

## Gramática

$Expr \rightarrow Expr + Term$

$Expr \rightarrow Expr - Term$

$Expr \rightarrow Term$

$Term \rightarrow Term * Factor$

$Term \rightarrow Term / Factor$

$Term \rightarrow Factor$

$Factor \rightarrow ( Expr )$

$Factor \rightarrow - Factor$

$Factor \rightarrow id$

$Factor \rightarrow num$

## Definición Dirigida por Sintaxis (DDS)

Producción Gramatical	Acción Semántica
$Expr \rightarrow Expr_1 + Term$	$Expr.ptr := mknode('+', Expr_1.ptr, Term.ptr)$
$Expr \rightarrow Expr_1 - Term$	$Expr.ptr := mknode('-', Expr_1.ptr, Term.ptr)$
$Expr \rightarrow Term$	$Expr.ptr := Term.ptr$
$Term \rightarrow Term_1 * Factor$	$Term.ptr := mknode('*', Term_1.ptr, Term.ptr)$
$Term \rightarrow Term_1 / Factor$	$Term.ptr := mknode('/', Term_1.ptr, Term.ptr)$
$Term \rightarrow Factor$	$Term.ptr := Factor.ptr$
$Factor \rightarrow ( Expr )$	$Factor.ptr := Expr.ptr$
$Factor \rightarrow - Factor_1$	$Factor.ptr := mkunode('-', Factor_1.ptr)$
$Factor \rightarrow id$	$Factor.ptr := mkleaf(id, id.ptr)$
$Factor \rightarrow num$	$Factor.ptr := mkleaf(num, num.ptr)$

## Esquema de Traducción (ETDS)

$Expr \rightarrow Expr_1 + Term \{ Expr.ptr := mknode('+', Expr_1.ptr, Term.ptr) \}$

$Expr \rightarrow Expr_1 - Term \{ Expr.ptr := mknode('-', Expr_1.ptr, Term.ptr) \}$

$Expr \rightarrow Term \{ Expr.ptr := Term.ptr \}$

$Term \rightarrow Term_1 * Factor \{ Term.ptr := mknode('*', Term_1.ptr, Term.ptr) \}$

$Term \rightarrow Term_1 / Factor \{ Term.ptr := mknode('/', Term_1.ptr, Term.ptr) \}$

$Term \rightarrow Factor \{ Term.ptr := Factor.ptr \}$

$Factor \rightarrow ( Expr ) \{ Factor.ptr := Expr.ptr \}$

$Factor \rightarrow - Factor_1 \{ Factor.ptr := mkunode('-', Factor_1.ptr) \}$

$Factor \rightarrow id \{ Factor.ptr := mkleaf(id, id.ptr) \}$

$Factor \rightarrow num \{ Factor.ptr := mkleaf(num, num.ptr) \}$

## Gramática sin Recursividad por la Izquierda

$Expr \rightarrow Term\ Expr'$

$Expr' \rightarrow +\ Term\ Expr'$

$Expr' \rightarrow -\ Term\ Expr'$

$Expr' \rightarrow \epsilon$

$Term \rightarrow Factor\ Term'$

$Term' \rightarrow *\ Factor\ Term'$

$Term' \rightarrow /\ Factor\ Term'$

$Term' \rightarrow \epsilon$

$Factor \rightarrow (\ Expr )$

$Factor \rightarrow -\ Factor$

$Factor \rightarrow id$

$Factor \rightarrow num$

## Esquema de Traducción (ETDS) Resultante

$Expr \rightarrow Term \{ Expr'.h := Term.ptr \} \ Expr' \{ Expr.ptr := Expr'.s \}$

$Expr' \rightarrow +\ Term \{ Expr'_1.h := mknode('+', Expr'.h, Term.ptr) \} \ Expr'_1 \{ Expr'.s := Expr'_1.s \}$

$Expr' \rightarrow -\ Term \{ Expr'_2.h := mknode('-', Expr'.h, Term.ptr) \} \ Expr'_2 \{ Expr'.s := Expr'_2.s \}$

$Expr' \rightarrow \epsilon \{ Expr'.s := Expr'.h \}$

$Term \rightarrow Factor \{ Term'.h := Factor.ptr \} \ Term' \{ Term.ptr := Term'.s \}$

$Term' \rightarrow *\ Factor \{ Term'_1.h := mknode('*', Term'.h, Factor.ptr) \} \ Term'_1 \{ Term'.s := Term'_1.s \}$

$Term' \rightarrow /\ Factor \{ Term'_2.h := mknode('/', Term'.h, Factor.ptr) \} \ Term'_2 \{ Term'.s := Term'_2.s \}$

$Term' \rightarrow \epsilon \{ Term'.s := Term'.h \}$

$Factor \rightarrow (\ Expr ) \{ Factor.ptr := Expr.ptr \}$

$Factor \rightarrow -\ Factor_1 \{ Factor.ptr := mkunode('-', Factor_1.ptr) \}$

$Factor \rightarrow id \{ Factor.ptr := mkleaf(id, id.ptr) \}$

$Factor \rightarrow num \{ Factor.ptr := mkleaf(num, num.ptr) \}$

## Estudio de la Gramática

NO TERMINAL	FIRST	FOLLOW
Expr	( - id num	\$ )
Expr'	+ - ε	\$ )
Term	( - id num	+ - \$ )
Term'	* / ε	+ - \$ )
Factor	( - id num	* / + - \$ )

PRODUCCIÓN	PREDICTION
Expr → Term Expr'	( - id num
Expr' → + Term Expr'	+
Expr' → - Term Expr'	-
Expr' → ε	\$ )
Term → Factor Term'	( - id num
Term' → * Factor Term'	*
Term' → / Factor Term'	/
Term' → ε	+ - \$ )
Factor → ( Expr )	(
Factor → - Factor	-
Factor → id	id
Factor → num	num

### Esquema de Traducción (ETDS) para Calcular el Resultado de la Evaluar la Expresión

$Expr \rightarrow Term\ Expr' \{ Expr.s := Term.s + Expr'.s \}$

$Expr' \rightarrow + Term\ Expr'_1 \{ Expr'.s := Term.s + Expr'_1.s \}$

$Expr' \rightarrow - Term\ Expr'_2 \{ Expr'.s := (Term.s * (-1)) + Expr'_2.s \}$

$Expr' \rightarrow \epsilon \{ Expr'.s := 0 \}$

$Term \rightarrow Factor\ Term' \{ Term.s := Factor.s * Term'.s \}$

$Term' \rightarrow * Factor\ Term'_1 \{ Term'.s := Factor.s * Term'_1.s \}$

$Term' \rightarrow / Factor\ Term'_2 \{ Term'.s := (1 / Factor.s) * Term'_2.s \}$

$Term' \rightarrow \epsilon \{ Term'.s := 1 \}$

$Factor \rightarrow ( Expr ) \{ Factor.s := Expr.s \}$

$Factor \rightarrow - Factor_1 \{ Factor.s := Factor_1.ptr * (-1) \}$

$Factor \rightarrow id \{ Factor.ptr := 1 \}$

$Factor \rightarrow num \{ Factor.ptr := num \}$