

CS 331 Programming Languages, Spring 2026
Shift-Reduce Parsing Table

Grammar

Start symbol: *all*.

\$ represents a lexeme marking the end of the input.

1. *all* → *expr* \$
2. *expr* → *term*
3. *expr* → *expr* ("+" | "-") *term*
4. *term* → *factor*
5. *term* → *term* ("*" | "/") *factor*
6. *factor* → ID
7. *factor* → NUMLIT
8. *factor* → "(" *expr* ")"

Parsing Table

A blank cell indicates ERROR. "NL" is short for NUMLIT.

STATE	ACTION TABLE									GOTO TABLE			
	ID	NL	+	-	*	/	()	\$	<i>all</i>	<i>expr</i>	<i>term</i>	<i>factor</i>
Start 1	S2	S3					S4			G18	G13	G10	G9
ID 2	R6												
NL 3	R7												
(4	S2	S3					S4				G7	G6	G5
(<i>f</i> 5	R4												
(<i>t</i> 6			R2	R2	S11	S11		R2					
(<i>e</i> 7			S14	S14				S8					
(<i>e</i>) 8	R8												
<i>f</i> 9	R4												
<i>t</i> 10			R2	R2	S11	S11			R2				
<i>t</i> * 11	S2	S3					S4						G12
<i>t</i> * <i>f</i> 12	R5												
<i>e</i> 13			S14	S14					S17				
<i>e</i> + 14	S2	S3					S4					G16	G15
<i>e</i> + <i>f</i> 15	R4												
<i>e</i> + <i>t</i> 16	R3												
<i>e</i> \$ 17	R1												
<i>a</i> 18	ACCEPT												