Attribute Grammars: examples

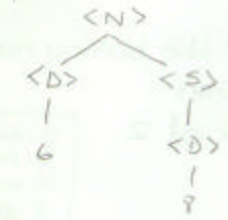
Translating Decimal Numbers between 0 and 99 into English Phrases

Grammar:

① <number> ::= <digit>
② <number> ::= <digit> <set_digit>
③ <set_digit> ::= <digit>
④ <digit> ::= 0 | 1 | ... | 9

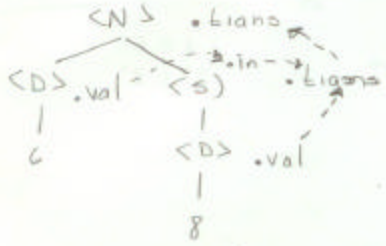
<N> ::= <D>
<N> ::= <D> <S>
<S> ::= <D>
<D> ::= 0 | 1 | ... | 9

Example: 68



Attributes???

D.val (value of the digit)
N.trans (translation of the number)
S.in (value from D of other branch)
S.trans (calculated using D.val & S.in)



Defined ← Syn LHS, In RHS

Used ← Syn RHS, In LHS

	<N>	<D>	<S>
In			in
Syn	trans	val	trans

	Defined	Used
1	N.trans	D.val
2	N.trans, S.in	D.val, S.trans
3	S.trans	S.in, D.val
4...	D.val	

Give function definitions

if n is multiple of 10 then decade (n div 10)
else if n<20 then spell (n)
else decade (n div 10) || spell (n mod 10)

Obtaining the Decimal Value of a Binary Number

Grammar:

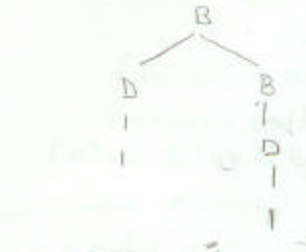
1) <binary> ::= <digit> | <B> ::= <D>
2) <binary> ::= <digit> <binary> | <B> ::= <D> <B>
3) <digit> ::= 0 | <D> ::= 0
4) <digit> ::= 1 | <D> ::= 1

Example: 11

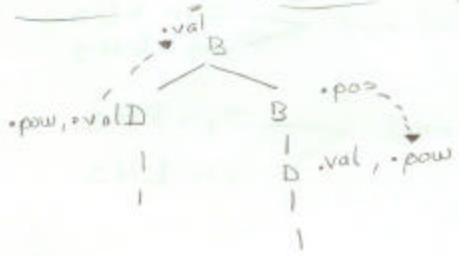
Attributes???

val: accumulated value of the binary number
pos: keep track of position
power: means the power of 2

D.val
D.pow
B.val
B.pos



Ex: 11 (2^1 2^0) 101 (2^2 2^1 2^0)



	B	D
In		pow
Syn	pos, val	val

	Defined	Used
1	B.pos, B.val, D.pow	D.val
2	B_1.pos, B.val, D.pow	B_2.pos, B_2.val, D.val
3	D.val	D.pow
4	D.val	D.pow

Define function definitions