

# Memoria de la Práctica de Procesadores de Lenguajes: Analizador Sintáctico

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# 1 Diseño del Analizador Sintáctico

## 1.1 Gramática

*Terminales* = { ; { } id ent cadena ( ) + < ! = |= var int  
boolean string print input , return function if else }

*NoTerminales* = { *P D T F T1 A K C S L M Q S1 G X E U R V S2* }

*Axioma* = *P*

*Producciones* = {

*P* → *D P*

*P* → *F P*

*P* → *S P*

*D* → *var T id ;*

*T* → *int*

*T* → *string*

*T* → *boolean*

*F* → *function T1 id ( A ) { C }*

*T1* →  $\lambda$

*T1* → *T*

*A* → *T id K*

*A* →  $\lambda$

*K* →  $\lambda$

*K* → *, T id K*

*C* → *D C*

*C* → *S C*

*C* →  $\lambda$

*S* → *id L E ;*

*S* → *id ( M ) ;*

*S* → *print ( E ) ;*

*S* → *input ( id ) ;*

*S* → *if ( E ) S1*

*S* → *return X ;*

*L* → *|=*

*L* → *=*

*M* → *E Q*

*M* →  $\lambda$

*Q* →  $\lambda$

*Q* → *, E Q*

*S1* → { *S2* } *G*

*S1* → *S*

*G* → *else { S2 }*

*G* →  $\lambda$

*X* → *E*

*X* →  $\lambda$

*E* → *E < U*

*E* → *U*

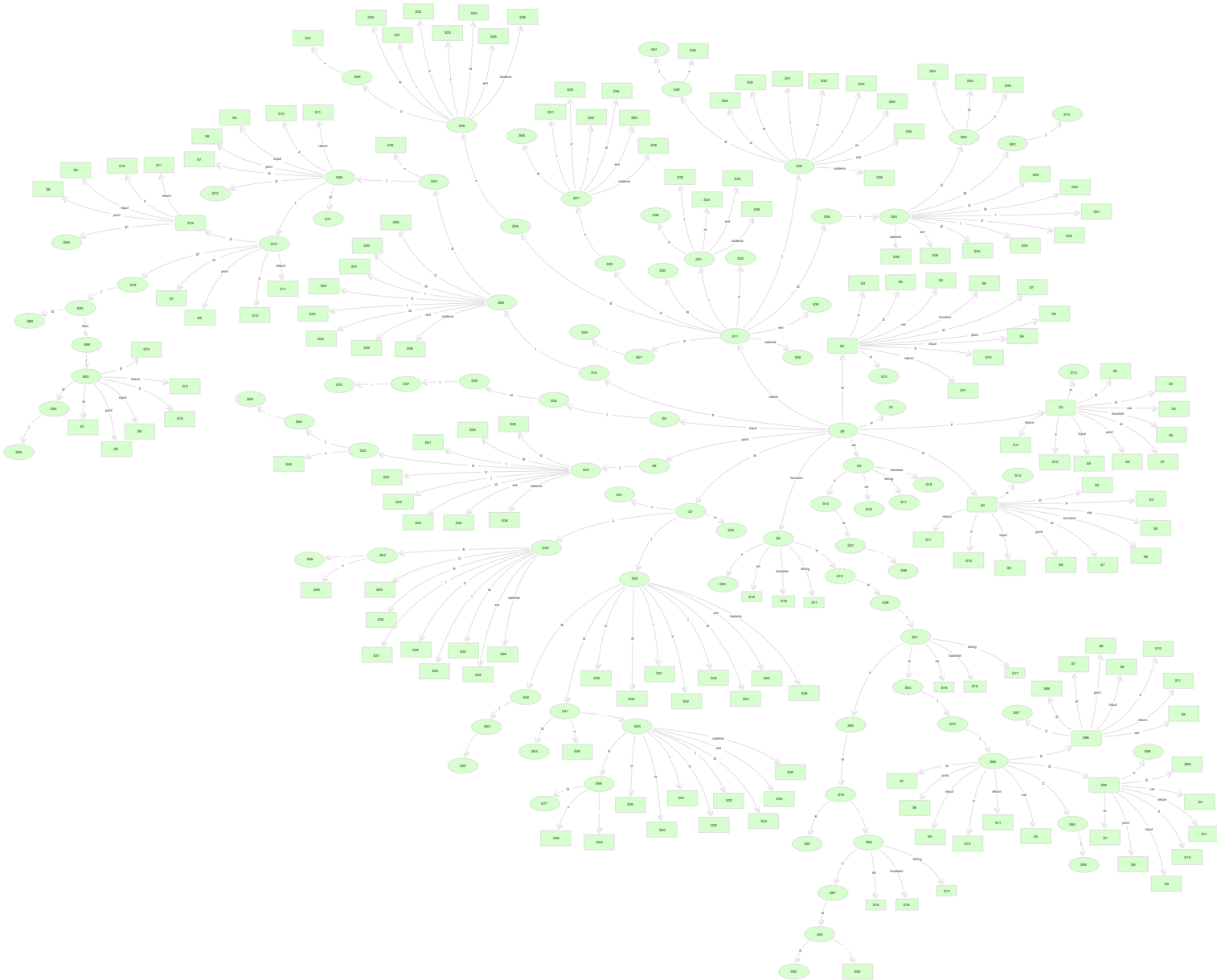
*U* → *U + R*

*U* → *R*

$$\begin{aligned}
R &\rightarrow ! V \\
R &\rightarrow V \\
V &\rightarrow ( E ) \\
V &\rightarrow id \\
V &\rightarrow id ( M ) \\
V &\rightarrow ent \\
V &\rightarrow cadena \\
S2 &\rightarrow S S2 \\
S2 &\rightarrow S \\
P &\rightarrow \lambda
\end{aligned}$$

