

## Homework 8: 属性文法

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### 1. 写出下面文法的属性文法

$$Number \rightarrow Number_1 Digit$$

$$Number \rightarrow Digit$$

$$Digit \rightarrow 0 \mid 1 \mid 2 \mid 3 \mid 4 \mid 5 \mid 6 \mid 7 \mid 8 \mid 9$$

解答

文法规则	语义规则
$Number \rightarrow Number_1 Digit$	$Number.val = Number_1.val \times 10 + Digit.val$
$Number \rightarrow Digit$	$Number.val = Digit.val$
$Digit \rightarrow 0$	$Digit.val = 0$
$Digit \rightarrow 1$	$Digit.val = 1$
$\dots$	$\dots$
$Digit \rightarrow 9$	$Digit.val = 9$

## 2. 写出下面文法的属性文法

$$Number \rightarrow Digit\ Number_1$$

$$Number \rightarrow Digit$$

$$Digit \rightarrow 0 \mid 1 \mid 2 \mid 3 \mid 4 \mid 5 \mid 6 \mid 7 \mid 8 \mid 9$$

解答

文法规则	语义规则
$Number \rightarrow Digit\ Number_1$	$Number.exp = Number_1.exp \times 10$ $Number.val = Digit.val \times Number.exp + Number_1.val$
$Number \rightarrow Digit$	$Number.exp = 1$ $Number.val = Digit.val$
$Digit \rightarrow 0$	$Digit.val = 0$
$Digit \rightarrow 1$	$Digit.val = 1$
...	...
$Digit \rightarrow 9$	$Digit.val = 9$

## 3. 十进制浮点数的文法修改如下

$$dnum \rightarrow num.snum$$

$$num \rightarrow num_1\ digit \mid digit$$

$$snum \rightarrow digit\ snum_1 \mid digit$$

$$digit \rightarrow 0 \mid 1 \mid 2 \mid 3 \mid 4 \mid 5 \mid 6 \mid 7 \mid 8 \mid 9$$

解答

文法规则	语义规则
$dnum \rightarrow num.snum$	$dnum.val = num.val + snum.val$
$num \rightarrow num_1\ digit$	$num.val = num_1.val \times 10 + digit.val$
$num \rightarrow digit$	$num.val = digit.val$
$snum \rightarrow digit\ snum_1$	$snum.val = digit.val/10 + snum_1.val/10$
$snum \rightarrow digit$	$snum.val = digit.val/10$
$digit \rightarrow 0$	$digit.val = 0$
$digit \rightarrow 1$	$digit.val = 1$
...	...
$digit \rightarrow 9$	$digit.val = 9$