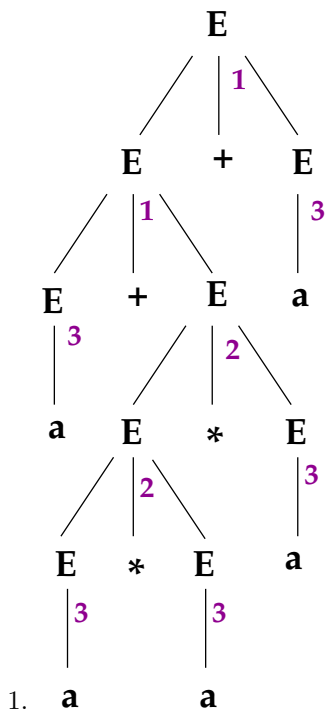


University of Nevada, Las Vegas Computer Science 456/656 Fall 2021

Answers to Assignment 6. Due Monday November 8, 2021

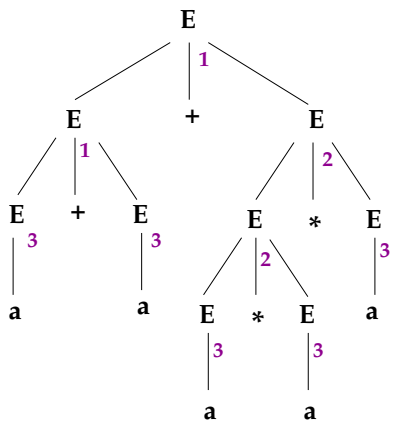
1. Read Parsing Handout 1, which is in the file 1alrhandout1.pdf.
2. Work problems 1, 2, 3, and 4 on page 2 of that Parsing Handout 1.



2. Row 5, column headed by *.
3. Row 5, column headed by +, and row 3, column headed by *.
- 4.

$\$0$	$a * a + a\$$		
$\$0a_6$	$*a + a\$$		s_6
$\$0E_1$	$*a + a\$$	3	r_3
$\$0E_1 * a_4$	$a + a\$$	3	s_4
$\$0E_1 * a_4 a_6$	$+a\$$	3	s_6
$\$0E_1 * a_4 E_5$	$+a\$$	33	r_3
$\$0E_1$	$+a\$$	332	r_2
$\$0E_1 + a_2$	$a\$$	332	s_2
$\$0E_1 + a_2 a_6$	$\$$	332	s_6
$\$0E_1 + a_2 E_3$	$\$$	3323	r_3
$\$0E_1$	$\$$	33231	r_1
$\$0E_1$	$\$$	33231	HALT

1. **a** **a**
3. The remaining questions deal with Parsing Handout 2, which is in the file 1alrhandout2.pdf. Read that handout carefully.
4. Sketch the parse tree for $a + a + a * a * a$.

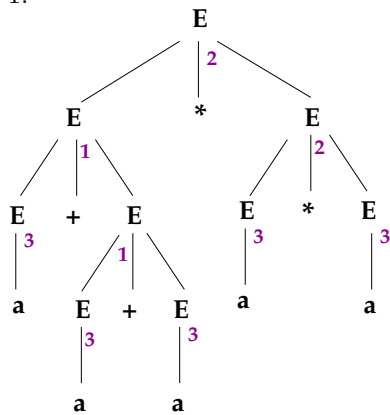


5. On page 6, there are completed ACTION and GOTO tables for the grammar given on page 1. Walk through the steps of the parser for the input file $(a + a) * a + a$.

$\$0$	$(a + a) * a + a\$$		
$\$0(6$	$a + a) * a + a\$$		$s6$
$\$0(6a9$	$+a) * a + a\$$		$s9$
$\$0(6E7$	$+a) * a + a\$$	4	$r4$
$\$0(6E7+4$	$a) * a + a\$$	4	$s4$
$\$0(6E7 +4 a9$	$) * a + a\$$	4	$s9$
$\$0(6E7 +4 E5$	$) * a + a\$$	44	$r4$
$\$0(6E7$	$) * a + a\$$	442	$r2$
$\$0(6E7)8$	$*a + a\$$	442	$s8$
$\$0E1$	$*a + a\$$	4423	$r3$
$\$0E1*4$	$a + a\$$	4423	$s4$
$\$0E1 *4 a9$	$+a\$$	4423	$s9$
$\$0E1 *4 E5$	$+a\$$	4423	$s9$
$\$0E1$	$+a\$$	44232	$r2$
$\$0E1+4$	$a\$$	44232	$s4$
$\$0E1 +4 a9$	$\$$	44232	$s9$
$\$0E1 +4 E5$	$\$$	442324	$r4$
$\$0E1$	$\$$	4423242	$r2$
$\$0E1$	$\$$	4423242	HALT

6. Sandy Redrock, my colleague at Xanthe Terra University, has told me that addition has precedence over multiplication on Mars, and that furthermore, both addition and multiplication are right associative.

(a) Sketch the Martian parse tree for $a + a + a * a * a$, using the grammar on page 1 of Parsing Handout 1.



(b) Write the Martian version of the Action table for the grammar on page 1 of Parsing Handout 1. It differs from the Earthly version in only four places.

	ACTION				GOTO
	a	$+$	$*$	$\$$	E
0	s6				1
1		s2	s4	HALT	
2	s6				3
3		s2	r1	r1	
4	s6				5
5		s2	s4	r2	
6		r3	r3	r3	