<http://courses.washington.edu/css448/zander/Notes/SLRtable.pdf>

SLR(1) = LR(0) + FOLLOW

Reduction Rules:

01 program ::= expr '\n'

02 expr ::= term expr\_tail

03 expr\_tail::= '+' term expr\_tail

04 | '-' term expr\_tail

05 | ε

06 term ::= factor\_p term\_tail

07 term\_tail::= '\*' factor term\_tail

08 | '/' factor term\_tail

09 | ε

10 factor ::= NUMBER

11 | '(' expr ')'

12 factor\_p ::= '-' factor

13 | factor

Bottom-up, table-driven, shift-reduce SLR(1) parse of (1+2)\*3

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Step | Parse Stack | LA Symbol | Unscanned Input | Action |
| 0 | $0 | ( | 1+2)\*3 \n $ | Shift 8 |
| 1 | $0 (8 | NUMBER1 | +2)\*3 \n $ | Shift 7 |
| 2 | $0 (8 NUMBER17 | + | 2)\*3 \n $ | Reduce r10 | factor ::= NUMBER |
| 3 | $0 (8 factor6 | + | 2)\*3 \n $ | Reduce r13 | factor\_p ::= factor |
| 4 | $0 (8 factor\_p4 | + | 2)\*3 \n $ | Reduce r09 | term\_tail :: = ε |
| 6 | $0 (8 factor\_p4 term\_tail15 | + | 2)\*3 \n $ | Reduce r06 | term ::= factor\_p term\_tail |
| 7 | $0 (8 term3 | + | 2)\*3 \n $ | Shift 10 |
| 8 | $0 (8 term3 +10 | 2 | )\*3 \n $ | Shift 7 |
| 9 | $0 (8 term3 +10 NUMBER27 | ) | \*3 \n $ | Reduce r10 | factor ::= NUMBER |
| 10 | $0 (8 term3 +10 factor6 | ) | \*3 \n $ | Reduce r13 | factor\_p ::= factor |
| 11 | $0 (8 term3 +10 factor\_p4 | ) | \*3 \n $ | Reduce r09 | term\_tail :: = ε |
| 12 | $0 (8 term3 +10 factor\_p4 term\_tail15 | ) | \*3 \n $ | Reduce r06 | term ::= factor\_p term\_tail |
| 13 | $0 (8 term3 +10 term3 | ) | \*3 \n $ | Reduce r05 | expr\_tail::= ε |
| 14add r03 | $0 (8 term3 +10 term3 expr\_tail12 | ) | \*3 \n $ | Reduce r03 | expr\_tail ::= + term expr\_tail |
| 15 | $0 (8 term3 expr\_tail12 | ) | \*3 \n $ | Reduce r02 | expr ::= term expr\_tail |
| 16 | $0 (8 expr17 | ) | \*3 \n $ | Shift 26 |
| 17 | $0 (8 expr17 )26 | \* | 3 \n $ | Reduce r11 | factor ::= ( expr ) |
| 18 | $0 factor6 | \* | 3 \n $ | Reduce r13 | factor\_p ::= factor |
| 19 | $0 factor\_p4 | \* | 3 \n $ | Shift 13 |
| 20 | $0 factor\_p4 \*13 | 3 | \n $ | Shift 7 |
| 21 | $0 factor\_p4 \*13 NUMBER37 | \n | $ | Reduce 10 | factor ::= NUMBER |
| 22 | $0 factor\_p4 \*13 factor6 | \n | $ | Reduce 13 | factor\_p ::= factor |
| 23 | $0 factor\_p4 \*13 factor\_p20 | \n | $ | Reduce 09 | term\_tail :: = ε |
| 24 | $0 factor\_p4 \*13 factor\_p20 term\_tail24 | \n | $ | Reduce 07 | term\_tail ::= \* factor term\_tail |
| 25 | $0 factor\_p4 term\_tail15 | \n | $ | Reduce 06 | term::= factor\_p term\_tail |
| 26 | $0 term3 | \n | $ | Reduce 05 | expr\_tail::= ε |
| 27 | $0 term3 expr\_tail12 | \n | $ | Reduce 02 | expr ::= term expr\_tail |
| 28 | $0 expr2 | \n | $ | Shift 9 |
| 29 | $0 expr2 \n9 | $ |  | Reduce 01 | program ::= expr '\n' |
| 30 | $0 program1 | $ |  | ACCEPT |

