

Assignment 4

1 Requirements

You are expected to complete all required exercises. For submission, please put all your answers in a PDF file. The name of the file should follow the format “**studentID assignmentNumber**” (e.g., 2021111554 assignment4). **The submission deadline is 11:59 PM, November 5, 2023. Please ensure that your answer process is detailed enough, otherwise it will affect the evaluation.**

2 Bottom-Up Parsing Exercises (100 points)

Exercise 1 (Simple LR): Consider the following grammar G:

$$S \rightarrow aB$$

$$B \rightarrow S + B \mid \epsilon$$

1. Construct the SLR(1) parsing table for G. Please put down the detailed steps, including the calculation of LR(0) item sets. [20 points]
2. Is the grammar SLR(1)? [10 points]
3. Can the SLR(1) parser accept the input string `aaaa+++`? If yes, please list the moves made by the parser; otherwise, state the reason. Before parsing, please resolve conflicts if any. [10 points]

Exercise 2 (Canonical LR): Convert Consider the grammar G in Exercise 1:

1. Construct the CLR(1) parsing table for G. Please put down the detailed steps, including the calculation of LR(1) item sets. [20 points]
2. Can the CLR(1) parser accept the input string `aaaa+++`? If yes, please list the moves made by the parser; otherwise, state the reason. Before parsing, please resolve conflicts if any. [10 points]

Exercise 3 (Lookahead LR): Consider the grammar G in Exercise 1:

1. Construct the LALR(1) parsing table for G. Please put down the detailed steps, including the merging of LR(1) item sets. [20 points]
2. Can the LALR(1) parser accept the input string `aaaa+++`? If yes, please list the moves made by the parser; otherwise, state the reason. Before parsing, please resolve conflicts if any. [10 points]