Attributte Grammars (G, A, R)

1. ? A.G. for counting the nr of vowels in a non-empty letter string. (lecture 11)

L - letter

$S \to SL$ $\qquad S_1.n = S_2.n + L.n$

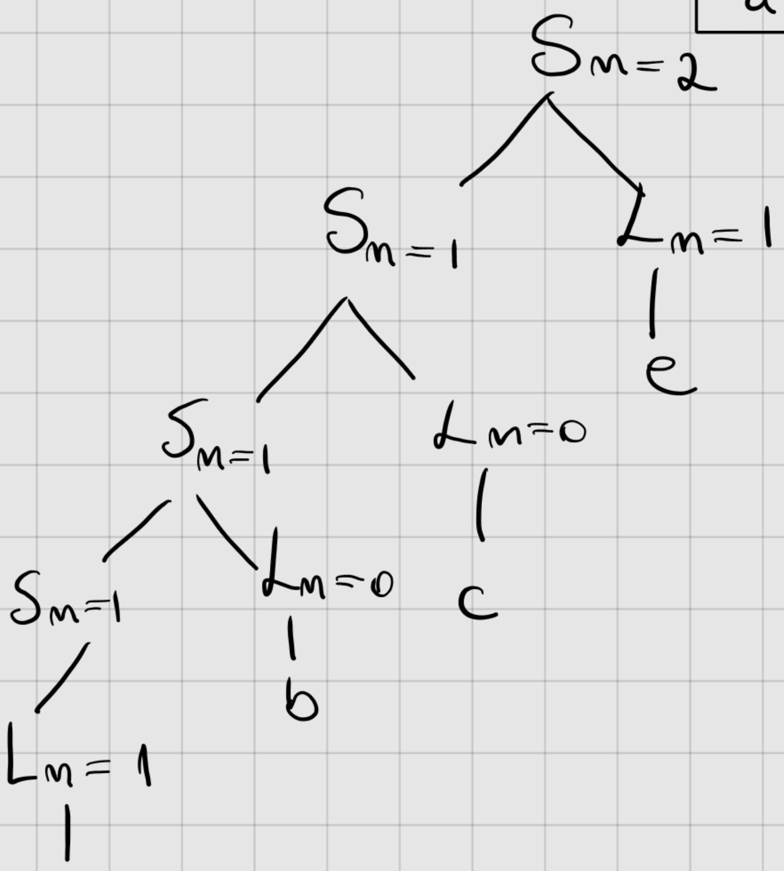
$S \to L$ $\qquad S.n = L.n$

$L \to a|e|i|o|u|A|E|I|O|U$ $\qquad L.n = 1$

$L \to b|c|d|f|....$ $\qquad L.n = 0$

(rules are in the right of the rules)

