

ISIS-1106 Lenguajes y Máquinas, PQ1

21 de septiembre de 2023

$\langle \text{PROGRAMA} \rangle ::= (\text{comando}())(\backslash n \text{comando}())^*$

$\langle \text{STRING} \rangle ::= [" : "] ([" a " - " z " , " A " - " Z "]) +$

$\langle \text{STRING1} \rangle ::= ([" a " - " z " , " A " - " Z "]) +$

$\langle \text{NUMERO} \rangle ::= [' - '] (1 | .. | 9) + [' . '] (0 | .. | 9) +$

$\langle \text{NUMBER} \rangle ::= ('random' \langle \text{SPACE} \rangle \langle \text{NUMERO} \rangle) | \langle \text{NUMERO} \rangle | \langle \text{OPERACION} \rangle [' ! ' \langle \text{STRING} \rangle$

$\langle \text{SPACE} \rangle ::= ' ' +$

$\langle \text{OPERADOR - BOOLEANO} \rangle ::= ' < ' | ' < = ' | ' > ' | ' > = ' | ' = '$

$\langle \text{COMANDO} \rangle ::= \langle \text{COMANDO - MITHEN - PARAMETRO} \rangle | \langle \text{COMANDO - MONO - PARAMETRO - NUMERO} \rangle | \langle \text{COMANDO - MONO - PARAMETRO - STRING} \rangle | \langle \text{COMANDO - MONO - PARAMETRO - NUMERO O STRING} \rangle | \langle \text{COMANDO - BI - PARAMETRO - NUMERO - NUMERO} \rangle$

$\langle \text{COMANDO - MITHEN - PARAMETRO} \rangle ::= \langle \text{MAKE} \rangle | \langle \text{TO - LLAMADO} \rangle | \langle \text{PRINT} \rangle | \langle \text{REPEAT} \rangle | \langle \text{CLEARSCREEN} \rangle | \langle \text{PENUP} \rangle | \langle \text{PENDOWN} \rangle | \langle \text{HIDETURTLE} \rangle | \langle \text{SHOWTURTLE} \rangle | \langle \text{HOME} \rangle | \langle \text{TO} \rangle | \langle \text{FOR} \rangle$

$\langle \text{COMANDO - MONO - PARAMETRO - NUMERO} \rangle ::= \langle \text{FORWADR} \rangle | \langle \text{BACK} \rangle | \langle \text{RIGHT} \rangle | \langle \text{LEFT} \rangle | \langle \text{SETX} \rangle | \langle \text{SETY} \rangle | \langle \text{ARC} \rangle | \langle \text{SETCOLOR} \rangle | \langle \text{SETWIDTH} \rangle | \langle \text{SETLABELHEIGHT} \rangle | \langle \text{SETHEADING} \rangle$

$\langle \text{COMANDO - MONO - PARAMETRO - STRING} \rangle ::= \langle \text{LABEL} \rangle$

$\langle \text{COMANDO - MONO - PARAMETRO - NUMERO O STRING} \rangle ::= \langle \text{CHANGESHape} \rangle$

$\langle \text{COMANDO - BI - PARAMETRO - NUMERO - NUMERO} \rangle ::= \langle \text{SETXY} \rangle$

$\langle \text{MAKE} \rangle ::= 'make' \langle \text{SPACE} \rangle ' ' \langle \text{STRING} \rangle \langle \text{SPACE} \rangle (" \langle \text{STRING} \rangle | \langle \text{NUMBER} \rangle)$

$\langle \text{TO - LLAMADO} \rangle ::= \langle \text{STRING} \rangle (\langle \text{SPACE} \rangle \langle \text{NUMBER} \rangle)^*$

$\langle \text{FOR} \rangle ::= 'for' [\langle \text{SPACE} \rangle] [' \langle \text{STRING} \rangle \langle \text{SPACE} \rangle \langle \text{NUMBER} \rangle \langle \text{SPACE} \rangle \langle \text{NUMBER} \rangle \langle \text{SPACE} \rangle \langle \text{NUMBER} \rangle] [\langle \text{SPACE} \rangle] [' [\langle \text{PROGRAMA} \rangle] ']$

$\langle \text{OPERACION} \rangle ::= \langle \text{SUM} \rangle | \langle \text{DIFFERENCE} \rangle | \langle \text{MULTIPLICACION} \rangle | \langle \text{DIVISION} \rangle$

$\langle \text{SUM} \rangle ::= ('sum' \langle \text{SPACE} \rangle \langle \text{NUMBER} \rangle \langle \text{SPACE} \rangle \langle \text{NUMBER} \rangle) | (\langle \text{NUMBER} \rangle \langle \text{SPACE} \rangle ' + ' \langle \text{SPACE} \rangle \langle \text{NUMBER} \rangle)$

$\langle \text{DIFFERENCE} \rangle ::= ('difference' \langle \text{SPACE} \rangle \langle \text{NUMBER} \rangle \langle \text{SPACE} \rangle \langle \text{NUMBER} \rangle) | (\langle \text{NUMBER} \rangle \langle \text{SPACE} \rangle ' - ' (\langle \text{SPACE} \rangle)^* \langle \text{NUMBER} \rangle)$

