

Lab 3

Dragon Book Questions

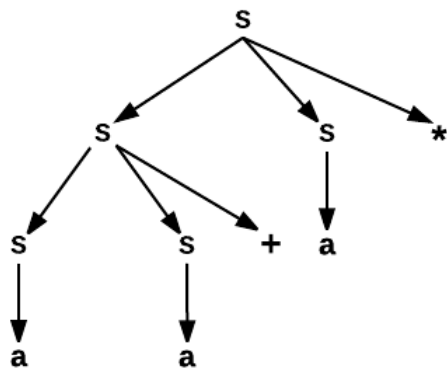
4.2.1 a) Give the leftmost derivation for the String $aa + a^*$

$S \Rightarrow SS^* \Rightarrow SS + S^* \Rightarrow aS + S^* \Rightarrow aa + S^* \Rightarrow aa + a^*$

4.2.1 b) Give the rightmost derivation for the String $aa + a^*$

$S \Rightarrow SS^* \Rightarrow Sa^* \Rightarrow SS + a^* \Rightarrow Sa + S^* \Rightarrow aa + a^*$

4.2.1 c) Give a parse tree for the String $aa + a^*$



Crafting a Compiler

4.7a) Show the leftmost derivation of the following string: num plus num times num plus num \$

Start \Rightarrow_{lm}	E \$
\Rightarrow_{lm}	T plus E \$
\Rightarrow_{lm}	F plus E \$
\Rightarrow_{lm}	num plus E \$
\Rightarrow_{lm}	num plus T plus E \$
\Rightarrow_{lm}	num plus T times F plus E \$
\Rightarrow_{lm}	num plus F times F plus E \$
\Rightarrow_{lm}	num plus num times F plus E \$
\Rightarrow_{lm}	num plus num times num plus E \$
\Rightarrow_{lm}	num plus num times num plus T \$
\Rightarrow_{lm}	num plus num times num plus F \$
\Rightarrow_{lm}	num plus num times num plus num \$

4.7a) Show the rightmost derivation of the following string: num times num plus num times num \$

Start	\Rightarrow_{rm}	E \$
	\Rightarrow_{rm}	T plus E \$
	\Rightarrow_{rm}	T plus T \$
	\Rightarrow_{rm}	T plus T times F \$
	\Rightarrow_{rm}	T plus T times num \$
	\Rightarrow_{rm}	T plus F times num \$
	\Rightarrow_{rm}	T plus num times num \$
	\Rightarrow_{rm}	T times F plus num times num \$
	\Rightarrow_{rm}	T times num plus num times num \$
	\Rightarrow_{rm}	F times num plus num times num \$
	\Rightarrow_{rm}	num times num plus num times num \$

4.7c) Describe how this grammar structures expressions, in terms of the precedence and left- or right- associativity of operators

- What I noticed about the grammar structures of the leftmost and rightmost derivatives when it comes to associativity of operators is that for the leftmost expressions it's best to start the derivative from the right of the string and for the rightmost it's best to start the derivative from the middle of the string.