}

## 1.2 Autómata Reconocedor de Prefijos Viables



### 1.2.1 Estados del autómata

$S_0 = \{P1 \rightarrow \bullet P, P \rightarrow \bullet DP, P \rightarrow \bullet SP, P \rightarrow \bullet , D \rightarrow \bullet \text{ var } T \text{ id};, \\ F \rightarrow \bullet \text{ function } T1 \text{ id}(A)\{C\}, S \rightarrow \bullet \text{ id } L \text{ E};, S \rightarrow \bullet \text{ id}(M); \\ S \rightarrow \bullet \text{ print}(E);, S \rightarrow \bullet \text{ input}(\text{id});, S \rightarrow \bullet \text{ if}(E) \text{ S1}, \\ S \rightarrow \bullet \text{ return } X;\}$   
 $S_1 = \{P1 \rightarrow P \bullet\}$   
 $S_2 = \{P \rightarrow D \bullet P, P \rightarrow \bullet DP, P \rightarrow \bullet SP, P \rightarrow \bullet , D \rightarrow \bullet \text{ var } T \text{ id};, \\ F \rightarrow \bullet \text{ function } T1 \text{ id}(A)\{C\}, S \rightarrow \bullet \text{ id } L \text{ E};, S \rightarrow \bullet \text{ id}(M); \\ S \rightarrow \bullet \text{ print}(E);, S \rightarrow \bullet \text{ input}(\text{id});, S \rightarrow \bullet \text{ if}(E) \text{ S1}, \\ S \rightarrow \bullet \text{ return } X;\}$   
 $S_3 = \{P \rightarrow F \bullet P, P \rightarrow \bullet DP, P \rightarrow \bullet FP, P \rightarrow \bullet SP, P \rightarrow \bullet , \\ D \rightarrow \bullet \text{ var } T \text{ id};, F \rightarrow \bullet \text{ function } T1 \text{ id}(A)\{C\}, \\ S \rightarrow \bullet \text{ id } L \text{ E};, S \rightarrow \bullet \text{ id}(M);, S \rightarrow \bullet \text{ print}(E);, \\ S \rightarrow \bullet \text{ input}(\text{id});, S \rightarrow \bullet \text{ if}(E) \text{ S1}, S \rightarrow \bullet \text{ return } X;\}$   
 $S_4 = \{P \rightarrow S \bullet P, P \rightarrow \bullet DP, P \rightarrow \bullet FP, P \rightarrow \bullet SP, P \rightarrow \bullet , \\ D \rightarrow \bullet \text{ var } T \text{ id};, F \rightarrow \bullet \text{ function } T1 \text{ id}(A)\{C\}, \\ S \rightarrow \bullet \text{ id } L \text{ E};, S \rightarrow \bullet \text{ id}(M);, S \rightarrow \bullet \text{ print}(E);, \\ S \rightarrow \bullet \text{ input}(\text{id});, S \rightarrow \bullet \text{ if}(E) \text{ S1}, S \rightarrow \bullet \text{ return } X;\}$   
 $S_5 = \{D \rightarrow \text{ var } \bullet T \text{ id};, T \rightarrow \bullet \text{ int}, T \rightarrow \bullet \text{ string}, T \rightarrow \bullet \text{ boolean}\}$   
 $S_6 = \{F \rightarrow \text{ function } \bullet T1 \text{ id}(A)\{C\}, T1 \rightarrow \bullet, T1 \rightarrow \bullet T, \\ T \rightarrow \bullet \text{ int}, T \rightarrow \bullet \text{ string}, T \rightarrow \bullet \text{ boolean}\}$   
 $S_7 = \{S \rightarrow \text{ id } \bullet L \text{ E};, S \rightarrow \text{ id } \bullet (M);, L \rightarrow \bullet =, L \rightarrow \bullet =\}$   
 $S_8 = \{S \rightarrow \text{ print } \bullet (E);\}$   
 $S_9 = \{S \rightarrow \text{ input } \bullet (\text{id});\}$   
 $S_{10} = \{S \rightarrow \text{ if } \bullet (E) \text{ S1}\}$   
