

1) LR(1) Table

State 0	$S \rightarrow Xa, \perp$	$X - 1$
	$S \rightarrow Yb, \perp$	$Y - 2$
	$S \rightarrow bXb, \perp$	$b - 3$
	$X \rightarrow c, a$	$c - 4$
	$Y \rightarrow c, b$	

State 1	$S \rightarrow Xa, \perp$	$a - 5$
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State 2	$S \rightarrow Yb, \perp$	$b - 6$
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State 3	$S \rightarrow b, Xb, \perp$	$X - 7$
	$X \rightarrow c, b$	$c - 8$

State 4	$X \rightarrow c, a$	$a - \text{Reduce 4}$
	$Y \rightarrow c, b$	$b - \text{Reduce 5}$

State 5	$S \rightarrow Xa, \perp$	$\perp - \text{Reduce 1}$
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State 6	$S \rightarrow Yb, \perp$	$\perp - \text{Reduce 2}$
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State 7	$S \rightarrow b, Xb, \perp$	$b - 9$
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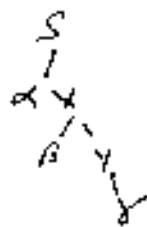
State 8	$X \rightarrow c, b$	$b - \text{Reduce 4}$
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State 9	$S \rightarrow b, Xb, \perp$	$\perp - \text{Reduce 3}$
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So LR(1).

True For  $X \rightarrow a -$

- (b) LL(0) means  $\text{First}_0(a) = \epsilon$   
 So all decisions based on inputs. So more are predictions. Exactly one syntax tree:



- (c) True here  $X \rightarrow a \mid b$   
 with  $\text{First}(a) \cap \text{First}(b) \neq \emptyset$ .

- (d) LALR(1)  $\subset$  LR(1) so True.

- (e)  $ab \vee cd - et -$   
 $ab \oplus cd - et -$   
 $\uparrow$   
 unary operator,  
 different from  
 binary operator.

2) LALR(1) - all items

lists different - so by default  
 can collapse similar ones so

LALR(1).

4) False - Remember:  $E \rightarrow E+T \mid T$   
 $T \rightarrow i \mid (E)$

1st class. Also, if unique symbol ends handle, then LR(0), but might not be regular - e.g.,  $\{a^n b^n\}$  is LR(0) but not regular.