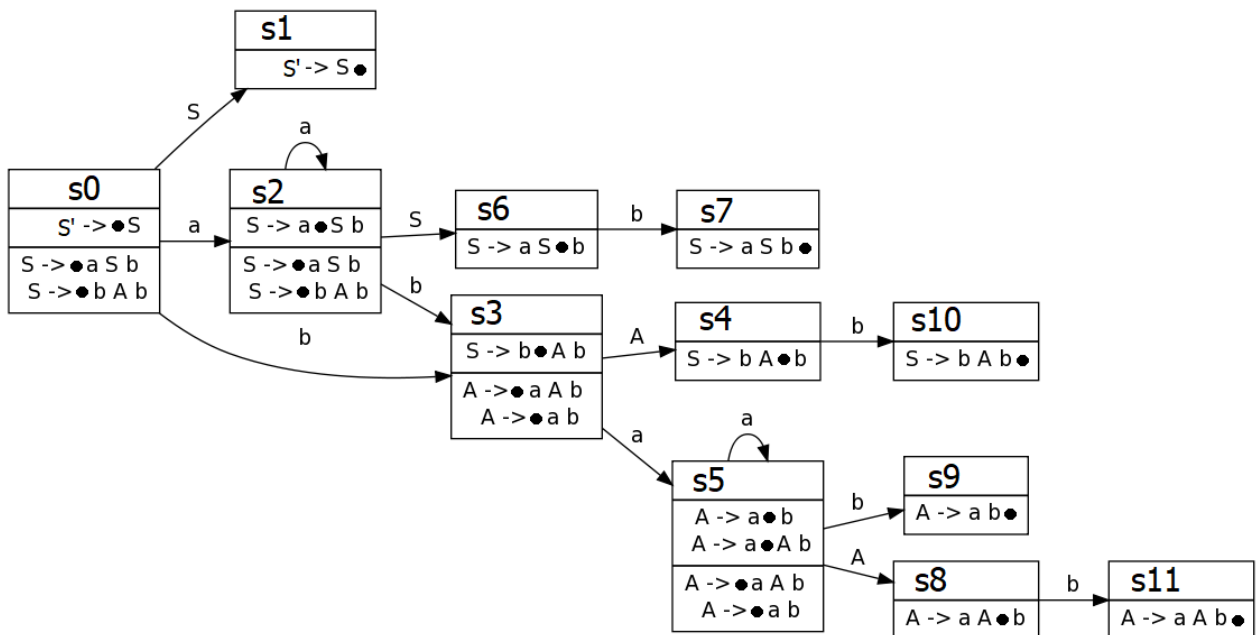
Riešenie: Gramatika **nie je redukovaná**, keďže B a c sú nedostupné symboly.

Redukovaná gramatika:

$$S \rightarrow aSb \mid bAb$$

$$A \rightarrow aAb \mid ab$$

$LR(0)$ -automat:

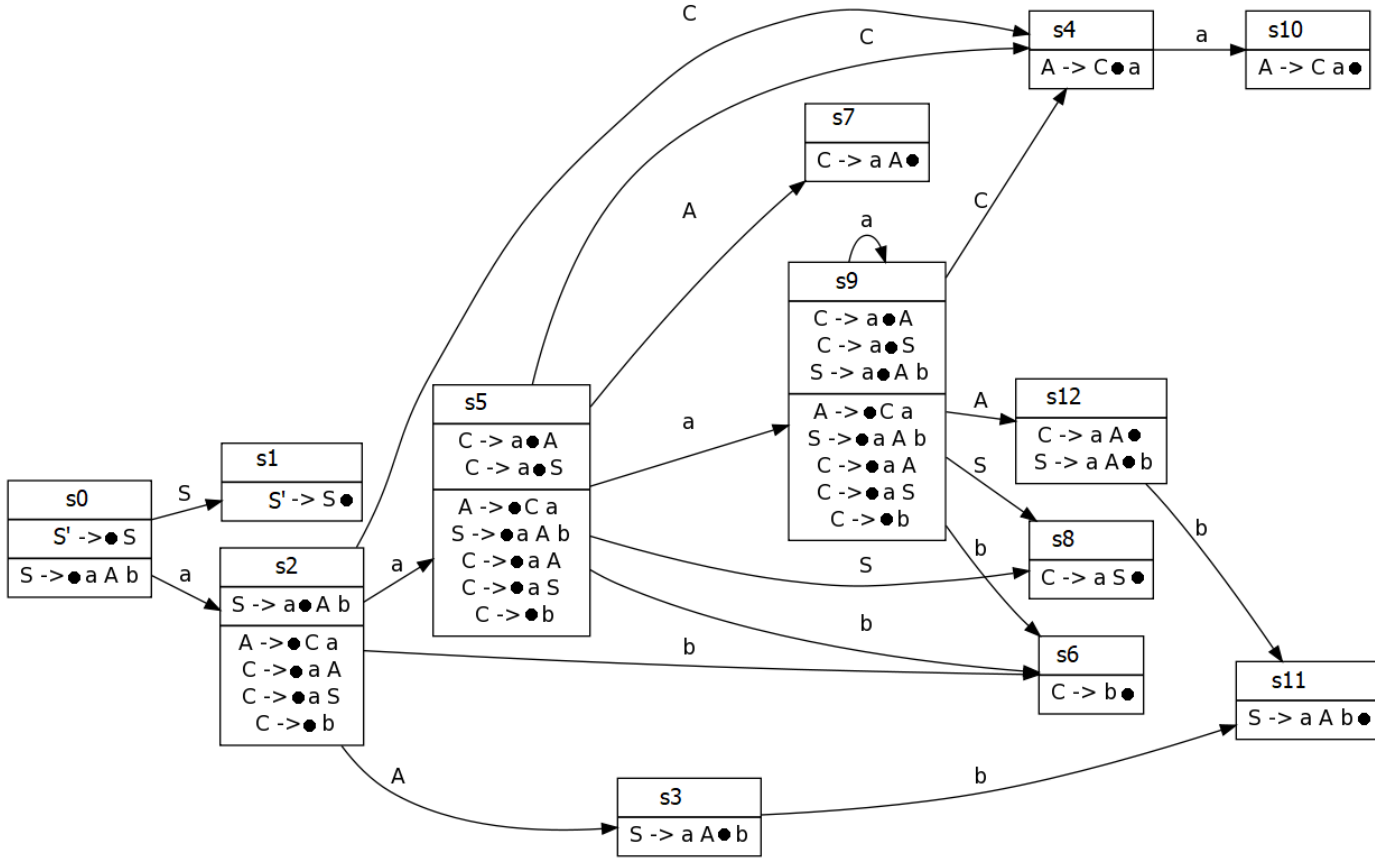


<i>ACTION</i>	s_0	s_1	s_2	s_3	s_4	s_5	s_6	s_7	s_8	s_9	s_{10}	s_{11}
	P	A	P	P	P	P	P	R1	P	R4	R2	R3
<i>GOTO</i>	s_0	s_1	s_2	s_3	s_4	s_5	s_6	s_7	s_8	s_9	s_{10}	s_{11}
<i>a</i>	s_2		s_2	s_5		s_5						
<i>b</i>	s_3		s_3		s_{10}	s_9	s_7		s_{11}			
<i>S</i>	s_1		s_6									
<i>A</i>				s_4		s_8						

Ide o $LR(0)$ -gramatiku, keďže *ACTION* neobsahuje konflikty.

$S \rightarrow aAb$
 $A \rightarrow Ca$
 $C \rightarrow aA \mid aS \mid b$

Riešenie: LR(0)-automat:



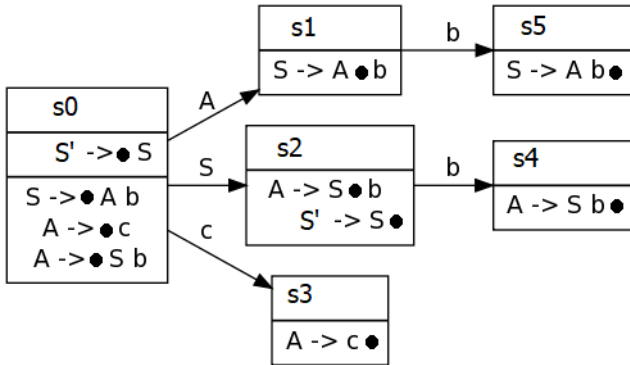
<i>ACTION</i>	s_0	s_1	s_2	s_3	s_4	s_5	s_6	s_7	s_8	s_9	s_{10}	s_{11}	s_{12}
	P	A	P	P	P	P	R5	R3	R4	P	R2	R1	P/R3
<i>GOTO</i>	s_0	s_1	s_2	s_3	s_4	s_5	s_6	s_7	s_8	s_9	s_{10}	s_{11}	s_{12}
<i>a</i>	s_2		s_5		s_{10}	s_9			s_9				
<i>b</i>			s_6	s_{11}		s_6			s_6				s_{11}
<i>S</i>	s_1					s_8			s_8				
<i>A</i>			s_3			s_7			s_{12}				
<i>C</i>			s_4			s_4			s_4				