 $S_{11} = \{S \rightarrow \text{ return } \bullet X;, X \rightarrow \bullet, X \rightarrow \bullet E, E \rightarrow \bullet E < U, E \rightarrow \bullet U, \\ U \rightarrow \bullet U + R, U \rightarrow \bullet R, R \rightarrow \bullet ! V, R \rightarrow \bullet V, V \rightarrow \bullet (E), \\ V \rightarrow \bullet \text{ id}, V \rightarrow \bullet \text{ id}(M), V \rightarrow \bullet \text{ ent}, V \rightarrow \bullet \text{ cadena}\}$   
 $S_{12} = \{P \rightarrow DP \bullet\}$   
 $S_{13} = \{P \rightarrow FP \bullet\}$   
 $S_{14} = \{P \rightarrow SP \bullet\}$   
 $S_{15} = \{D \rightarrow \text{ var } T \bullet \text{ id};\}$   
 $S_{16} = \{T \rightarrow \text{ int } \bullet\}$   
 $S_{17} = \{T \rightarrow \text{ string } \bullet\}$   
 $S_{18} = \{T \rightarrow \text{ boolean } \bullet\}$   
 $S_{19} = \{F \rightarrow \text{ function } T1 \bullet \text{ id}(A)\{C\}\}$   
 $S_{20} = \{T1 \rightarrow T \bullet\}$   
 $S_{21} = \{L \rightarrow = \bullet\}$   
 $S_{22} = \{S \rightarrow \text{ id } ( \bullet M);, M \rightarrow \bullet E \text{ Q}, M \rightarrow \bullet, E \rightarrow \bullet E < U, E \rightarrow \bullet U, \\ U \rightarrow \bullet U + R, U \rightarrow \bullet R, R \rightarrow \bullet ! V, R \rightarrow \bullet V, V \rightarrow \bullet (E), \\ V \rightarrow \bullet \text{ id}, V \rightarrow \bullet \text{ id}(M), V \rightarrow \bullet \text{ ent}, V \rightarrow \bullet \text{ cadena}\}$   
 $S_{23} = \{L \rightarrow \mid = \bullet\}$   
 $S_{24} = \{S \rightarrow \text{ print } ( \bullet E);, E \rightarrow \bullet E < U, E \rightarrow \bullet U, U \rightarrow \bullet U + R, \\ U \rightarrow \bullet R, R \rightarrow \bullet ! V, R \rightarrow \bullet V, V \rightarrow \bullet (E), V \rightarrow \bullet \text{ id}, \\ V \rightarrow \bullet \text{ id}(M), V \rightarrow \bullet \text{ ent}, V \rightarrow \bullet \text{ cadena}\}$   
 $S_{25} = \{S \rightarrow \text{ input } ( \bullet \text{id})\}$   
 $S_{26} = \{S \rightarrow \text{ if } ( \bullet E) \text{ S1}, E \rightarrow \bullet E < U, E \rightarrow \bullet U, U \rightarrow \bullet U + R, \\ U \rightarrow \bullet R, R \rightarrow \bullet ! V, R \rightarrow \bullet V, V \rightarrow \bullet (E), V \rightarrow \bullet \text{ id}, \\ V \rightarrow \bullet \text{ id}(M), V \rightarrow \bullet \text{ ent}, V \rightarrow \bullet \text{ cadena}\}$   
 $S_{27} = \{S \rightarrow \text{ return } X \bullet ;\}$   
 $S_{28} = \{X \rightarrow E \bullet, E \rightarrow E \bullet < U\}$   
 $S_{29} = \{E \rightarrow U \bullet, U \rightarrow U \bullet + R\}$   
 $S_{30} = \{U \rightarrow R \bullet\}$   
 $S_{31} = \{R \rightarrow ! \bullet V, V \rightarrow \bullet (E), V \rightarrow \bullet \text{ id}, V \rightarrow \bullet \text{ id}(M), \\ V \rightarrow \bullet \text{ ent}, V \rightarrow \bullet \text{ cadena}\}$   
 $S_{32} = \{R \rightarrow V \bullet\}$   
 $S_{33} = \{V \rightarrow ( \bullet E), E \rightarrow \bullet E < U, E \rightarrow \bullet U, U \rightarrow \bullet U + R,$

