

School of Mathematical and Computational Sciences
Indian Association for the Cultivation of Science

Compiler Construction: COM 5202

Tutorial VII (18 February 2026)

M. Sc Semester IV: 2025-2026

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Exercise 1. Consider the following grammar:

$$S \rightarrow S S + \mid S S - \mid S S * \mid S S / \mid ic$$

where ic is the token corresponding to an integer constant.

- (a) Compute the canonical collection of $LR(0)$ items for the grammar. Justify that the grammar is $LR(0)$.
- (b) Show the $LR(0)$ parsing table corresponding to these items.
- (c) Show the snapshots of $LR(0)$ parsing stacks on the input $7\ 10\ 2\ /\ -\ 4\ +\ 3\ *\ 20\ -\ \$$ using the parsing table. Also evaluate the expression along with parsing.

Exercise 2. Show that $G_1 = (\{-, (,), ic\}, \{S, E, T\}, P, S)$ where the production rules are

$$\begin{aligned} S &\rightarrow E \\ E &\rightarrow E - T \\ E &\rightarrow T \\ T &\rightarrow (E) \\ T &\rightarrow ic \end{aligned}$$

is not $LR(0)$. But $G_2 = (\{\$, -, (,), ic\}, \{S, E, T\}, P, S)$ is $LR(0)$ where the production rules are

$$\begin{aligned} S &\rightarrow E \$ \\ E &\rightarrow E - T \\ E &\rightarrow T \\ T &\rightarrow (E) \\ T &\rightarrow ic \end{aligned}$$

Exercise 3. Describe the viable prefixes of the following grammars

(a) $S \rightarrow 0 S 1 \mid 0 1$

(b)

$$\begin{aligned} S &\rightarrow S S + \\ S &\rightarrow S S - \\ S &\rightarrow S S * \\ S &\rightarrow S S / \\ S &\rightarrow a \end{aligned}$$