

Script generated by TTT

Title: Petter: Compiler Construction (28.05.2020)
-21: Canonical LR(0) Automata

Date: Mon May 11 12:15:06 CEST 2020

Duration: 20:39 min

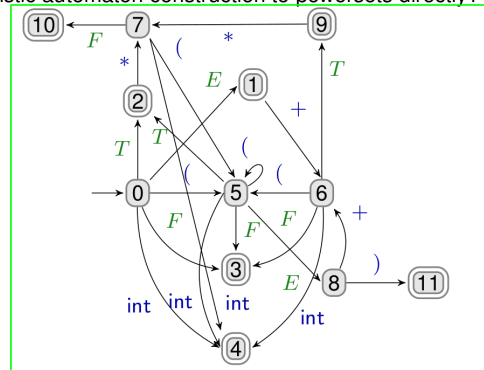
Pages: 11

Canonical LR(0)-Automaton

The canonical LR(0)-automaton $LR(G)$ is created from $c(G)$ by:

- 1 performing arbitrarily many ϵ -transitions after every consuming transition
- 2 performing the powerset construction
- 3 Idea: or rather apply characteristic automaton construction to powersets directly?

... for example:

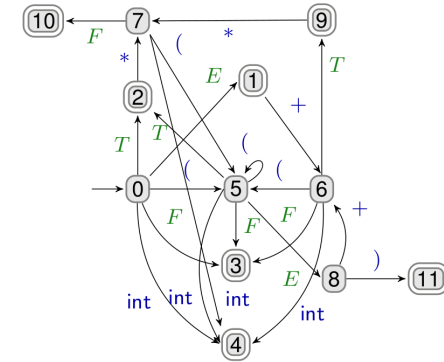


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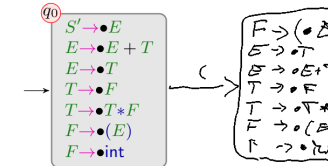
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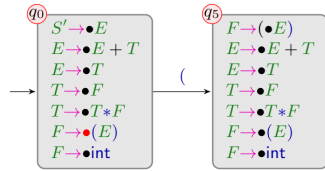
Canonical LR(0)-Automaton – Example:

$S' \rightarrow E$
 $E \rightarrow E+T \mid T$
 $T \rightarrow T*F \mid F$
 $F \rightarrow (E) \mid \text{int}$



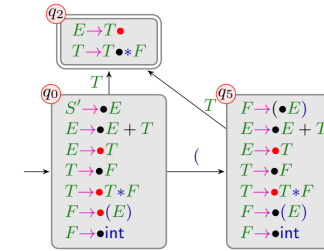
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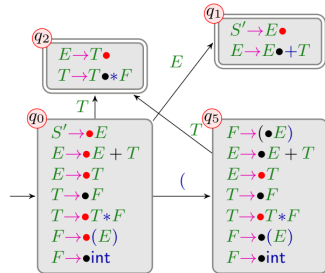
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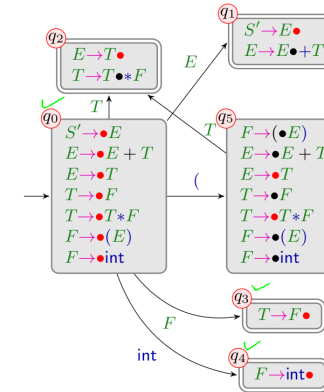
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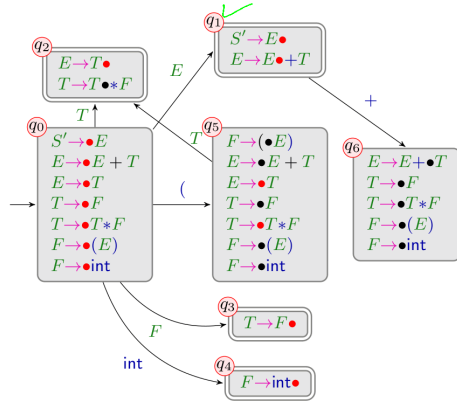
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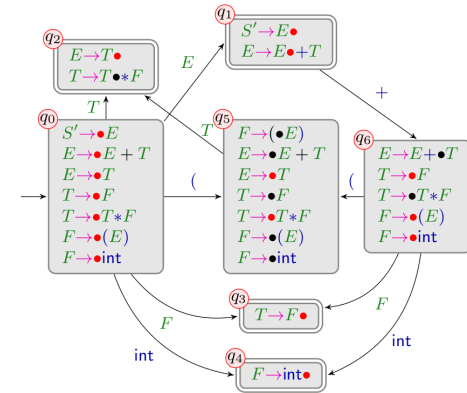
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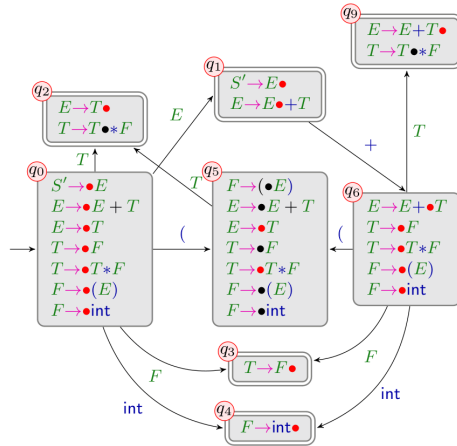
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Canonical LR(0)-Automaton

Observation:

The canonical LR(0)-automaton can be created directly from the grammar. For this we need a helper function δ_ϵ^* (ϵ -closure)

$$\delta_\epsilon^*(q) = q \cup \{ [B \rightarrow \bullet \gamma] \mid B \rightarrow \gamma \in P, [A \rightarrow \alpha \bullet B' \beta'] \in q, B' \rightarrow^* B \beta \}$$

We define:

States: Sets of items;

Start state: $\delta_\epsilon^* \{ [S' \rightarrow \bullet S] \}$

Final states: $\{ q \mid [A \rightarrow \alpha \bullet] \in q \}$

Transitions: $\delta(q, X) = \delta_\epsilon^* \{ [A \rightarrow \alpha X \bullet \beta] \mid [A \rightarrow \alpha \bullet X \beta] \in q \}$