$U \rightarrow \bullet R, R \rightarrow \bullet ! V, R \rightarrow \bullet V, V \rightarrow \bullet (E), V \rightarrow \bullet id,$   
 $V \rightarrow \bullet id(M), V \rightarrow \bullet ent, V \rightarrow \bullet cadena\}$   
 $S_{34}=\{V \rightarrow id \bullet, V \rightarrow id \bullet (M)\}$   
 $S_{35}=\{V \rightarrow ent \bullet\}$   
 $S_{36}=\{V \rightarrow cadena \bullet\}$   
 $S_{37}=\{D \rightarrow var T id \bullet;\}$   
 $S_{38}=\{F \rightarrow function T1 id \bullet (A)\{C\}\}$   
 $S_{39}=\{S \rightarrow id L \bullet E, E \rightarrow \bullet E < U, E \rightarrow \bullet U, U \rightarrow \bullet U + R,$   
 $U \rightarrow \bullet R, R \rightarrow \bullet ! V, R \rightarrow \bullet V, V \rightarrow \bullet (E), V \rightarrow \bullet id,$   
 $V \rightarrow \bullet id(M), V \rightarrow \bullet ent, V \rightarrow \bullet cadena\}$   
 $S_{40}=\{S \rightarrow id (M \bullet);\}$   
 $S_{41}=\{M \rightarrow E \bullet Q, E \rightarrow E \bullet < U, Q \rightarrow \bullet, Q \rightarrow \bullet ,EQ\}$   
 $S_{42}=\{S \rightarrow print(E \bullet);, E \rightarrow E \bullet < U\}$   
 $S_{43}=\{S \rightarrow input(id \bullet);\}$   
 $S_{44}=\{S \rightarrow if(E \bullet) S1, E \rightarrow E \bullet < U\}$   
 $S_{45}=\{S \rightarrow return X; \bullet\}$   
 $S_{46}=\{E \rightarrow E < \bullet U, U \rightarrow \bullet R, U \rightarrow \bullet U + R, R \rightarrow \bullet ! V, R \rightarrow \bullet V$   
 $V \rightarrow \bullet (E), V \rightarrow \bullet id, V \rightarrow \bullet id(M), V \rightarrow \bullet ent, V \rightarrow \bullet cadena\}$   
 $S_{47}=\{U \rightarrow U + \bullet R, R \rightarrow \bullet ! V, V \rightarrow \bullet (E), V \rightarrow \bullet id(M),$   
 $V \rightarrow \bullet ent, V \rightarrow \bullet cadena\}$   
 $S_{48}=\{R \rightarrow ! V \bullet\}$   
 $S_{49}=\{V \rightarrow (E \bullet), E \rightarrow E \bullet < U\}$   
 $S_{50}=\{V \rightarrow id(\bullet M), M \rightarrow \bullet E Q, M \rightarrow \bullet, E \rightarrow \bullet E < U, E \rightarrow \bullet U,$   
 $U \rightarrow \bullet U + R, U \rightarrow \bullet R, R \rightarrow \bullet ! V, R \rightarrow \bullet V, V \rightarrow \bullet (E),$   
 $V \rightarrow \bullet id, V \rightarrow \bullet id(M), V \rightarrow \bullet ent, V \rightarrow \bullet cadena\}$   
 $S_{51}=\{F \rightarrow function T1 id(\bullet A)\{C\}, A \rightarrow \bullet T id K, A \rightarrow \bullet, T \rightarrow \bullet int,$   
 $T \rightarrow \bullet string, T \rightarrow \bullet boolean\}$   