abce



a

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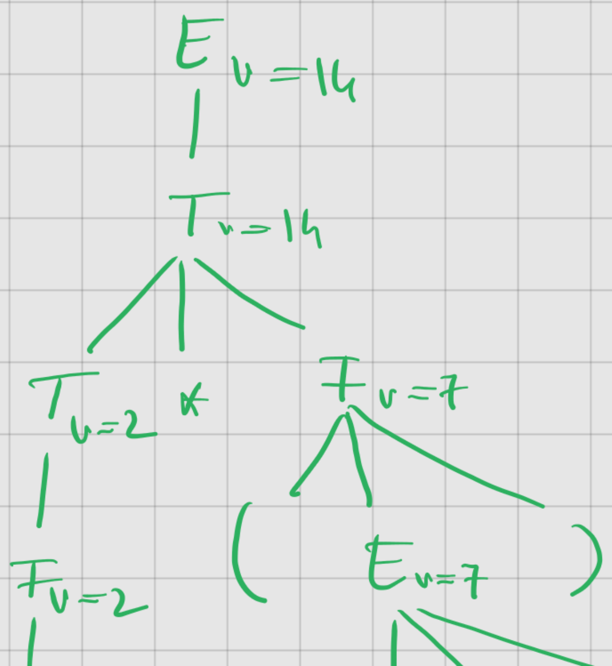
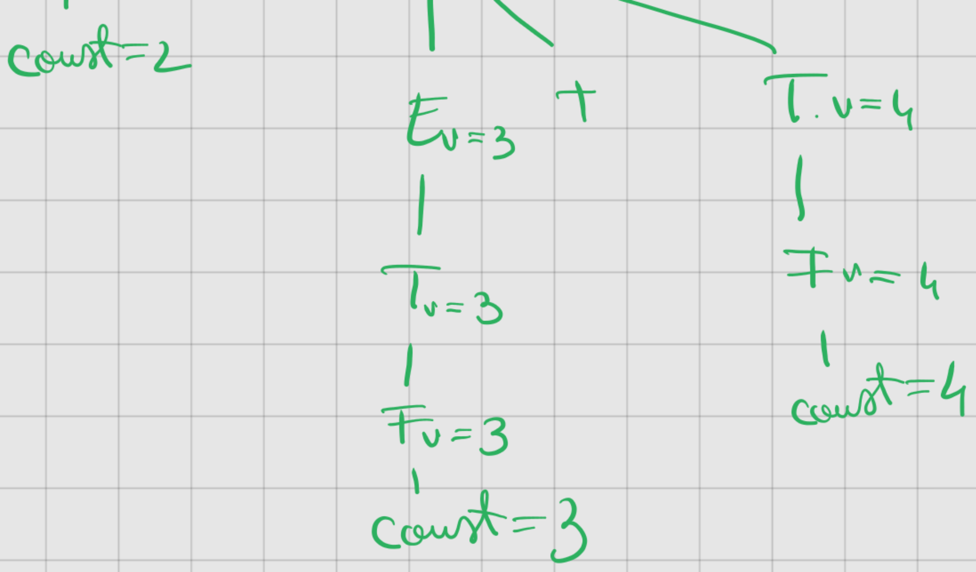
2. ? AG. for computing the value of an arithmetic expressions. expr (+, −, *, (,), const).

$E \to E + T$	$E_1.v = E_2.v + T.v$
$E \to E - T$	$E_1.v = E_2.v - T.v$
$E \to T$	$E.v = T.v$
$T \to T * F$	$T_1.v = T_2.v * F.v$
$T \to T / F$	$T_1.v = T_2.v / F.v$
$T \to F$	$T.v = F.v$
$F \to (E)$	$F.v = E.v$
$F \to$ const	$F.v =$ const

$2 * (3+4)$





3. Address Code

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1. if (a>d) OR c AND ( b<c)
   then : a:=-1
   else : b:= b+c
   endif
```

current	operator	arg_1	arg_2	result
1	>	a	d	T_1
2	<	b	c	T_2
3	AND	c	T_2	T_3
4	OR	T_1	T_3	T_4
5	goto	T_4		(9)
6	+	b	c	T_5
7	:=	T_5		b

8	goto			(11)
9	@	1		T_6
10	:=	T_6		a
11				

```
while( i < 100  AND  j < 100)
    sum = sum + i * j
    i = i + 1
    j = j * 2
endwhile
```

current	operator	arg_1	arg_2	result
1	<	i	100	T_1
2	<	j	100	T_2
3	AND	T_1	T_2	T_3
4	NOT	T_3		T_4
5	goto	T_4		(14)
6	*	i	j	T_5
7	+	sum	T_5	T_6
8	=	T		

8	−	T_6		sum
9	+	i	1	T_7
10	=	T_7		i
11	*	j	2	T_8
12	=	T_8		j
13	goto	T_8		(1)
14				

```
for i = 1, n do
    sum = i * (i-2) + sum
endfor
```

current	operator	arg_1	arg_2	
(1)	=	i	1	
(2)	>	i	n	
(3)	goto	(2)	(11)	
(4)	−	i	2	
(5)	*	i	(4)	
(6)	+	(5)	sum	

(6)	+	(5)	sum
(7)	=	sum	(6)
(8)	+	i	1
(9)	=	i	(8)
(10)	goto		(2)
(11)			