CS323 Written Assignment 4

1   Requirements

You are expected to complete all required homework exercises. For submission, please put all your answers in a single PDF file and submit it via the assignment channel on BlackBoard. The name of the file should follow the format **"studentID_HW#"** (e.g., 30003554_HW1). **The submission deadline is 10:00 PM, November 23, 2025.** Late submissions are allowed within three days after the deadline (grace period). If you submit your assignment during the grace period, your score will be 60% of the score you could get if the submission was made in time. Assignments submitted after the grace period will not be graded.

2   Exercises (100 points)

Exercise 1:   Consider the following grammar G, which you have seen in the previous assignment:

```
E -> TX
X -> +E | ε
T -> FY
Y -> T | ε
F -> PZ
Z -> *Z | ε
P -> (E) | a | b
```

- Please construct the SLR parsing table for G. Is the grammar SLR(1)? [20 points]

- Give the parsing steps for the input string $(a * +b) + b$. If there are conflicts in the parsing table, please address them reasonably. [10 points]

Exercise 2:   Consider the following grammar G:

```
S -> 0A
A -> S1A | ε
```

- Please construct the shift-reduce parsing table for the above grammar G using each of the following algorithms: (1) SLR, (2) CLR, and (3) LALR. [45 points]

- Is the grammar SLR(1)? Is it LR(1)? Is it LALR(1)? [15 points]

- Can an LALR(1) parser accept the string 000001111? If yes, please list the parsing steps; otherwise, please state the reason. Before parsing, please address conflicts in the parsing table if any. [10 points]