

A2 - sol.

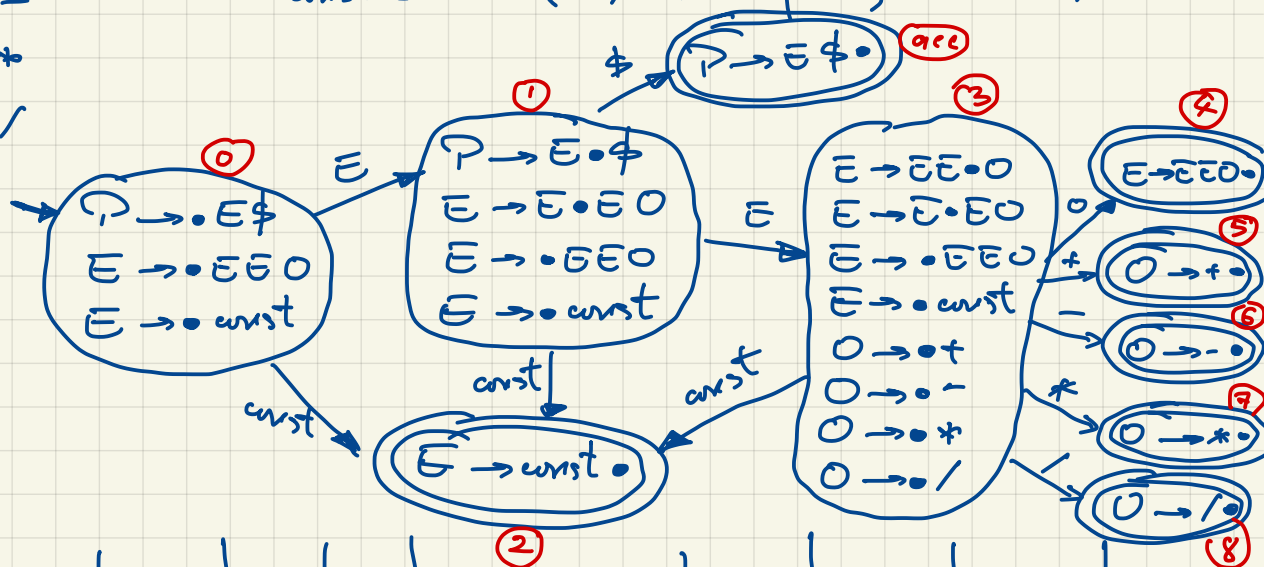
(win. 2023)

① ② $P \rightarrow E \phi$

1. $E \rightarrow EEO$
2. $E \rightarrow \text{const}$
3. $O \rightarrow +$
4. $O \rightarrow -$
5. $O \rightarrow *$
6. $O \rightarrow /$

| | FIRST | FOLLOW |
|---|------------|---------------------------|
| E | const | const, +, -, *, /, ϕ |
| O | +, -, *, / | const, +, -, *, /, ϕ |