 $S_{52}=\{S \rightarrow id L E \bullet; , E \rightarrow E \bullet < U\}$   
 $S_{53}=\{S \rightarrow id(M) \bullet; \}$   
 $S_{54}=\{M \rightarrow E Q \bullet\}$   
 $S_{55}=\{Q \rightarrow , \bullet E Q, E \rightarrow \bullet E < U, E \rightarrow \bullet U,$   
 $U \rightarrow \bullet U + R, U \rightarrow \bullet R, R \rightarrow \bullet ! V, R \rightarrow \bullet V, V \rightarrow \bullet (E),$   
 $V \rightarrow \bullet id, V \rightarrow \bullet id(M), V \rightarrow \bullet ent, V \rightarrow \bullet cadena\}$   
 $S_{56}=\{S \rightarrow print(E) \bullet; \}$   
 $S_{57}=\{S \rightarrow input(id) \bullet; \}$   
 $S_{58}=\{S \rightarrow if(E) \bullet S1, S1 \rightarrow \bullet \{S2\}G, S1 \rightarrow \bullet S, S \rightarrow \bullet id L E; ,$   
 $S \rightarrow \bullet id(M); , S \rightarrow \bullet print(E); , S \rightarrow \bullet input(id); ,$   
 $S \rightarrow \bullet if(E)S1, S \rightarrow \bullet return X; \}$   
 $S_{59}=\{E \rightarrow E < U \bullet, U \rightarrow U \bullet + R\}$   
 $S_{60}=\{U \rightarrow U + R \bullet\}$   
 $S_{61}=\{V \rightarrow (E) \bullet\}$   
 $S_{62}=\{V \rightarrow id(M \bullet)\}$   
 $S_{63}=\{M \rightarrow E \bullet Q, E \rightarrow E \bullet < U, Q \rightarrow \bullet, Q \rightarrow \bullet ,EQ\}$   
 $S_{64}=\{F \rightarrow function T1 id(A \bullet)\{C\}\}$   
 $S_{65}=\{A \rightarrow T \bullet id K\}$   
 $S_{66}=\{S \rightarrow id L E ; \bullet\}$   
 $S_{67}=\{S \rightarrow id (M); \bullet\}$   
 $S_{68}=\{Q \rightarrow ,E \bullet Q, E \rightarrow E \bullet < U, Q \rightarrow \bullet, Q \rightarrow \bullet ,EQ\}$   
 $S_{69}=\{S \rightarrow print(E); \bullet\}$   
 $S_{70}=\{S \rightarrow input(id); \bullet\}$   
 $S_{71}=\{S \rightarrow if(E) S1 \bullet\}$   
 $S_{72}=\{S1 \rightarrow \{\bullet S2\}G, S2 \rightarrow \bullet S S2, S2 \rightarrow \bullet S, S \rightarrow \bullet id L E; ,$   
 $S \rightarrow \bullet id(M); , S \rightarrow \bullet print(E); , S \rightarrow \bullet input(id); ,$   
 $S \rightarrow \bullet if(E)S1, S \rightarrow \bullet return X; \}$   
 $S_{73}=\{S1 \rightarrow S \bullet\}$   
 $S_{74}=\{S2 \rightarrow S \bullet S2 , S2 \rightarrow S \bullet , S2 \rightarrow \bullet S S2, S2 \rightarrow \bullet S,$   
 $S \rightarrow \bullet id L E ; , S \rightarrow \bullet id ( M ) ; , S \rightarrow \bullet print ( E ) ; ,$   
 $S \rightarrow \bullet input ( id ) ; , S \rightarrow \bullet if ( E ) S1, S \rightarrow \bullet return X ; \}$

