

Questions

13.0/15.0 points (graded)

Consider the augmented grammar below:

$$0. S' \rightarrow S$$

$$1. S \rightarrow Xp$$

$$2. S \rightarrow qXr$$

$$3. S \rightarrow Yr$$

$$4. S \rightarrow qYp$$

$$5. X \rightarrow t$$

$$6. Y \rightarrow t$$

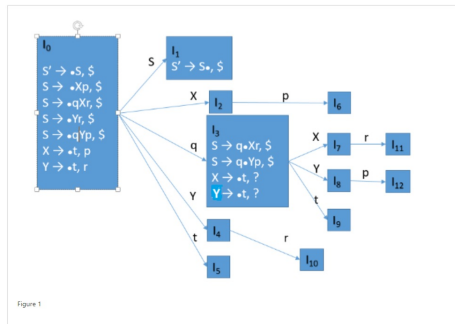


Figure 1

Figure 1 shows the skeleton of the LR(1) automaton for the grammar.

Complete the set of items. Construct the LALR(1) table and answer the following questions based on your derived results.

1. How many items are there in the set of items, I_0

2. How many items are there in the set of items, I_3

3. In the LALR(1) table, which of the following cells contain **Accept** ?

☐ I_0, p

☐ I_0, ϵ

☐ $I_0, \$$

☒ $I_0, \$$

☐ All of the above

☐ None of the above

4. In the LALR(1) table, which of the following do you get in the cell (I_0, t) ?

☐ S

☐ R

☐ S

☐ ERROR

☒ S/S/S

5. In the LALR(1) table, which of the following do you get in the cell (I_3, X) ?

☐ S

☐ R

☒ ?

☐ R

☐ S

☐ ERROR

6. In the LALR(1) table, which of the following do you get in the cell (I_3, Y) ?

☐ S

☐ R

☒ ?

☐ R

☐ ERROR

9. Is the given grammar a valid LALR(1) grammar?

☐ YES

☐ NO

10. If the LR(1) table for a certain grammar does not have any conflict, what kind of conflict can there possibly be in the derived LALR(1) table for the same grammar (if any)?

☒ Shift-Reduce

☐ Reduce-Reduce

☐ Shift-Shift

☐ None

13. In Figure 1, GOTO (I_3, t) leads to a set of items I_5 . Which of the following item(s) does the set contain?

☐ $X \rightarrow t, p$

☒ $Y \rightarrow t, p$

☐ $X \rightarrow t, q$

☐ $Y \rightarrow t, q$

☐ $X \rightarrow t, r$

☐ $Y \rightarrow t, r$

14. How many states does the LALR(1) automaton have?

☐ 10

☒ 11

☐ 12

15. Which of the following statements is correct?

☐ The set of LALR(1) grammars is a subset of LR(1) grammars

☐ The set of LALR(1) grammars is a superset of LR(1) grammars

☐ The set of LR(1) grammars is a subset of LR(1) grammars

☐ None of the above

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