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| State |  | Production | ACTION | | | | | | | | | LHS GOTO | | | | | | |
| ~~s’~~ | N | ( | ) | + | - | \* | / | \n | $ | program | expr | expr\_tail | term | term\_tail | factor | factor\_p | |
| 0 | ~~0~~ | S0->·program  program-> ·expr \n  expr->·term expr\_tail  term->·factor\_p term\_tail  factor\_p->·-factor  factor->·NUMBER  factor->·(expr) | shift 7 | shift 8 |  |  | shift 5 |  |  |  |  | 1 | 2 |  | 3 |  | 6 | 4 | |
| 1 | ~~5~~ | S0->program· |  |  |  |  |  |  |  |  | ACC |  |  |  |  |  |  |  | |
| 2 | ~~1~~ | program -> expr·\n |  |  |  |  |  |  |  | shift 9 |  |  |  |  |  |  |  |  | |
| 3 | ~~4~~ | expr->term·expr\_tail expr\_tail->·+term expr\_tail  expr\_tail->·-term expr\_tail  expr\_tail->· |  |  | r05 | shift 10 | shift 11 |  |  | r05 |  |  |  | 12 |  |  |  |  | |
| 4 | ~~3~~ | term->factor\_p·term\_tail  term\_tail->·\*factor\_p term\_tail  term\_tail->·/factor\_p term\_tail  term\_tail->· |  |  | r09 | r09 | r09 | shift 13 | shift 14 | r09 |  |  |  |  |  | 15 |  |  | |
| 5 | ~~6~~ | factor\_p->-·factor  factor->·NUMBER  factor->·(expr) | shift 7 | shift 8 |  |  |  |  |  |  |  |  |  |  |  |  | 16 |  | |
| 6 | ~~2~~ | factor\_p->factor· |  |  | r13 | r13 | r13 | r13 | r13 | r13 |  |  |  |  |  |  |  |  | |
| 7 | ~~7~~ | factor->NUMBER· |  |  | r10 | r10 | r10 | r10 | r10 | r10 |  |  |  |  |  |  |  |  | |
| 8 | ~~8~~ | factor->(·expr)  expr->· term expr\_tail  term->· factor\_p term\_tail  factor\_p->·factor  factor->·NUMBER  factor->·(expr) | shift 7 | shift 8 |  |  | shift 5 |  |  |  |  |  | 17 |  | 3 |  | 6 | 4 | |
| 9 | ~~17~~ | program -> expr \n· |  |  |  |  |  |  |  |  | r01 |  |  |  |  |  |  |  | |
| 10 | ~~12~~ | expr\_tail->+·term expr\_tail  term->·factor\_p term\_tail  factor\_p->·-factor  factor\_p->·factor  factor->·NUMBER  factor->.(expr) | shift 7 | shift 8 |  |  | shift 5 |  |  |  |  |  |  |  | 18 |  | 6 | 4 | |
| 11 | ~~13~~ | expr\_tail->-·term expr\_tail  term->·factor\_p term\_tail  factor\_p->·-factor  factor\_p->·factor  factor->·NUMBER  factor->.(expr) | shift 7 | shift 8 |  |  | shift 5 |  |  |  |  |  |  |  | 19 |  | 6 | 4 | |
| 12 | ~~11~~ | expr->term expr\_tail· |  |  | r03 |  |  |  |  | r02 |  |  |  |  |  |  |  |  | |
| 13 | ~~15~~ | term\_tail->\*·factor\_p term\_tail  factor\_p->·-factor  factor\_p->·factor  factor->·NUMBER  factor->.(expr) | shift 7 | shift 8 |  |  | shift 5 |  |  |  |  |  |  |  |  |  | 6 | 20 | |
| 14 | ~~16~~ | term\_tail -> / · factor\_p term\_tail  factor\_p->·-factor  factor\_p->·factor  factor->·NUMBER  factor->.(expr) | shift 7 | shift 8 |  |  | shift 5 |  |  |  |  |  |  |  |  |  | 6 | 21 | |
| 15 | ~~14~~ | term-> factor\_p term\_tail· |  |  | r06 | r06 | r06 |  |  | r06 |  |  |  |  |  |  |  |  | |
| 16 | ~~10~~ | factor\_p->-factor· |  |  | r10 | r10 | r10 | r10 | r10 | r10 |  |  |  |  |  |  |  |  | |
| 17 | ~~9~~ | factor->(expr·) |  |  | shift 26 |  |  |  |  |  |  |  |  |  |  |  |  |  | |
| 18 | ~~21~~ | expr\_tail->+term·expr\_tail  expr\_tail->·+term expr\_tail  expr\_tail->·-term expr\_tail  expr+tail->· |  |  | r05 | shift 10 | shift 11 |  |  | r05 |  |  |  | 22 |  |  |  |  | |
| 19 | ~~20~~ | expr\_tail->-term·expr\_tail  expr\_tail->·+term expr\_tail  expr\_tail->·-term expr\_tail  expr+tail->· |  |  | r05 | shift 10 | shift 11 |  |  | r05 |  |  |  | 23 |  |  |  |  | |
| 20 | ~~19~~ | term\_tail->\* factor\_p ·term\_tail  term\_tail->·\* factor\_p term\_tail  term\_tail->·/ factor\_p term\_tail  term\_tail->· |  |  | r09 | r09 | r09 | shift 13 | shift 14 | r09 |  |  |  |  |  | 24 |  |  | |
| 21 | ~~18~~ | term\_tail->/ factor\_p ·term\_tail  term\_tail->·\* factor\_p term\_tail  term\_tail->·/ factor\_p term\_tail  term\_tail->· |  |  | r09 | r09 | r09 | shift 13 | shift 14 | r09 |  |  |  |  |  | 25 |  |  | |
| 22 | ~~23~~ | expr\_tail->+ term expr\_tail· |  |  | r03 |  |  |  |  | r03 |  |  |  |  |  |  |  |  | |
| 23 | ~~24~~ | expr\_tail->- term expr\_tail· |  |  | r04 |  |  |  |  | r04 |  |  |  |  |  |  |  |  | |
| 24 | ~~25~~ | term\_tail->\* factor\_p term\_tail· |  |  | r07 | r07 | r07 |  |  | r07 |  |  |  |  |  |  |  |  | |
| 25 | ~~26~~ | term\_tail->/ factor\_p term\_tail· |  |  | r08 | r08 | r08 |  |  | r08 |  |  |  |  |  |  |  |  | |
| 26 | ~~22~~ | fact0r->(expr)· |  |  | r11 | r11 | r11 | r11 | r11 | r11 |  |  |  |  |  |  |  |  | |
| State |  | Production | ACTION | | | | | | | | | LHS GOTO | | | | | | |
| ~~s’~~ | N | ( | ) | + | - | \* | / | \n | $ | program | expr | expr\_tail | term | term\_tail | factor | factor\_p | |