$S_{75}=\{F \rightarrow \text{function } T1 \text{ id } (K) \bullet \{C\}\}$   
 $S_{76}=\{A \rightarrow T \text{ id } \bullet K, K \rightarrow \bullet, K \rightarrow \bullet, T \text{ id } K\}$   
 $S_{77}=\{Q \rightarrow, E Q \bullet\}$   
 $S_{78}=\{S1 \rightarrow \{S2 \bullet\} G\}$   
 $S_{79}=\{S2 \rightarrow S \bullet S2, S2 \rightarrow S \bullet, S2 \rightarrow \bullet S S2, S \rightarrow \bullet \text{id } L E;, S \rightarrow \bullet \text{id}(M);, S \rightarrow \bullet \text{print}(E); S \rightarrow \bullet \text{if}(E)S1;, S \rightarrow \bullet \text{input}(\text{id});, S \rightarrow \text{return } X;\}$   
 $S_{80}=\{F \rightarrow \text{function } T1 \text{ id } (K) \{ \bullet C \}, C \rightarrow \bullet D C, C \rightarrow \bullet, D \rightarrow \bullet \text{var } T \text{ id };, S \rightarrow \bullet \text{id } L E, S \rightarrow \bullet \text{id } (M);, S \rightarrow \bullet \text{print } (E);, S \rightarrow \bullet \text{input } (\text{id});, S \rightarrow \bullet \text{if } (E) S1, S \rightarrow \bullet \text{return } X ;\}$   
 $S_{81}=\{A \rightarrow T \text{ id } K \bullet\}$   
 $S_{82}=\{K \rightarrow, \bullet T \text{ id } K, T \rightarrow \bullet \text{int}, T \rightarrow \bullet \text{string}, T \rightarrow \bullet \text{boolean}\}$   
 $S_{83}=\{S1 \rightarrow \{S2\} \bullet G, G \rightarrow \bullet \text{else } \{S2\}, G \rightarrow \bullet\}$   
 $S_{84}=\{F \rightarrow \text{function } T1 \text{ id } (K) \{C \bullet\}\}$   
 $S_{85}=\{C \rightarrow D \bullet C, C \rightarrow \bullet D C, C \rightarrow \bullet S C, C \rightarrow \bullet, D \rightarrow \bullet \text{var } T \text{ id };, S \rightarrow \bullet \text{id } L E ;, S \rightarrow \bullet \text{id } ( M ) ;, S \rightarrow \bullet \text{print } ( E ) ;, S \rightarrow \bullet \text{input } ( \text{id } ) ;, S \rightarrow \bullet \text{if } ( E ) S1, S \rightarrow \bullet \text{return } X ;\}$   
 $S_{86}=\{C \rightarrow S \bullet C, C \rightarrow \bullet D C, C \rightarrow \bullet S C, C \rightarrow \bullet, D \rightarrow \bullet \text{var } T \text{ id };, S \rightarrow \bullet \text{id } L E ;, S \rightarrow \bullet \text{id } ( M ) ;, S \rightarrow \bullet \text{print } ( E ) ;, S \rightarrow \bullet \text{input } ( \text{id } ) ;, S \rightarrow \bullet \text{if } ( E ) S1, S \rightarrow \bullet \text{return } X ;\}$   
 $S_{87}=\{K \rightarrow, T \bullet \text{id } K\}$   
 $S_{88}=\{S1 \rightarrow \{S2\} G \bullet\}$   
 $S_{89}=\{G \rightarrow \text{else } \bullet \{S2\}\}$   
 $S_{90}=\{F \rightarrow \text{function } T1 \text{ id } (K) \{C\} \bullet\}$   
 $S_{91}=\{K \rightarrow, T \text{ id } \bullet K, K \rightarrow \bullet, K \rightarrow \bullet, T \text{ id } K\}$   
 $S_{92}=\{G \rightarrow \text{else } \{ \bullet S2 \}, S2 \rightarrow \bullet S S2, S2 \rightarrow \bullet S, S \rightarrow \bullet \text{id } L E ;, S \rightarrow \bullet \text{id } ( M ) ;, S \rightarrow \bullet \text{print } ( E ) ;, S \rightarrow \bullet \text{input}(\text{id});, S \rightarrow \bullet \text{if } ( E ) S1, S \rightarrow \bullet \text{return } X ;\}$   
 $S_{93}=\{K \rightarrow, T \text{ id } K \bullet\}$   
 $S_{94}=\{G \rightarrow \text{else } \{ S2 \bullet \}\}$   
 $S_{95}=\{G \rightarrow \text{else } \{ S2 \} \bullet\}$   
 $S_{96}=\{C \rightarrow D C \bullet\}$   
 $S_{97}=\{C \rightarrow S C \bullet\}$   
 $S_{98}=\{D \rightarrow \text{var } T \text{ id }; \bullet\}$   
 $S_{99}=\{S2 \rightarrow S S2 \bullet\}$