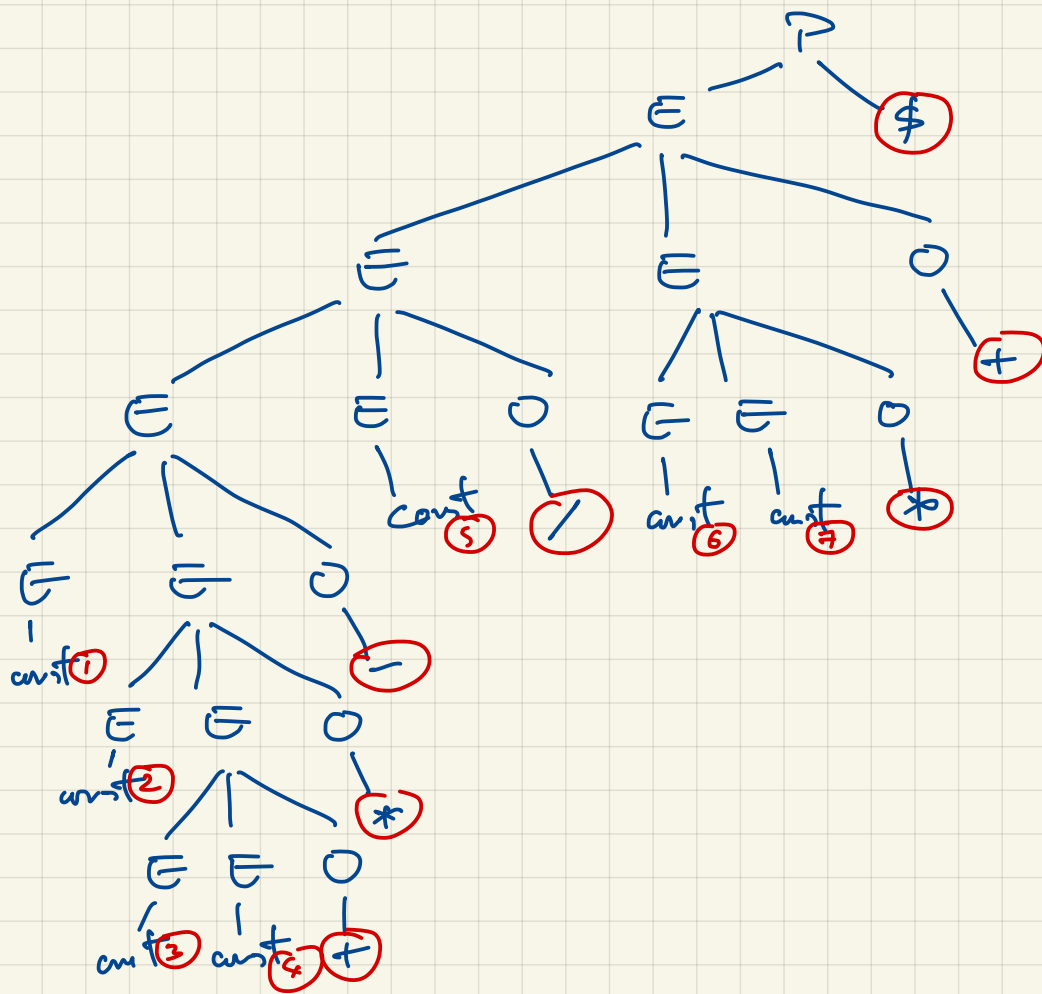
$\text{const} \in \text{FIRST}(E) \Rightarrow \text{conflict, not LL(1)}$



| state \ token | + | - | * | / | const | ϕ | E | O |
|---------------|----|----|----|----|-------|--------|----|----|
| 0 | | | | | s2 | | s1 | |
| 1 | | | | | s2 | acc | s3 | |
| 2 | r2 | r2 | r2 | r2 | r2 | r2 | | |
| 3 | s5 | s6 | s7 | s8 | s2 | | | s4 |
| 4 | r1 | r1 | r1 | r1 | r1 | r1 | | |
| 5 | r3 | r3 | r3 | r3 | r3 | r3 | | |
| 6 | r4 | r4 | r4 | r4 | r4 | r4 | | |
| 7 | r5 | r5 | r5 | r5 | r5 | r5 | | |
| 8 | r6 | r6 | r6 | r6 | r6 | r6 | | |

no conflicts \Rightarrow SLR(1)

