

## 第五章 属性文法 1-1 课后作业

1. 写出下面文法的属性文法：

$$\begin{aligned} \text{Number} &\rightarrow \text{Number1 Digit} \\ \text{Number} &\rightarrow \text{Digit} \\ \text{Digit} &\rightarrow 0 \mid 1 \mid 2 \mid 3 \mid 4 \mid 5 \mid 6 \mid 7 \mid 8 \mid 9 \end{aligned}$$

Number 的属性为 val, Digit 的属性为 lexval。

| 产生式                                              | 属性文法规则                                                              |
|--------------------------------------------------|---------------------------------------------------------------------|
| $\text{Number} \rightarrow \text{Number1 Digit}$ | $\text{Number.val} = \text{Number1.val} * 10 + \text{Digit.lexval}$ |
| $\text{Number} \rightarrow \text{Digit}$         | $\text{Number.val} = \text{Digit.lexval}$                           |
| $\text{Digit} \rightarrow d$                     | $\text{Digit.lexval} = d$                                           |

2. 写出下面文法的属性文法：

$$\begin{aligned} \text{Number} &\rightarrow \text{Digit Number1} \\ \text{Number} &\rightarrow \text{Digit} \\ \text{Digit} &\rightarrow 0 \mid 1 \mid 2 \mid 3 \mid 4 \mid 5 \mid 6 \mid 7 \mid 8 \mid 9 \end{aligned}$$

Number 的属性为 val 和 len, Digit 的属性为 lexval。

| 产生式                                              | 属性文法规则                                                                                                                                   |
|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| $\text{Number} \rightarrow \text{Digit Number1}$ | $\text{Number.val} = \text{Digit.lexval} * 10^{\text{Number1.len}} + \text{Number1.val}$<br>$\text{Number.len} = \text{Number1.len} + 1$ |
| $\text{Number} \rightarrow \text{Digit}$         | $\text{Number.val} = \text{Digit.lexval}$                                                                                                |
| $\text{Digit} \rightarrow d$                     | $\text{Digit.lexval} = d$                                                                                                                |

3. 十进制浮点数的文法修改如下：

$$\begin{aligned} dnum &\rightarrow num.snum \\ num &\rightarrow num1 digit \mid digit \\ snum &\rightarrow digit snum1 \mid digit \\ digit &\rightarrow 0 \mid 1 \mid 2 \mid 3 \mid 4 \mid 5 \mid 6 \mid 7 \mid 8 \mid 9 \end{aligned}$$

dnum 的属性为 val, num 的属性为 val, snum 的属性为 val 和 len, digit 的属性为 lexval。

| 产生式                                          | 属性文法规则                                                                                                                         |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| $\text{dnum} \rightarrow \text{num.snum}$    | $\text{dnum.val} = \text{num.val} + \text{snum.val} / 10^{\text{snum.len}}$                                                    |
| $\text{num} \rightarrow \text{num1 digit}$   | $\text{num.val} = \text{num1.val} * 10 + \text{digit.lexval}$                                                                  |
| $\text{num} \rightarrow \text{digit}$        | $\text{num.val} = \text{digit.lexval}$                                                                                         |
| $\text{snum} \rightarrow \text{digit snum1}$ | $\text{snum.val} = \text{digit.lexval} * 10^{\text{snum1.len}} + \text{snum1.val}$<br>$\text{snum.len} = \text{snum1.len} + 1$ |
| $\text{snum} \rightarrow \text{digit}$       | $\text{snum.val} = \text{digit.lexval}$                                                                                        |
| $\text{digit} \rightarrow d$                 | $\text{digit.lexval} = d$                                                                                                      |