School of Mathematical and Computational Sciences Indian Association for the Cultivation of Science Compiler Construction: COM 5202

Tutorial VI (19 February, 2025)

M. Sc Semester IV: 2024-2025

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Exercise 1. For each of the following grammars, design predictive parsers (if possible) and show the parsing tables. You may left-factor and/or eliminate left recursion from your grammar.

- (a) $S \to 0 S 1 \mid 0 1$
- (b) $S \rightarrow (S) S \mid \varepsilon$
- (c) $S \to S(S) | \varepsilon$

(d) $S \rightarrow S + S \mid SS \mid (S) \mid S \ast \mid a$

Exercise 2. Following grammar is not LL(1).

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

where *ic* is the toke corresponding to an integer constant.

- (a) Transform it to an equivalent LL(1) grammar.
- (b) Draw the parse tree for the input 7 10 2 / 4 + 3 \ast 20 using the transformed grammar.
- (c) Design the parse table for a predictive parser.

Exercise 3. Compute the canonical collection of LR(0) items for the grammar of (**Ex.2**). Justify that the grammar is LR(0).

Exercise 4. Draw the LR(0) parsing table corresponding to the DFA of (Ex.3).

Exercise 5. Show that the grammar with production rules $E \to E + T.E \to E - T, E \to T, T \to (E), T \to ic$ with $\{E, T\}$ as nonterminals and E as the start symbol is an LR(0) grammar. Is the language regular?