2



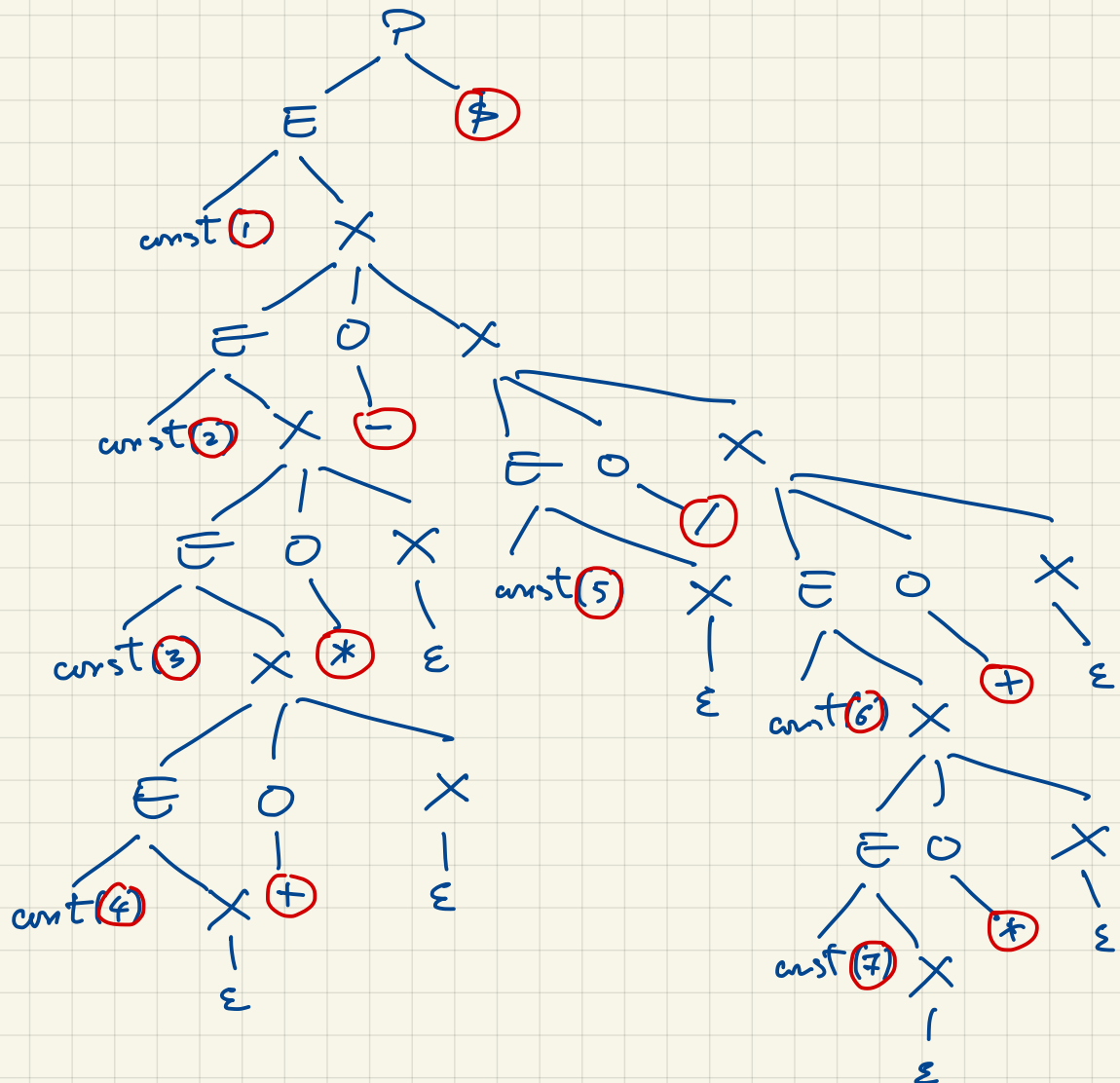
- ©
0. $P \rightarrow E \$$
 1. $E \rightarrow \text{const } X$
 2. $X \rightarrow E O X$
 3. $X \rightarrow \epsilon$
 4. $O \rightarrow +$
 5. $O \rightarrow -$
 6. $O \rightarrow *$
 7. $O \rightarrow /$

| | FIRST | FOLLOW |
|---|---------|--------------------|
| E | const | +,-,*,/, \$ |
| O | +,-,*,/ | +,-,*,/, const, \$ |
| X | const | +,-,*,/, \$ |

| non-term / term | + | - | * | / | const | \$ |
|-----------------|---|---|---|---|-------|----|
| E | | | | | 1 | |
| O | 4 | 5 | 6 | 7 | | |
| X | 3 | 3 | 3 | 3 | 2 | 3 |

no conflicts,
so it is LL(1)

(d)



② @

$$S \rightarrow A_1 P_1 R \mid e A_2 P_2$$

$$P_1 \rightarrow P_2 D$$

$$P \rightarrow D$$

$$R_1 \rightarrow D R_2$$

$$R \rightarrow D$$

$$D \rightarrow i, 0 \leq i \leq 9$$

$$A \rightarrow + \mid - \mid \varepsilon$$

$$S.val \leftarrow A_1.val \times (P_1.val + R_1.val \times 10^{-1}) \times 10^{A_2.val \times P_2.val}$$

$$P_1.val \leftarrow 10 \times P_2.val + D$$

$$P.val \leftarrow D.val$$

$$R_1.val \leftarrow D.val + R_2.val \times 10^{-1}$$

$$R.val \leftarrow D.val$$

$$D.val \leftarrow i$$

$$A.val = + \mid - \mid \varepsilon$$

②