Keďže *ACTION* obsahuje konflikt Presun/Redukcia pre stav s_{12} , uvedená gramatika **nie je** LR(0) gramatikou.

$S \rightarrow Ab$

$A \rightarrow c \mid Sb$

Riešenie: LR(0)-automat:



<i>ACTION</i>	s_0	s_1	s_2	s_3	s_4	s_5
	P	P	A/P	R2	R3	R1
<i>GOTO</i>	s_0	s_1	s_2	s_3	s_4	s_5
<i>b</i>		s_5	s_4			
<i>c</i>	s_3					
<i>S</i>	s_2					
<i>A</i>	s_1					

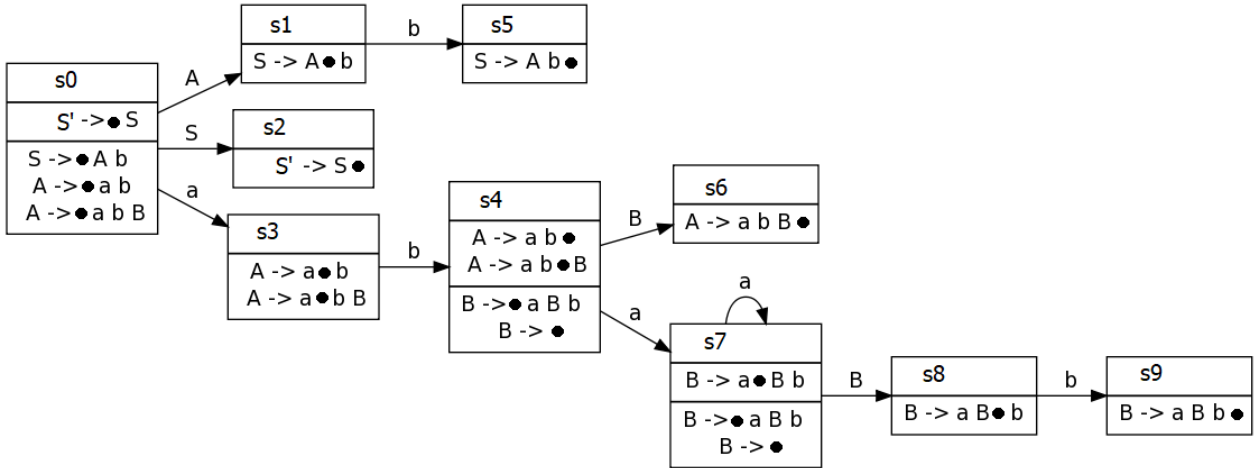
Keďže *ACTION* obsahuje konflikt Presun/Redukcia (resp. Presun/Akceptácia, čo je typ konfliktu Presun/Redukcia) pre stav s_2 , uvedená gramatika **nie je** LR(0) gramatikou.

$S \rightarrow Ab$

$A \rightarrow ab \mid abB$

$B \rightarrow aBb \mid \varepsilon$

Riešenie: LR(0)-automat:



<i>ACTION</i>	s_0	s_1	s_2	s_3	s_4	s_5	s_6	s_7	s_8	s_9
	P	P	A	P	P/R3/R5	R1	R3	P/R5	P	R4
<i>GOTO</i>	s_0	s_1	s_2	s_3	s_4	s_5	s_6	s_7	s_8	s_9
a	s_3				s_7			s_7		
b		s_5		s_4					s_9	
S	s_2									
A	s_1									
B					s_6			s_8		

Keďže *ACTION* obsahuje konflikt Presun/Redukcia pre stav s_7 a konflikty Presun/Redukcia a Redukcia/Redukcia pre stav s_4 , uvedená gramatika **nie je** LR(0) gramatikou.