### 1.3 Conflictos

Como podemos observar en la tabla de decisión no hay ningún conflicto.

Los posibles conflictos son:

#### Reducción-Reducción

Podríamos ver como en los posibles estados con este conflicto, en nuestro caso ninguno, se verifica que

$\forall \{A \rightarrow \alpha \bullet, B \rightarrow \beta \bullet\} \subset S_x \Rightarrow \text{Follow}(A) \cap \text{Follow}(B) = \emptyset$  (Esto lo podemos observar al no tener dos entradas de reducción en la misma celda de cada fila de  $S_x$  )

#### Reducción-Desplazamiento

Podemos ver como en los posibles estados con este conflicto,  $S_0, S_2, S_3, S_4, S_6, S_{11}, S_{22}, S_{28}, S_{29}, S_{34}, S_{41}, S_{50}, S_{51}, S_{59}, S_{63}, S_{68}, S_{76}, S_{79}, S_{80}, S_{83}, S_{85}, S_{86}, S_{91}$ , se verifica que

$\forall \{A \rightarrow \alpha \bullet b \gamma, C \rightarrow \beta \bullet\} \subset S_x \Rightarrow b \notin \text{Follow}(C)$  (Esto lo podemos observar al no tener una entrada de desplazamiento y otra de reducción en la misma celda de

cada fila de  $S_x$  )

## 2 Anexo de Pruebas

### Prueba 1 Correcta

```
1 var int a;
2 var int b;
3 var int c;
4 print ('Introduce el primer operando');
5 input (a);
6 print ('Introduce el segundo operando');
7 input (b);
8 function int suma (int num1, int num2)
9 {
10     var int res;
11     res = num1+num2;
12     return res;
13 }
14 c = suma (a, b);
15 print (c);
```

