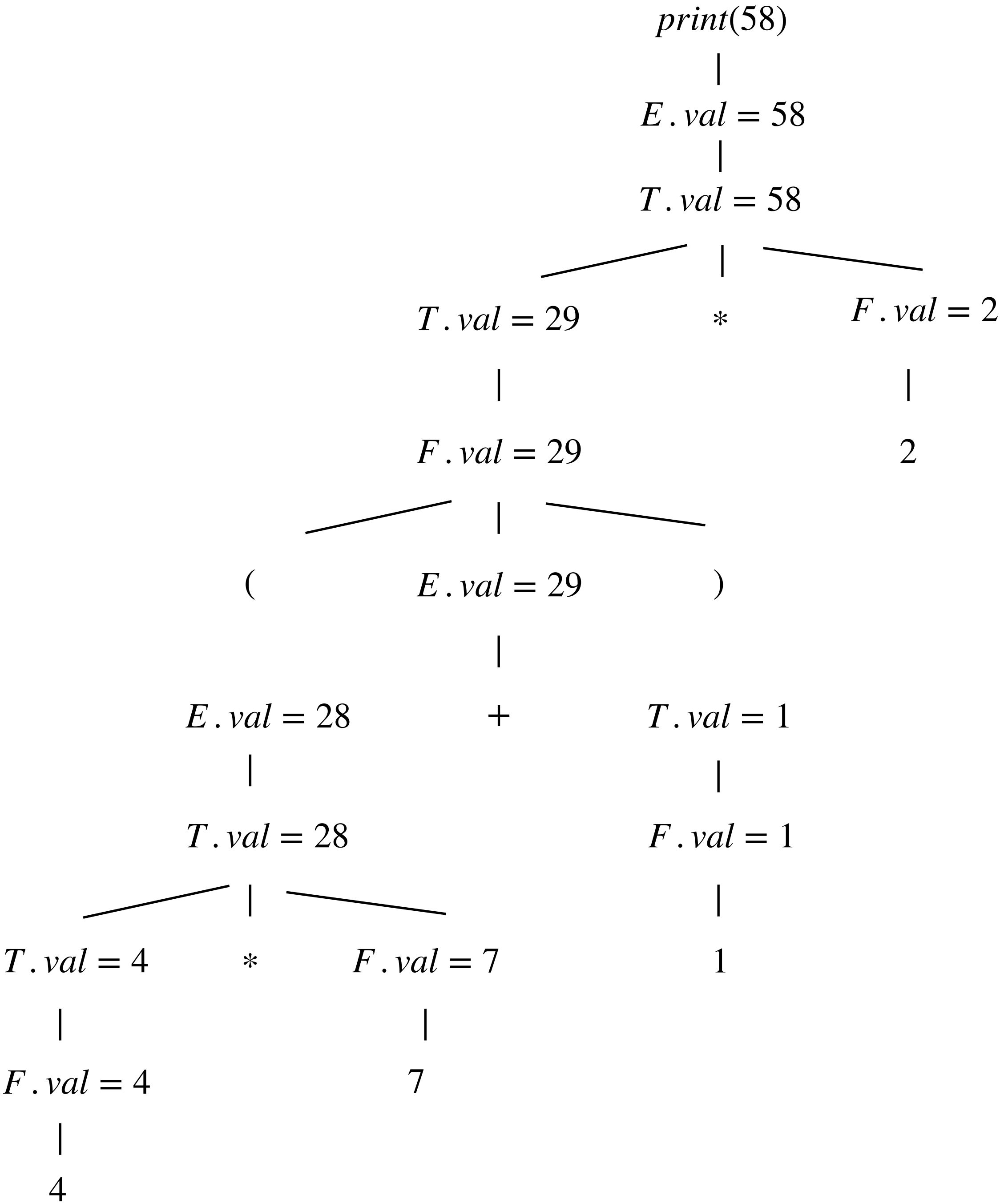


Compilers Assignment 8

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(1)



(2)

$S \rightarrow E$

print(E.code)

$E \rightarrow E_1 E_2 +$

$E.code = E_1.code + ' + ' + E_2.code$

$E.op = ' + '$

$E \rightarrow E_1 E_2 *$

if $E_1.op = ' + ' \& E_2.op = ' + ' then$

$E.code = ' (E_1.code + ') * (+ E_2.code + ') '$

else if $E_1.op = ' + ' \& E_2.op = ' * ' then$

$E.code = ' (E_1.code + ') * ' + E_2.code$

else if $E_1.op = ' * ' \& E_2.op = ' + ' then$

$E.code = E_1.code + ') * (+ E_2.code + ') '$

else

$E.code = E_1.code + ' * ' + E_2.code$

$E \rightarrow id$

$E.code = id.lexval$

3.a

$E \rightarrow TR$

IF $T.type = integer$ and $R.type = integer$ THEN

$E.type = integer$

ELSE

$E.type = double$

$R \rightarrow +TR$

IF $T.type = integer$ and $R.type = integer$ THEN

$R.type = integer$

ELSE

$R.type = double$

$R \rightarrow \varepsilon$

$T \rightarrow \text{num.num}$

$T.type = double$

$T \rightarrow \text{num}$

$T.type = integer$

3.b

$S \rightarrow E$	$print(E.code)$		
$E \rightarrow TR$	$IF R.type = null THEN$ $E.code = valtostr(T.val)$ $E.type = T.type$ $ELSE$ $IF T.type = integer and R.type = integer THEN$ $E.type = integer$ $E.val = T.val + R.val$ $R.code = ' + ' valtostr(T.val) valtostr(R.val)$ $ELSE$ $IF T.type = integer THEN$ $T.val = inttoreal(T.val)$ $IF R.type = integer THEN$ $R.val = inttoreal(T.val)$ $R.val = T.val + R.val$ $E.code = ' + ' valtostr(R.val) valtostr(T.val)$	$R \rightarrow + TR$	$IF R.type = null THEN$ $R.code = valtostr(T.val)$ $R.type = T.type$ $ELSE$ $IF T.type = integer and R.type = integer THEN$ $R.type = integer$ $R.val = T.val + R.val$ $R.code = ' + ' valtostr(T.val) valtostr(R.val)$ $ELSE IF T.type = double or R.type = double THEN$ $IF T.type = integer THEN$ $T.val = inttoreal(T.val)$ $IF R.type = integer THEN$ $R.val = inttoreal(T.val)$ $R.val = T.val + R.val$ $R.code = ' + ' valtostr(R.val) valtostr(T.val)$
$R \rightarrow \epsilon$	$R.code = ''$ $R.type = null$	$T \rightarrow num.num$	$T.type = double$ $T.val = num.num.lexval$ $T.code = num.num.lexval$
		$T \rightarrow num$	$T.type = integer$ $T.val = num.lexval$ $T.code = num.lexval$

Note: function ‘valtostr’ is used to convert number value into a char string.