$\langle \text{MULTIPLICACION} \rangle ::= \langle \text{NUMBER} \rangle (\langle \text{SPACE} \rangle)^* '*' (\langle \text{SPACE} \rangle)^* \langle \text{NUMBER} \rangle$
 $\langle \text{DIVISION} \rangle ::= \langle \text{NUMBER} \rangle (\langle \text{SPACE} \rangle)^* '/' (\langle \text{SPACE} \rangle)^* \langle \text{NUMBER} \rangle$
 $\langle \text{REPEAT} \rangle ::= 'repeat' \langle \text{SPACE} \rangle \langle \text{NUMBER} \rangle [\langle \text{SPACE} \rangle]' [' \langle \text{SPACE} \rangle (\langle \text{COMANDO} \rangle \langle \text{SPACE} \rangle)^* \langle \text{SPACE} \rangle ']$
 $\langle \text{FORWARD} \rangle ::= ('forward'|'fd') \langle \text{SPACE} \rangle \langle \text{NUMBER} \rangle$
 $\langle \text{BACK} \rangle ::= ('back'|'bk') \langle \text{SPACE} \rangle \langle \text{NUMBER} \rangle$
 $\langle \text{RIGHT} \rangle ::= ('right'|'rt') \langle \text{SPACE} \rangle \langle \text{NUMBER} \rangle$
 $\langle \text{LEFT} \rangle ::= ('left'|'lt') \langle \text{SPACE} \rangle \langle \text{NUMBER} \rangle$
 $\langle \text{CLEARSCREEN} \rangle ::= 'clearscreen'|'cs'$
 $\langle \text{PENUP} \rangle ::= 'penup'$
 $\langle \text{PENDOWN} \rangle ::= 'pendown'$
 $\langle \text{HIDETURTLE} \rangle ::= 'hideturtle'$
 $\langle \text{SHOWTURTLE} \rangle ::= 'showturtle'$
 $\langle \text{HOME} \rangle ::= 'home'$
 $\langle \text{SETX} \rangle ::= 'setx' \langle \text{SPACE} \rangle \langle \text{NUMBER} \rangle$
 $\langle \text{SETY} \rangle ::= 'sety' \langle \text{SPACE} \rangle \langle \text{NUMBER} \rangle$
 $\langle \text{SETXY} \rangle ::= 'setxy' \langle \text{SPACE} \rangle \langle \text{NUMBER} \rangle \langle \text{SPACE} \rangle \langle \text{NUMBER} \rangle$
 $\langle \text{SETHEDGING} \rangle ::= ('setheading'|'seth') \langle \text{SPACE} \rangle \langle \text{NUMBER} \rangle$
 $\langle \text{ARC} \rangle ::= 'arc' \langle \text{SPACE} \rangle \langle \text{NUMBER} \rangle$
 $\langle \text{CHANGESHape} \rangle ::= ('changeshape'|'chs') \langle \text{SPACE} \rangle (\langle \text{NUMBER} \rangle | \langle \text{STRING} \rangle)$
 $\langle \text{PRINT} \rangle ::= 'print' \langle \text{SPACE} \rangle \langle \text{PRINT} - \text{ARGUMENTOS} \rangle$
 $\langle \text{LABEL} \rangle ::= 'label' \langle \text{SPACE} \rangle " \langle \text{STRING} \rangle$
 $\langle \text{SETLABELHEIGHT} \rangle ::= 'setlabelheight' \langle \text{SPACE} \rangle \langle \text{NUMBER} \rangle$
 $\langle \text{SETWIDTH} \rangle ::= 'setlabelheight' \langle \text{SPACE} \rangle \langle \text{NUMBER} \rangle$
 $\langle \text{SETCOLOR} \rangle ::= 'setcolor' \langle \text{SPACE} \rangle \langle \text{NUMBER} \rangle$
 $\langle \text{PRINT} - \text{ARGUMENTOS} \rangle ::= \langle \text{POS} \rangle | \langle \text{XCOR} \rangle | \langle \text{YCOR} \rangle | \langle \text{HEADING} \rangle | " \langle \text{STRING} \rangle | \langle \text{NUMBER} \rangle | \langle \text{TOWARDS} \rangle$
 $\langle \text{POS} \rangle ::= 'pos'$
 $\langle \text{XCOR} \rangle ::= 'XCOR'$
 $\langle \text{YCOR} \rangle ::= 'YCOR'$
 $\langle \text{HEADING} \rangle ::= 'heading'$
 $\langle \text{TOWARDS} \rangle ::= 'towards' \langle \text{SPACE} \rangle 'list' \langle \text{NUMBER} \rangle \langle \text{SPACE} \rangle \langle \text{NUMBER} \rangle$

$$\begin{aligned}
< TO > ::= 'to' < STRING > < SPACE > ('.' < STRING >)^* < SPACE > ['if' < SPACE > \\
(' < STRING > | < NUMBER >) < OPERADOR-BOOLEANO > (' < STRING > | < NUMBER > \\
) ['stop' < SPACE >] (< COMANDO > [< SPACE >])^* < SPACE > 'end'
\end{aligned}$$