A 5 4 5 4 5 4 46 41 39 37 20 21 46 41 39 37 20 21 5 10 5 5 13 14 11 5 4 25 43 41 39 43  
41 38 37 18 43 41 39 37 34 23 17 16 16 15 8 25 43 41 39 37 43 41 39 37 28 29 26 44 41  
39 37 18 43 41 39 37 20 49 3 3 2 3 3 3 3 1 1 1

### Prueba 2 Correcta

```
1 var string texto;
2 function imprime (string msg)
3 {
4     print ('Mensaje introducido:');
5     print (msg);
6 }
7 function pideTexto ()
8 {
9     print ('Introduce un texto');
10    input (texto);
11 }
12 pideTexto();
13 imprime (texto);
```

A 6 4 9 6 13 11 46 41 39 37 20 43 41 39 37 20 17 16 16 8 9 12 46 41 39 37 20 21 17 16  
16 8 27 19 43 41 39 37 28 26 19 49 3 3 2 2 1

### Prueba 3 Correcta

```
1 var string s;
2 var int uno;
3 var int UNO;
4 function int Factorial (int n)
5 {
6     if (n < 0) return 1;
7     return n + Factorial (n + 1);
8 }
9 var int For;
10 var int functional;
```







```

11 var int While;
12
13 function imprime (string s, string msg, int f)
14 {
15     print (s); print (msg); print (f);
16     return;
17 }
18 function string cadena (boolean log)
19 {
20     if (!log)
21     {
22         imprime (s, 'hola', 33);
23         if (uno < UNO) return s;
24     }
25     else
26     {
27         return 'Fin';
28     }
29 }
30 s = 'El factorial ';
31
32 print (s);
33 print ('Introduce un numero●');
34 input (num);
35 var
36 boolean
37 booleano;
38 if (num < 0)    print ('No existe el factorial de un negativo●');
39 imprime (cadena (booleano), 'recursivo es: ', Factorial (num));

```

A 6 4 5 4 5 4 5 10 5 13 11 43 41 39 37 45 41 39 36 45 41 39 37 34 23 31 22 43 41 39 43 41  
 39 45 41 38 37 28 26 44 41 38 37 34 23 17 16 16 8 5 4 5 4 5 4 9 6 6 5 13 14 14 11 43 41 39  
 37 20 43 41 39 37 20 43 41 39 37 20 35 23 17 16 16 16 16 8 6 10 7 13 11 43 40 39 37 43 41  
 39 37 46 41 39 37 45 41 39 37 28 29 29 26 19 43 41 39 37 43 41 39 36 43 41 39 37 34 23 31  
 22 48 47 46 41 39 37 34 23 48 32 30 22 17 16 8 25 46 41 39 37 18 43 41 39 37 20 46 41 39  
 37 20 21 7 4 43 41 39 37 45 41 39 36 46 41 39 37 20 31 22 43 41 39 37 28 26 44 41 39 37  
 46 41 39 37 43 41 39 37 28 26 44 41 39 37 28 29 29 26 19 49 3 3 1 3 3 3 2 2 1 1 1 2 1 1 1

#### Error 1

```

1 var int a;
2 var b;
3 a = 3;
4 b = a;
5 if (a < b) b = 1;
6 if (b < a) b = 8;
7 a = a + b;
8 print (a);
9 print (b);

```

Error Sintactico: Declaracion incorrecta de variable. Linea: 2

#### Error 2

```

1 var string texto;
2 function pideTexto ()
3 {
4     print ('Introduce un texto');

```

```

5   input (texto);
6 }
7 function imprime (string msg,)
8 {
9     print (msg);
10 }
11 pideTexto();
12 var string textoAux;
13 textoAux = texto;
14 imprime (textoAux);

```

Error Sintactico: Declaracion incorrecta de funcion. Linea: 7

### Error 3

```

1 var int a;
2 var int b;
3 a = 3;
4 b = a;
5 var boolean c;
6 c = a < b;
7 if (c) {
8     b = 1;
9 } else {
10 c = b < a;
11 if (c) b = 4;
12 a = a + b;
13 print (a);
14 print (b);

```

Error Sintactico: Sentencia condicional compuesta incorrecta. Linea: 14