Midterm Review

PLT-4115

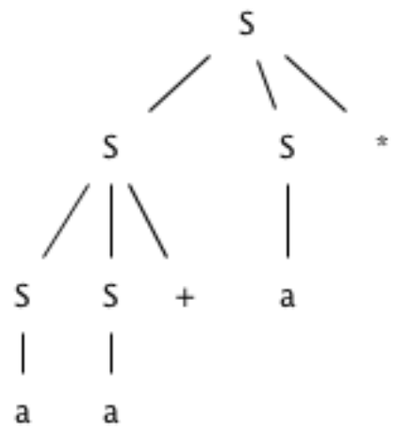
Q1. Consider the context-free grammar:

S -> S S + | S S * | a, and the string aa + a*

1. Give a leftmost derivation for the string.
2. Give a rightmost derivation for the string.
3. Give a parse tree for the string.
4. Is the grammar ambiguous or unambiguous? Justify your answer.

Answers:

1. S =lm=> SS* => SS+S* => aS+S* => aa+S* => aa+a*
2. S =rm=> SS* => Sa* => SS+a* => Sa+a* => aa+a*
3.



4. Unambiguous

Q2. Design grammars for the following languages:

1. The set of all strings of 0s and 1s that are palindromes; that is, the string reads the same backward as forward.
2. The set of all strings of 0s and 1s with an equal number of 0s and 1s.

Answers:

1. S -> 0S0 | 1S1 | 0 | 1 | ε
2. S -> 0S1S | 1S0S | ε

Q1. Are the following grammars SLR(1) w/o ambiguity

- Grammar1: **S->Sa|b**

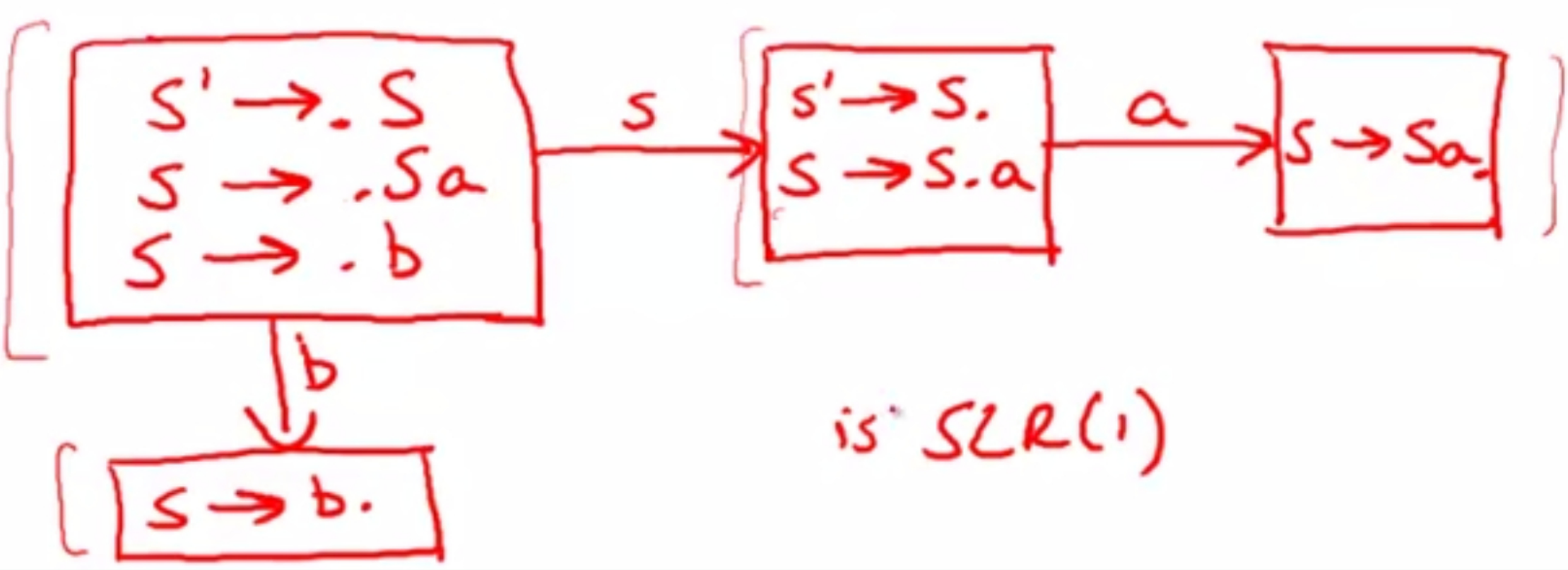
- Grammar2: **S->SaS | b**

$S' \rightarrow S$

$S \rightarrow Sa$

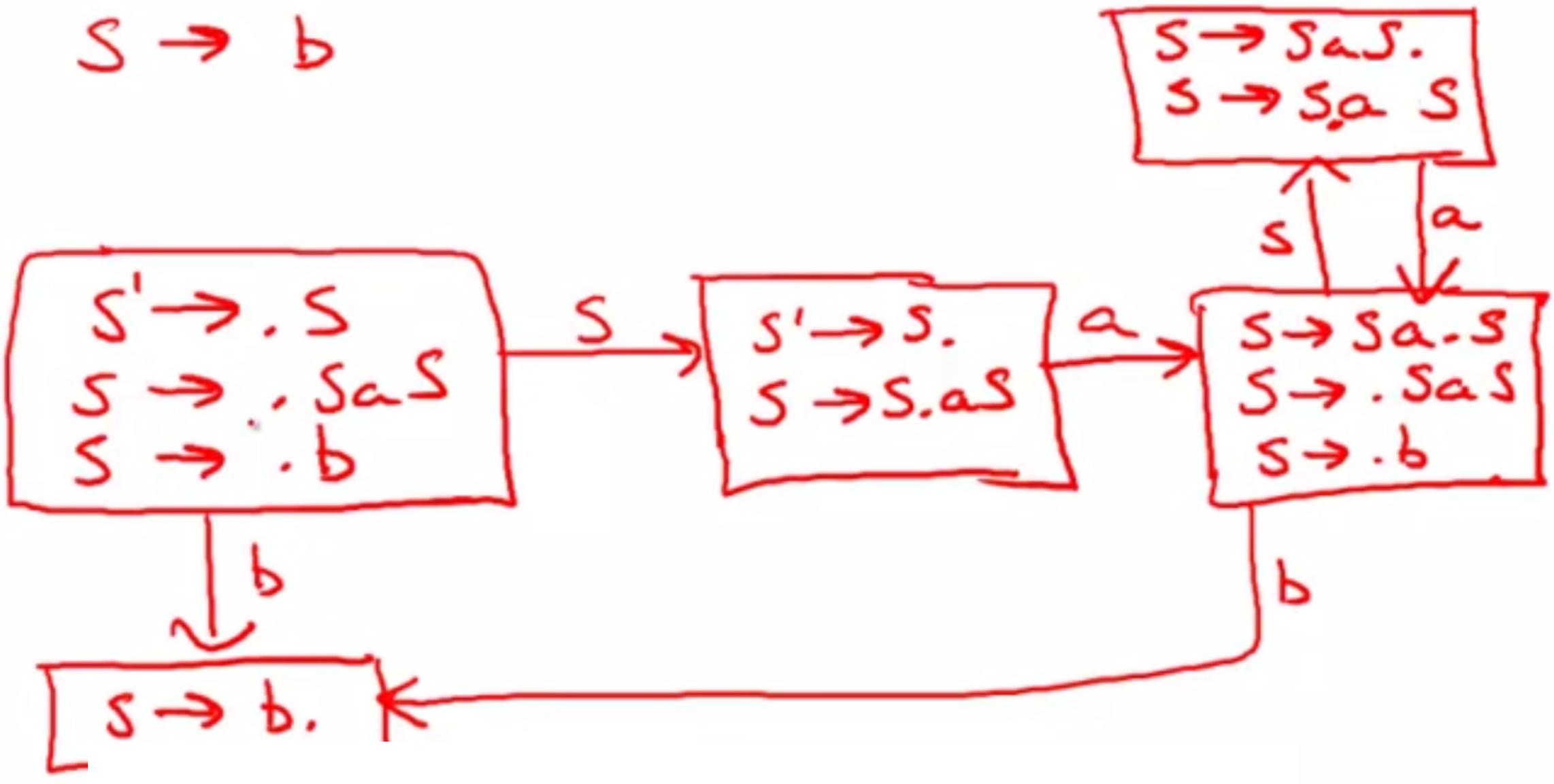
$S \rightarrow b$

follow(S') = { $ }



is SLR(1)

$S' \rightarrow S$

$S \rightarrow SaS$

$S \rightarrow b$